

Hitachi Command Control Interface Command Reference

Hitachi Unified Storage VM

Hitachi Virtual Storage Platform

Hitachi Universal Storage Platform V/VM

Hitachi TagmaStore® USP/NSC

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Preface

This document describes and provides instructions for using the Hitachi Command Control Interface (CCI) software to configure and perform operations on the RAID storage systems.

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

This preface includes the following information:

- ☐ [Intended audience](#)
- ☐ [Product version](#)
- ☐ [Document revision level](#)
- ☐ [Changes in this revision](#)
- ☐ [Referenced documents](#)
- ☐ [Document organization](#)
- ☐ [Document conventions](#)
- ☐ [Convention for storage capacity values](#)
- ☐ [Accessing product documentation](#)
- ☐ [Getting help](#)
- ☐ [Comments](#)

Intended audience

This document is intended for system administrators, Hitachi Data Systems representatives, and authorized service providers who are involved in installing, configuring, and operating the storage system.

This document assumes the following:

- The user has a background in data processing and understands RAID storage systems and their basic functions.
- The user is familiar with the Hitachi RAID storage system and has read the User and Reference Guide for the storage system (for example, *Hitachi Virtual Storage Platform User and Reference Guide*).
- The user is familiar with the Storage Navigator software and has read the Storage Navigator User Guide for the storage system.

Product version

Hitachi Command Control Interface software version 01-29-03 or later.

Document revision level

Revision	Date	Description
MK-90RD7009-00	Oct 2010	Initial Release
MK-90RD7009-01	Dec 2010	Revision 1, supersedes and replaces MK-90RD7009-00
MK-90RD7009-02	Jan 2011	Revision 2, supersedes and replaces MK-90RD7009-01
MK-90RD7009-03	Apr 2011	Revision 3, supersedes and replaces MK-90RD7009-02
MK-90RD7009-04	Jun 2011	Revision 4, supersedes and replaces MK-90RD7009-03
MK-90RD7009-05	Aug 2011	Revision 5, supersedes and replaces MK-90RD7009-04
MK-90RD7009-06	Nov 2011	Revision 6, supersedes and replaces MK-90RD7009-05
MK-90RD7009-07	Mar 2012	Revision 7, supersedes and replaces MK-90RD7009-06
MK-90RD7009-08	Jul 2012	Revision 8, supersedes and replaces MK-90RD7009-07
MK-90RD7009-09	Sep 2012	Revision 9, supersedes and replaces MK-90RD7009-08
MK-90RD7009-10	Nov 2012	Revision 10, supersedes and replaces MK-90RD7009-09

Changes in this revision

- Added information about Hitachi Thin Image throughout the document.
- Added the following new commands:
 - [raidcom add snapshot on page 5-92](#)
 - [raidcom delete snapshot on page 5-93](#)
 - [raidcom modify snapshot on page 5-94](#)
 - [raidcom get snapshot on page 5-95](#)
- Added tiering functionality (options, output) to the following commands: [raidcom get ldev on page 5-45](#), [raidcom modify ldev on page 5-55](#).

- Added information about the R-Time value (retention time for write protect) that is output by the raidvchkdsp command ([raidvchkdsp on page 2-77](#)).
- Added -check_status options to the raidcom get ldev command ([raidcom get ldev on page 5-45](#)).
- Updated the description of the POLF (pool full) condition (displayed by raidvchkscan, raidcom get pool, raidcom get snap_pool, raidcom get dp_pool, and raidcom get pool).

Referenced documents

Hitachi Command Control Interface documents:

- *Hitachi Command Control Interface Installation and Configuration Guide, MK-90RD7008*
- *Hitachi Command Control Interface User and Reference Guide, MK-90RD7010*

Hitachi Unified Storage VM documents:

- *Hitachi Unified Storage Block Module Provisioning Guide, MK-92HM7012*
- *Hitachi ShadowImage® User Guide, MK-92HM7013*
- *Hitachi Storage Navigator User Guide, MK-92HM7016*
- *Hitachi Storage Navigator Messages, MK-92HM7017*
- *Hitachi TrueCopy® User Guide, MK-92HM7018*
- *Hitachi Universal Replicator User Guide, MK-92HM7019*
- *Hitachi Universal Volume Manager User Guide, MK-92HM7020*

Hitachi Virtual Storage Platform documents:

- *Hitachi Copy-on-Write Snapshot User Guide, MK-90RD7013*
- *Provisioning Guide for Mainframe Systems, MK-90RD7021*
- *Provisioning Guide for Open Systems, MK-90RD7022*
- *Hitachi ShadowImage® for Mainframe User Guide, MK-90RD7023*
- *Hitachi ShadowImage® User Guide, MK-90RD7024*
- *Hitachi Storage Navigator User Guide, MK-90RD7027*
- *Hitachi Storage Navigator Messages, MK-90RD7028*
- *Hitachi TrueCopy® User Guide, MK-90RD7029*
- *Hitachi TrueCopy® for Mainframe User Guide, MK-90RD7030*
- *Hitachi Universal Replicator for Mainframe User Guide, MK-90RD7031*
- *Hitachi Universal Replicator User Guide, MK-90RD7032*
- *Hitachi Universal Volume Manager User Guide, MK-90RD7033*

Hitachi Universal Storage Platform V/VM documents:

- *Hitachi Copy-on-Write Snapshot User Guide, MK-96RD607*
- *LUN Manager User's Guide, MK-96RD615*

- *Hitachi ShadowImage for IBM® z/OS® User Guide*, MK-96RD619
- *Hitachi ShadowImage® User Guide*, MK-96RD618
- *Hitachi Storage Navigator User Guide*, MK-96RD621
- *Hitachi Storage Navigator Messages*, MK-96RD613
- *Hitachi TrueCopy® User Guide*, MK-96RD622
- *Hitachi TrueCopy for IBM® z/OS® User's Guide*, MK-96RD623
- *Hitachi Universal Replicator for IBM® z/OS® User's Guide*, MK-96RD625
- *Hitachi Universal Replicator User Guide*, MK-96RD624
- *Hitachi Universal Volume Manager User Guide*, MK-96RD626

Document organization

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

Chapter	Description
Chapter 1, Overview of commands	Provides an overview for the CCI commands.
Chapter 2, Data management commands	Describes the CCI data management commands.
Chapter 3, Subcommands	Describes the CCI subcommands.
Chapter 4, Command tools	Describes the CCI command tools.
Chapter 5, Configuration setting commands	Describes the CCI raidcom commands.

Document conventions

This document uses the following terminology conventions:

Convention	Description
Hitachi RAID storage system	Refers to all supported models, unless otherwise noted. The Hitachi RAID storage systems include the following models: • Hitachi Unified Storage VM (HUS VM) • Hitachi Virtual Storage Platform (VSP) • Hitachi Universal Storage Platform V/VM (USP V/VM) • Hitachi TagmaStore® Universal Storage Platform (TagmaStore USP) and Hitachi TagmaStore® Network Storage Controller (TagmaStore NSC)
Hitachi enterprise storage system	Refers to the Hitachi RAID storage systems except for the Hitachi Unified Storage VM.

This document uses the following typographic conventions:

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click OK .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <i>source-file</i> <i>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: # pairedisplay -g oradb
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # pairedisplay -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.

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

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

Convention for storage capacity values

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

Physical capacity unit	Value
1 KB	1,000 bytes
1 MB	1,000 ² bytes

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

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

Logical capacity unit	Value
1 KB	1,024 bytes
1 MB	1,024 KB or 1,024 ² bytes
1 GB	1,024 MB or 1,024 ³ bytes
1 TB	1,024 GB or 1,024 ⁴ bytes
1 PB	1,024 TB or 1,024 ⁵ bytes
1 EB	1,024 PB or 1,024 ⁶ bytes
1 block	512 bytes

Accessing product documentation

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

Getting help

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

Comments

Please send us your comments on this document: doc.comments@hds.com. Include the document title, number, and revision, and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems.

Thank you!

Overview of commands

This chapter provides an overview of the Hitachi Command Control Interface (CCI) commands.

- [Summary of commands](#)
- [Typographic conventions for command format](#)
- [Differences between CCI and Storage Navigator](#)

Summary of commands

Hitachi Command Control Interface is command-line interface (CLI) software that enables you to perform operations on Hitachi RAID storage systems. CCI can be used from attached hosts and from Storage Navigator computers.

This document describes and provides the specifications for the CCI commands. There are four types of CCI commands:

- [Data management commands on page 1-2](#)
- [Configuration setting commands on page 1-4](#)
- [Command tools on page 1-8](#)
- [Subcommands on page 1-7](#)

Data management commands

Data management operations include data replication and data protection operations. [Table 1-1 Data management commands on page 1-2](#) lists the CCI data management commands in alphabetical order and provides a brief description of each command.

Table 1-1 Data management commands

Command	Description
horcctl	Used for both maintenance and troubleshooting on TrueCopy. The horcctl command allows you to change and display the internal trace control parameters (for example, level, type, buffer size) of the HORC Manager and/or TrueCopy commands. If a new value is not specified to a parameter, the trace control parameter that is specified currently is displayed.
horcmshutdown	Script for stopping HORCM.
horcmstart	Script that starts HORCM. This script can also set the environment variables for HORCM as needed (for example, HORCM_CONF, HORCM_LOG, HORCM_LOGS).
horctakeoff	Scripted command for executing multiple HORC operation commands combined. It checks the volume attribute (optionally specified) and decides a takeover action. The horctakeoff operation is defined to change from 3DC multi-target to 3DC multi-hop with the state of running APP, after that the horctakeover command can configure 3DC multi-target on the remote site without stopping the application. The granularity of either a logical volume or volume group can be specified with this command.
horctakeover	Scripted command for executing multiple TrueCopy takeover operations. It checks the specified volume's or group's attributes (paircurchk), decides the takeover function based on the attributes, executes the chosen takeover function, and returns the result.
paircreate	Creates a new volume pair from two unpaired volumes.
paircurchk	Checks the current status of the secondary volume(s) by evaluating the data consistency based on pair status and fence level.

Command	Description
pairdisplay	Displays the pair status allowing you to verify completion of pair operations (for example, paircreate, pairresync). The pairdisplay command is also used to confirm the configuration of the pair volume connection path (the physical link of paired volumes and servers).
pairevtwait	Waits for completion of pair creation and pair resynchronization and confirms the status of pair operations
pairmon	Obtains the pair status transition of each volume pair and reports it. If the pair status changes (due to an error or a user-specified command), the pairmon command issues a message.
pairresync	Re-establishes a split pair volume and then restarts the update copy operations to the secondary volume. The pairresync command can resynchronize either a paired logical volume or a group of paired volumes.
pairsplit	Splits and deletes volume pairs.
pairsyncwait	Used to confirm data consistency between the P-VOL and S-VOL by confirming that required writing was stored in the DFW area of RCU, and confirming whether the last writing just before this command reached the RCU DFW area.
pairvolchk	Checks the attributes and status of a pair volume. It acquires and reports the attribute of a volume or group connected to the local host (issuing the command) or remote host. The volume attribute is SMPL (simplex), P VOL (primary volume), or S VOL (secondary volume).
raidar	Displays the status and I/O activity information for the specified port/TID(s)/LUN(s) at the specified time interval. The configuration information is acquired directly from the storage system (not from the configuration definition file).
raidqry	Displays the configuration of the connected host and RAID storage system.
raidscan	Displays the status information for the specified port/TID(s)/LUN(s)/MU#(s). The information is acquired directly from the storage system (not the configuration definition file).
raidvchkdsp	Displays the parameters for data validation of the specified volumes. Unit of checking for the validation is based on the group of CCI configuration definition file.
raidvchkscan	Displays the fibre port of the storage system (9900V and later), target ID, LDEV mapped for LUN#, and LDEV status, regardless of the configuration definition file.
raidvchkscan (for UR/URz)	Supports the (-v jnl [t] [unit#]) option to find the journal volume list setting. It also displays any information for the journal volume. The Universal Replicator function is available on the USP V/VM and TagmaStore USP/TagmaStore NSC storage systems.
raidvchkscan (for Thin Image, Copy-on-Write Snapshot pool and Dynamic Provisioning)	Supports the option (-v pid[a] [unit#]) to find the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool settings, and displays information for the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

Command	Description
raidvchkset	If you sets the parameters for data validation of the specified volumes, all of the validation checking can be set to off without specifying [type]. Unit of checking for the validation is based on the group of CCI configuration definition file.

Configuration setting commands

[Table 1-2 Configuration setting commands on page 1-4](#) lists and describes the CCI configuration setting commands. The configuration setting commands include all commands that begin with “raidcom”.

Table 1-2 Configuration setting commands

Command	Description
raidcom add copy_grp	Creates a copy group.
raidcom delete copy_grp	Deletes a copy group.
raidcom get copy_grp	Displays copy group information.
raidcom add device_grp	Creates a device group.
raidcom delete device_grp	Deletes a device group.
raidcom get device_grp	Displays a device group.
raidcom add external_grp	Maps an external volume.
raidcom delete external_grp	Unmaps an external volume.
raidcom check_ext_storage external_grp	Checks the connection for an external volume and restarts using.
raidcom disconnect external_grp	Disconnects the connection for an external volume.
raidcom get external_grp	Displays the external volume information that is already registered.
raidcom modify external_grp	Changes the attribute of an external volume.
raidcom discover external_storage	Searchs the external storage information.
raidcom add host_grp	Creates a host group.
raidcom delete host_grp	Deletes a host group.
raidcom modify host_grp	Sets the host mode.
raidcom get host_grp	Displays the host group information.
raidcom add hba_wwn	Registers a host to a host group.
raidcom delete hba_wwn	Deletes a host (WWN) from a host group.
raidcom get hba_wwn	Displays WWN information of a registered host adapter.
raidcom add journal	Registers a journal volume to a journal.
raidcom delete journal	Deletes a journal volume from a journal. and delete the journal.
raidcom modify journal	Changes an option of Universal Replicator to be used at a journal.
raidcom get journal	Displays a journal group information.
raidcom get ldev	Displays LDEV information.

Command	Description
raidcom extend ldev	Extends the virtual volume capacity of V-VOL.
raidcom add ldev	Creates LDEV or V-VOL.
raidcom delete ldev	Deletes LDEV or V-VOL.
raidcom modify ldev	Changes the attribute of an LDEV.
raidcom initialize ldev	Formats an LDEV.
raidcom add lun	Sets the LU paths.
raidcom delete lun	Deletes a LU path on the host group of the specified port.
raidcom get lun	Displays LU path information.
raidcom discover lun	Searchs the external volume information.
raidcom add path	Adds an external path for Universal Volume Manager to the existed path group.
raidcom delete path	Deletes an external path for Universal Volume Manager.
raidcom check_ext_storage path	Recovers a path for the external volume.
raidcom disconnect path	Stops a path for the external volume.
raidcom get path	Displays an external path for Universal Volume Manager.
raidcom delete pool	Deletes a pool.
raidcom modify pool	Sets an option of a pool.
raidcom get pool	Displays pool information.
raidcom rename pool	Changes the pool name.
raidcom monitor pool	Starts or stops the performance monitoring pool for Dynamic Tiering and Dynamic Tiering for Mainframe.
raidcom reallocate pool	Starts or stops a relocation of the Dynamic Tiering and Dynamic Tiering for Mainframe pool.
raidcom modify port	Sets port.
raidcom get port	Displays Port information.
raidcom get parity_grp	Displays a parity group information.
raidcom get rcu	Displays RCU information.
raidcom add rcu	Registers an RCU.
raidcom delete rcu	Deletes an RCU.
raidcom modify rcu	Sets an attribute of RCU.
raidcom add rcu_path	Add a logical path of RCU.
raidcom delete rcu_path	Deletes a logical path between RCUs.
raidcom add ssid	Adds an SSID to an RCU.
raidcom delete ssid	Deletes an SSID from an RCU.
raidcom lock resource	Locks a resource.
raidcom unlock resource	Unlocks a resource.
raidcom add resource	Creates a resource group and adds a resource to a resource group.

Command	Description
raidcom delete resource	Deletes a resource group and deletes Deletes a resource from a resource group.
raidcom get resource	Displays resource group information.
raidcom add snap_pool	Creates a pool for Thin Image or Copy-on-Write Snapshot.
raidcom get snap_pool	Displays pool information for Thin Image or Copy-on-Write Snapshot.
raidcom add dp_pool	Creates a pool for Dynamic Provisioning and Dynamic Provisioning for Mainframe.
raidcom get dp_pool	Displays pool information for Dynamic Provisioning, Dynamic Provisioning for Mainframe, Dynamic Tiering, and Dynamic Tiering for Mainframe.
raidcom set hba_wwn	Sets a nickname to the WWN specified on the specified port.
raidcom reset hba_wwn	Deletes a nickname from the WWN specified on the specified port.
raidcom get command_status	Displays an error information of the configuration setting command which is executed asynchronously.
raidcom reset command_status	Resets an error information of the configuration setting command which is executed asynchronously.
raidcom get error_message	Displays the error message for an error code.
raidcom get clpr	Displays the CLPR information.
raidcom modify clpr	Modifies a CLPR, including migrating LDEVs, parity groups, and external volume groups to other CLPRs.
raidcom add spm_wwn	Specifies the Server Priority Manager name for preferred/non-preferred WWNs.
raidcom add spm_group	Registers Server Priority Manager target WWN to Server Priority Manager group.
raidcom delete spm_wwn	Deletes WWN from the Server Priority Manager targets.
raidcom delete spm_group	Deletes the Server Priority Manager target WWN from the Server Priority Manager group.
raidcom modify spm_wwn	Specifies the Server Priority Manager information to the Server Priority Manager target WWN.
raidcom modify spm_group	Specifies the Server Priority Manager information to the Server Priority Manager target group.
raidcom get spm_wwn	Gets the Server Priority Manager information of the Server Priority Manager target WWN.
raidcom get spm_group	Gets the Server Priority Manager information of the Server Priority Manager target WWN by the Server Priority Manager group unit.
raidcom monitor spm_wwn	Gets the monitoring information of Server Priority Manager target WWN.

Command	Description
raidcom monitor spm_group	Gets the monitoring information of Server Priority Manager target WWN by the Server Priority Manager group unit.
raidcom add snapshot	Creates new snapshot groups and adds ldevs to snapshot groups.
raidcom delete snapshot	Deletes snapshot data and snapshot groups.
raidcom modify snapshot	Modifies snapshot groups.
raidcom get snapshot	Displays snapshot group and snapshot data information.

Subcommands

CCI provides subcommands that are executed as options of CCI commands. The CCI subcommands include the Windows subcommands and the environment variable subcommands. [Table 1-3 Windows subcommands on page 1-7](#) lists the Windows subcommands in alphabetical order and provides a brief description of each subcommand. [Table 1-4 Environment variable subcommands on page 1-7](#) lists the environment variable subcommands in alphabetical order and provides a brief description of each subcommand.

Table 1-3 Windows subcommands

Subcommand	Description
drivescan	Displays the relationship between the disk numbers assigned by the Windows system and the LDEVs on the RAID storage system, and also displays attribute and status information for each LDEV.
findcmddev	Searches for command devices within the specified range of disk drive numbers. If it is found, the command device appears in the same format as in the configuration definition file. This subcommand is used when the command device name is not known and when the HORCM is not started.
mount	Mounts the specified drive to the specified partition on the specified hard disk drive using the drive letter. When the mount subcommand is executed without an argument, all currently mounted drives (including directory mounted volumes) are displayed, and logical drive has been mounting an LDM volume then displays Harddisk#[n] configured an LDM volume.
portscan	Displays the devices on the specified port(s).
sync and syncd	The sync (synchronization) Windows subcommand sends unwritten data remaining on the Windows server to the specified device(s) to synchronize the pair(s) before the CCI command is executed. The syncd (sync delay) Windows subcommand waits the delayed IO for dismount after issued "sync".

Table 1-4 Environment variable subcommands

Subcommand	Description
env	Displays the environment variables.
setenv	Sets the specified environment variables.

Subcommand	Description
sleep	Causes CCI to wait for the specified time.
usetenv	Deletes the specified environment variables.

Command tools

[Table 1-5 Command tools on page 1-8](#) lists and describes the CCI command tools.

Table 1-5 Command tools

Subcommand	Description
inraid	Used to confirm the drive connection between the storage system and host system. The inraid command displays the relation between special file(s) on the host system and actual physical drive of the RAID storage system.
mkconf	Used to make a configuration file from a special file (raw device file) provided via STDIN.

Typographic conventions for command format

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click OK .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <i>source-file</i> <i>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: # pairedisplay -g oradb
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # pairedisplay -g <group> Note: Italic is also used to indicate variables.
[] square brackets	Indicates optional values. Example: [a b] indicates that you can choose a, b, or nothing.
{ } braces	When items in braces are set off with vertical bars: - Indicates required or expected values. Example: { a b } indicates that you must choose either a or b. When items in braces are enclosed by square brackets: - Indicates one or more items can be specified. Example: { [-A][-B][-C] } indicates that you can specify one or more items from A, B, or C.

Convention	Description
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.
... ellipsis	Indicates that the user can type multiple arguments of the same type. The user types only the information, not the ellipsis (...). Example: -ldev_id <ldev#> ... Multiple "ldev_id<ldev#>" can be specified.

Differences between CCI and Storage Navigator

This section describes the differences between CCI and Storage Navigator:

- [Supported characters on page 1-9](#)
- [Maximum number of characters on page 1-11](#)

Supported characters

There are some differences between the supported characters for CCI and the supported characters for Storage Navigator. Because of this, you should always use only characters that are supported by both CCI and Storage Navigator.

[Figure 1-1 Usable characters for CCI commands on page 1-10](#) shows the characters that can be used in CCI commands and their ASCII codes. [Figure 1-2 Usable characters for Storage Navigator on page 1-11](#) shows the characters that can be used in Storage Navigator commands and their ASCII codes. For CCI do not use characters that are not supported by the operating system in which the command is executed.

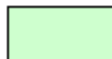
The following characters are not supported by both CCI and Storage Navigator. To ensure that names are usable in both CCI and Storage Navigator, do not use these characters in names.

- SP (space)
- ! (exclamation mark)
- " (quotation mark)
- # (number sign)
- \$ (dollar sign)
- % (percent sign)
- & (ampersand)
- ' (apostrophe)
- ((left parenthesis)
-) (right parenthesis)
- + (plus sign)
- · (middle dot)

- { (left curly bracket)
- } (right curly bracket)
- | (vertical line)
- ~ (tilde)
- : (colon)
- = (equals sign)

The backslash character "\" can be used only on WIN32. The forward slash character "/" can be used only on UNIX series (except WIN32).

Low4 bits	High3 bits							
	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	\$	4	D	T	d	t
5	ENQ	NAC	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF/NL	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

 : usable

 : unusable

Figure 1-1 Usable characters for CCI commands

Low4 bits	High3 bits							
	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	\$	4	D	T	d	t
5	ENQ	NAC	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF/NL	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

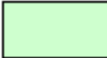
 : usable
 : unusable

Figure 1-2 Usable characters for Storage Navigator

Maximum number of characters

There are some differences between the maximum number of characters for names in CCI commands and the maximum number of characters for names in Storage Navigator. Because of this, you should always try to use the number of characters that can be used in both CCI and Storage Navigator.

If you enter more than the maximum number of characters for a name in a CCI command, the name is truncated and only the allowable number of characters is used. For example, if the maximum number of characters is 32 and you enter 35 characters, only the first 32 characters are used.

[Table 1-6 Maximum number of characters on page 1-12](#) specifies the maximum number of characters for names in CCI and Storage Navigator. To ensure that names are usable in both CCI and Storage Navigator, observe the following requirements:

- WWN nickname: Do not use more than 32 characters.
- User ID: Do not use more than 63 characters.
- Password: Do not use more than 63 characters.

Table 1-6 Maximum number of characters

Name	CCI command	Storage Navigator
Host group name	64 characters	64 characters
Device group name	32 characters	-
Device name	32 characters	-
LDEV nickname	32 characters	32 characters
WWN nickname	32 characters	64 characters
Copy group name	32 characters	32 characters
Pool name	32 characters	32 characters
Resource group name	32 characters	32 characters
User name (User ID)	63 characters	256 characters
User name (Password)	63 characters	256 characters

Operational differences

[Table 1-7 Operational differences between CCI and Storage Navigator on page 1-12](#) lists the operational differences between CCI and Storage Navigator.

Table 1-7 Operational differences between CCI and Storage Navigator

Operation	CCI	Storage Navigator
Add path or change path for an external volume (UVM)	The path definition is required for each external volume in the path group.	You can specify the path groups on the screen and execute the add/change path at one time.
Operations when a program product is not installed	You can change and delete existing resources for this program product, but you cannot add new resources.	You cannot perform any operations for this program product.
Display of WWN	The WWN is displayed only when LUN security is enabled.	The WWN is displayed (in gray) when LUN security is disabled.
Pool ID setting	Optional	Required

Operation	CCI	Storage Navigator
Add LDEV	You can specify the LDEV size in GB or LBA. When you specify GB, CCI does not perform size correction. If the capacity of LDEVs that are created by each GUI and CLI are the same, a copy pair might not be created. To create a pair with the LDEV that is created by GUI, create an LDEV by specifying LBA.	You can specify the LDEV size in GB or LBA. When you specify GB, CCI performs size correction.
Extending the capacity of Dynamic Provisioning or Dynamic Provisioning for Mainframe volume	You need to specify the capacity to be added to the volume.	You need to specify the total capacity after the volume is extended.
Moving the CLPR assigned to the parity groups of LUSE volumes or the parity groups of the volumes including LUSE volumes	CLPRs can be moved, but it is not recommended.	CLPRs cannot be moved.
Deleting SPM name	The registration of the SPM name in the specified port is released by deleting the SPM name from WWN.	The SPM name of WWN is deleted, but the SPM registration is maintained.
Deleting SPM group	The registration of SPM in the specified port is released by deleting WWN from the group.	WWN is deleted from the group, but the SPM registration is maintained.

Data management commands

This chapter provides the specifications for the CCI data management (replication and protection) commands.

- ☐ [paircreate](#)
- ☐ [pairsplit](#)
- ☐ [pairresync](#)
- ☐ [pairevtwait](#)
- ☐ [pairmon](#)
- ☐ [pairvolchk](#)
- ☐ [pairdisplay](#)
- ☐ [paircurchk](#)
- ☐ [horctakeover](#)
- ☐ [raidscan](#)
- ☐ [raidar](#)
- ☐ [raidqry](#)
- ☐ [raidvchkset](#)
- ☐ [raidvchkdsp](#)
- ☐ [raidvchkscan](#)

- ☐ [raidvchkscan for Universal Replicator](#)
- ☐ [raidvchkscan for Thin Image, Copy-on-Write Snapshot, and Dynamic Provisioning](#)
- ☐ [horcmstart](#)
- ☐ [horcmshutdown](#)
- ☐ [horcctl](#)
- ☐ [horctakeoff](#)
- ☐ [pairsyncwait](#)

paircreate



WARNING: Use the **paircreate** command with caution. The command starts the initial copy operation, which overwrites all data on the secondary/target volume of the pair. If the primary and secondary volumes are not identified correctly, or if the wrong options are specified (for example, vl instead of vr), data is copied to the wrong volume overwriting and the data in the target of transferring will be overwritten.

The *paircreate* command is used to create a new volume pair from two unpaired volumes. The *paircreate* command can create either a paired logical volume or a group of paired volumes. The *paircreate* command allows you to specify the direction (local or remote) of the pair generation (see [Figure 2-1 Pair Creation on page 2-3](#)). If local (vl option) is specified, the server issuing the *paircreate* command has the primary volume. If remote (vr option) is specified, the remote server has the primary volume. The -split option of the *paircreate* command (ShadowImage/Copy-on-Write Snapshot only) allows you to simultaneously create and split pairs using a replication command only. When -split is used, the pair status changes from COPY to PSUS (instead of PAIR) when the initial copy operation is complete.

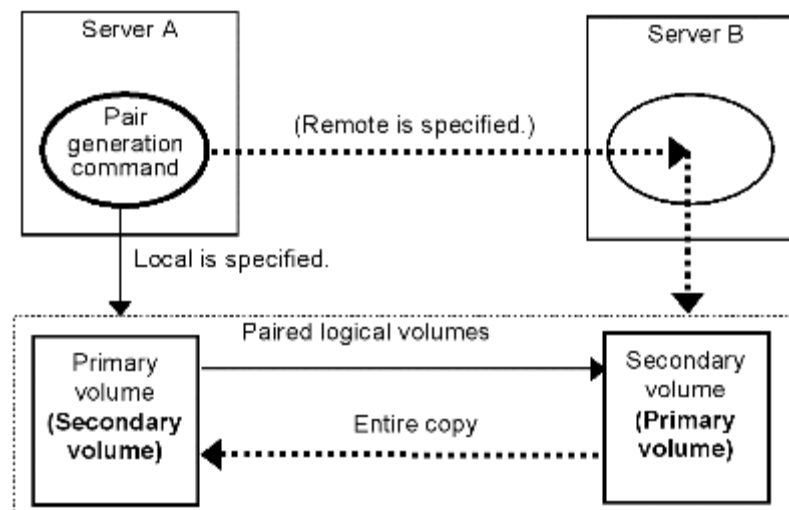


Figure 2-1 Pair Creation

Before issuing the *paircreate* command, make sure that the secondary volume is not mounted on any system. If the secondary volume is found to be mounted after *paircreate*, delete the pair (*pairsplit -S*), unmount the secondary volume, and then reissue the *paircreate* command.

The *paircreate* command terminates before the initial copy operation is complete (except when the *nocopy* option is specified). Use the *pairevtwait* or *pairdisplay* command to verify that the initial copy operation completed successfully (status changes from COPY to PAIR, or from COPY to PSUS if the -split option was specified).

Syntax

```
paircreate { -h | -q | -z | -I[H][M][instance#] or
             I[TC][SI][instance#] | -g <group> | -d <pair Vol> | -d[g]
             <raw_device> [MU#] | -FHORC [MU#] -d[g] <seq#> <LDEV#> [MU#]
```

```
| -f[g] <fence> [CTGID] | -v | -c <size> | -nocopy | -nomsg
| -split | [-m <mode>] | -jp <id> | -jq <id> | -js <id>
| -pid <PID> | -fq <mode> | -cto <o-time> <c-time> <r-time>
| -nocsus | -pvol(svol) [ldevgrp]}
```

Options and parameters

Option	Description
-h	Displays help/usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the <i>paircreate</i> command enter interactive mode. The -zx option guards performing of the HORCM in interactive mode. When this option detects a HORCM shutdown, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name defined in the configuration definition file. The command is executed for the specified group unless the <i>-d <pair Vol></i> option is specified.
-d <pair Vol>	Specifies paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volume.
-d[g] <raw_devic e> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of <i>-g <group></i> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of <i>"-g <group>"</i> option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-f[g] <fence> [CTGID]	TrueCopy and Universal Replicator only. Specifies the fence level for assuring the consistency of paired volume data. A fence level of "data", "status", "never", or "async" must be specified. This option must always be specified. Fence level "-f async" can be specified only for TrueCopy Async/Universal Replicator. The "-fg" option is used to make TrueCopy Sync CTG volume, and fence level must be specified as "-fg data", "-fg status", or "-fg never". A CTGID (CT Group ID) is assigned automatically if you do not specify the "CTGID" option in this command and define it in the config file. If "CTGID" is not specified (with "-f async" or "-fg" option) and the maximum number of CT groups already exists (for example, 256 for TagmaStore USP/TagmaStore NSC, 128 for 9900V), an EX_ENOCTG error is returned. Therefore, the "CTGID" option can forcibly assign a volume group to an existing CTGID (0-15/63/127/255) on the RAID storage systems. The CTGID option is ignored unless you specify the "-f async" or "-fg" option.

Option	Description
-vl or -vr -pvol [ldevgrp] or -svol [ldevgrp]	Specifies the data flow direction and must always be specified. The -vl(-pvol) option specifies "local" and the host which issues the command possesses the primary volume. The -vr(-svol) option specifies "remote" and the remote host possesses the primary volume while the local host possesses the secondary volume. [ldevgrp] makes the specified LDEV group as the second volume.
-c <size>	TrueCopy/ShadowImage only. Specifies the track size of extents (1 - 15) to be used for the copy operation. If you specify a large number, the time for copy operation will be shortened. When you want to copy in a short time by stopping Write of P-VOL, specify the maximum value 15. If this option is not specified, the default value (3) is used. In TrueCopy for Mainframe, when you specify the number less than 3, the copy speed is 3 tracks. When you specify the number more than 4, the copy speed is 15 tracks. In ShadowImage, when you specify 1 or 2, the copy speed is slow, when you specify 3, the copy speed is medium, and when you specify 4, the copy speed is fast.
-nocopy	TrueCopy/Universal Replicator only Creates paired volumes without copying data when the data consistency of simplex volumes is assured by the user. Note: This option cannot be specified for ShadowImage or ShadowImage for Mainframe.
-nomsg	Suppresses messages to be displayed when this command is executed. It is used to execute this command from a user program. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.
-split	ShadowImage/Copy-on-Write Snapshot only. Splits the paired volume after the initial copy operation is complete. This option will return after changed the state in PVOL_PSUS & SVOL_COPY immediately, and SVOL state is changed to "SVOL_SSUS" after all data is copied.

Option	Description
-m <mode>	Specifies the mode. mode = noread (ShadowImage only): Specifies the noread mode for hiding the secondary volume. The secondary volume becomes read-disabled when this mode option is specified. The secondary volume is read-enabled when this mode option is omitted. Note: The primary volume becomes read-disabled during a reverse resync operation (restore option of pairresync command). mode = cyl (9900V only): sets TrueCopy bitmap difference management to cylinder. mode = trk (9900V only): sets TrueCopy bitmap difference management to track. Note: If the mode (cyl or track) is not specified, the default values are used: default is track for OPEN-3 and OPEN-9; default is cylinder for OPEN-E and OPEN-L. Note: For TrueCopy volumes paired between 9900V storage systems, the bitmap tables are managed at the Cylinder level, even if Track is specified. mode=grp [CTGID] (9900V ShadowImage/Copy-on-Write Snapshot/Volume Migration only). Makes a group for splitting all ShadowImage pairs specified in a group. Like a TrueCopy Async/Universal Replicator consistency group, ShadowImage guarantees data consistency among multiple LUNs in a group at a single point in time when doing a split using the "pairsplit -g <group>" command (except "-S" or "-E" option). A CTGID (CT Group ID) is assigned automatically if you do not specify the "CTGID" option in this command. If "CTGID" is not specified and the maximum number of CT groups already exists, an EX_ENOCTG error is returned. Therefore, the "CTGID" option can forcibly assign a volume group to an existing CTGID (for example, 0-127 on USP V/VM). Note: This option cannot be specified with "-split" option in the same command. mode = cc (Volume Migration only): Specifies the Cruising Copy mode for volume migration. The -vl option specifies "local", and copies from the local instance LU(PVOL) to the remote instance LU(SVOL). An original volume as the local instance LU is migrated from PVOL to SVOL, and the physical volume mapping between PVOL and SVOL is swapped after copied. The -vr option specifies "remote", and copies from the remote instance LU(PVOL) to the local instance LU(SVOL). An original volume as the remote instance LU is migrated from PVOL to SVOL, and the physical volume mapping between PVOL and SVOL is swapped after copied. During maintenance work on the storage system (SVP is in modify mode), this operation cannot be completed. <i>Notes:</i> This option cannot be specified with the "-split" option in the same command. This option ignores the "-c <size>" option.

Option	Description
-jp <id>	Universal Replicator only. Because Universal Replicator has many of the same characteristics as an asynchronous remote copy journal, you can use this option when specifying a journal ID for PVOL. Both the -jp <id> and -js <id> options are valid when the fence level is set to "ASYNC", and each journal ID is automatically bound to the CTGID.
-js <id>	Universal Replicator only. This option is used when specifying a journal ID for SVOL. Both the -jp <id> and -js <id> options are valid when the fence level is set to "ASYNC", and each journal ID is automatically bound to the CTGID.
-pid <PID>	Copy-on-Write Snapshot only. The user or application can specify the Pool ID so that they can specify independent ID for Copy-on-Write Snapshot pool different from [CTGID] for splitting at time. LDEVs in a group which was specified by "PID" belong to the specified Pool for the Copy-on-Write Snapshot. If "PID" is not specified, then the corresponding LDEVs belong to the default pool ID(0). If the specified pool is for Thin Image, a Thin Image pair is created. If the specified pool is for Copy-on-Write Snapshot, a Copy-on-Write Snapshot pair is created.

Option	Description																		
-fq <mode>	ShadowImage only. This option is used when specifying the mode whether "-split" is performed or not as "QUICK".<i>mode = normal</i>. The "<i>paircreate -split</i>" is performed as non-quick mode regardless of setting of \$HORCC_SPLT environment variable and/or the system option mode 122 via SVP. <i>mode = quick</i>: The "<i>paircreate -split</i>" is performed as Quick Split regardless of setting of \$HORCC_SPLT environment variable and/or the system option mode 122 via SVP. If this option is not specified, then the performing of the "Split" depends on \$HORCC_SPLT environment variable and/or the system option mode setting through the SVP, whether the paircreate operation is Quick Split or not. The relationship between "-fq" option and \$HORCC_SPLT is as shown below: <table><tr><th>-fq option</th><th>\$HORCC_SPLT</th><th>Behavior</th></tr><tr><td>quick</td><td>Don't care</td><td>Quick Split</td></tr><tr><td>normal</td><td>Don't care</td><td>Normal Split</td></tr><tr><td>Unspecified</td><td>QUICK</td><td>Quick Split</td></tr><tr><td>Unspecified</td><td>NORMAL</td><td>Normal Split</td></tr><tr><td>Unspecified</td><td>Unspecified</td><td>Depends on system option mode 122</td></tr></table> Notes: This -fq option also is validated on TrueCopy-TrueCopy/ShadowImage cascading operation using "-FBC [MU#]" option. The -fq option is applied for Unified Storage VM, VSP, USP V/VM, and TagmaStore USP/TagmaStore NSC. This option is ignored for Lightning 9900 V, because this behavior is to maintain the compatibility on 9900V, so that you can use the same script added this option.	-fq option	\$HORCC_SPLT	Behavior	quick	Don't care	Quick Split	normal	Don't care	Normal Split	Unspecified	QUICK	Quick Split	Unspecified	NORMAL	Normal Split	Unspecified	Unspecified	Depends on system option mode 122
-fq option	\$HORCC_SPLT	Behavior																	
quick	Don't care	Quick Split																	
normal	Don't care	Normal Split																	
Unspecified	QUICK	Quick Split																	
Unspecified	NORMAL	Normal Split																	
Unspecified	Unspecified	Depends on system option mode 122																	
-FHORC [MU#] or -FCA [MU#]	This option is used when creating the cascading configuration with -g <group> and -gs <group> option from the local node (takeover node). -g <group> is used when specifying the cascading PVOL, and also -gs <group> option is used when specifying the cascading SVOL. This operation ignores the -vl or vr option, because SVOL is specified with -gs <group> option. -gs <group>: This "s" option is used when specifying a group name for cascading SVOL (defined in the configuration definition file). The command is executed for the specified group unless the -ds <pair Vol> option shown below is specified. -ds <pair Vol>: The following options can be specified for cascading S-VOL. -d[g]s <raw_device> [MU#] ... -d[g]s <seq#> <LDEV#> [MU#]																		

Option	Description
<code>-cto <o-time> [c-time] [r-time]</code>	TrueCopy Async and Universal Replicator only. These options are valid for only TrueCopy Async/Universal Replicator. If you specify "-cto <o-time> [c-time] [r-time]" option on TrueCopy Sync, it is ignored. o-time: This option is used when setting "offloading timer" for controlling inflow of write I/O to the specified CT group. For TrueCopy Async <i>o-time</i> must be specified within the limits of 255 from 1, in units of sec as value. If this option is not specified, then "90" seconds is set as default. For Universal Replicator, <i>o-time</i> must be specified within the limits of 600 from 1, in units of sec as value. If this option is not specified, then "60" seconds is set as default. If "o-time=0" is specified, the inflow of write I/O becomes invalid. If Sidefile quantity is over limit of Sidefile Area then host side Write I/O is waited for enough space of Sidefile when storing next new write data until this timeout value (1 second to 255(600) seconds). Default timeout value are 90(60)seconds. If the timeout happens with this waiting state, then the pair state is changed from "PAIR" to "PSUS" state of sidefile (Journal) Full, and its host side Write I/O is continued and Writing data is managed by BITMAP mode. Therefore o-time timeout value should have less a low value than I/O timeout value of the host system [c-time](TrueCopy Async only): This option is used when setting "Copy Pending timer" to the specified CT group. <i>c-time</i> must be specified within the limits of 15 from 1, in units of minutes as value. If this option is not specified, then this value is set as below. - If CT group is created, then sets 5 minutes as default, if not, it is not changed. [r-time] (TrueCopy Async only): This option is used when specifying "RCU Ready timer" to the specified CT group. <i>r-time</i> can be set from 1 to 10 minutes. If this option is not specified, this value is set as follows: - If CT group is created, then sets 5 minutes as default; if not, it is not changed. Notes: These options are invalid when pair-volume is added in CT group. The propagation and persistence of these parameters are as follows. For TrueCopy Async, these parameters are also forwarded to the SVOL side with the <i>paircreate</i> command, and are used when SVOL is changed to PVOL. These parameters are maintained until the pair-volumes are changed to SMPL For Universal Replicator, these parameters are maintained on each journal, therefore it must be set respectively on both PVOL and SVOL side. For example, to change 30 seconds: <pre>paircreate -g UR -vr -f async -nocopy -jp 1 -js 1 -cto 30 pairsplit -g UR -S paircreate -g UR -vl -f async -jp 1 -js 1 -cto 30</pre> These parameters are maintained until the journal is broken.

Option	Description
-nocsus	Universal Replicator only. This option is used to create the suspended journal volumes without copying data in order to make the delta-resync between DC2 (Sync-SVOL) and DC3 (Universal Replicator-SVOL).

Returned values

The paircreate command sets either of the following returned values in exit (), which allows users to check the execution results using a user program.

Normal termination: 0. When creating groups, 0 = normal termination for all pairs.

Abnormal termination: other than 0. Refer to the error code for error details.

Error codes

Unrecoverable errors are fixed and not resolved, even after re-executing the command. If the command fails, the detailed status is logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	Confirm status using the pairdisplay command. Make sure all volumes in the group have the same fence level and volume attributes.	236
	EX_INCSTG	Inconsistent status in group	Confirm pair status using pairdisplay.	229
	EX_INVVOL	Invalid volume status	Confirm volume status/attribute using pairdisplay (-l option) or 'raidvchkdsp -v aou'. "Aou" (allocation on use) refers to dynamic provisioning.	222
	EX_INVSTP	Invalid pair status	Confirm pair status using pairdisplay.	228
	EX_ENQSIZ	Unmatched volume size for pairing	Confirm volume size or number of LUSE volume using raidscan -f, and make sure volume sizes are identical.	212

Category	Error Code	Error Message	Recommended Action	Value
Resource (Unrecoverable)	EX_ENOCTG	Not enough CT groups in the RAID	Choose an existing CTGID (pairvolchk displays CTGIDs). Use '-f async <CTGID>' or '-m grp <CTGID>' option of paircreate to force the pair into a pre-existing CTGID.	217
	EX_ENXCTG	No CT groups left for OPEN Vol use.	Confirm whether all CT groups are already used by TrueCopy Async or ShadowImage.	215
	EX_ENOPOL	Not enough Pool in RAID	Could not retain the pool for executing a command due to be exceeded the threshold rate. Delete unnecessary/earlier generations paired volume, or re-synchronize unnecessary/earlier generations split volume.	206

Examples

Example 1

The following figure shows an example of creating a cascading configuration with -g <group> and -gs <group> option from the local node (takeover node).

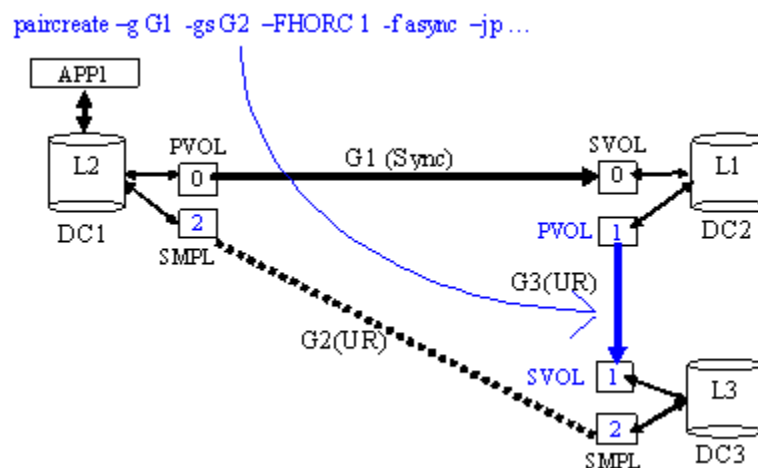


Figure 2-2 Creating a cascading configuration from the local node

Example 2

The following figure shows an example for creating a suspended journal volume.

On DC1 side:

```
paircreate -g G1 -gs G2 -FHORC 2 -nocsus -f async <ctgid> -jp <id>
-js <id>
```

On DC2 side:

```
paircreate -g G3 -vl -nocsus -f async <ctgid> -jp <id> -js <id>
```

On DC3 side:

```
paircreate -g G3 -vr -nocsus -f async <ctgid> -jp <id> -js <id>
```

Note: The journal ID for the shared Universal Replicator-SVOL must be specified the same journal ID for SVOL currently. The CTGID for *paircreate* can be specified the same CT group for SVOL currently.

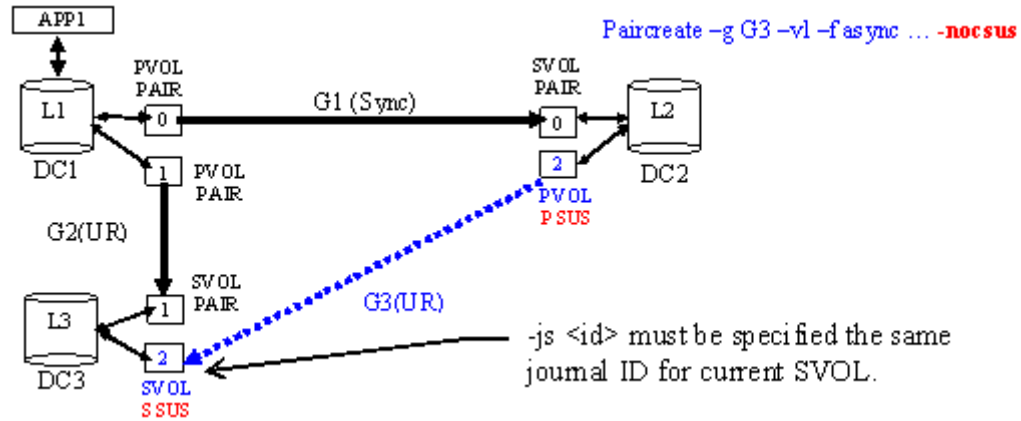


Figure 2-3 Example for creating a suspended journal volume

Example 3

The following figure shows a takeover example used to suspend a journal volume.

Note: The pairresync command must be issued after TC_Sync volume became SVOL_SSWS or PVOL_COPY/PAIR through the horctakeover command.

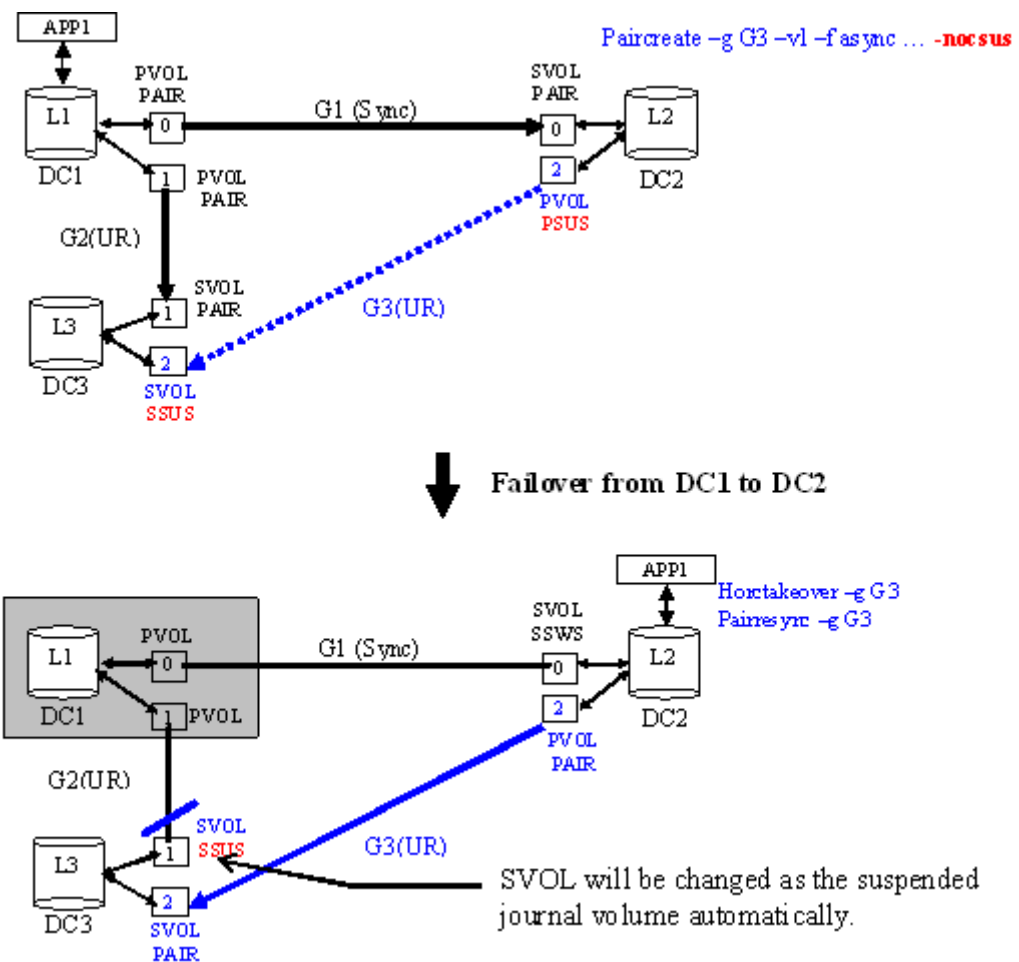


Figure 2-4 Takeover example used to suspend a journal volume

pairsplit

The **pairsplit** command is used to split volume pairs. This command stops updates to the secondary volume of a pair and can either maintain (status = PSUS) or delete (status = SMPL) the pairing status of the volumes. The **pairsplit** command can be applied to a paired logical volume or a group of paired volumes. The **pairsplit** command allows read access or read/write access to the secondary volume, depending on the selected options. When the **pairsplit** command is specified, acceptance of write requests to the primary volume depends on the fence level of the pair (data, status, never, or async).

The **-ms <Split-Maker>** and **-mscas <Split-Maker> [mun#]** options are not supported on the Hitachi RAID or HUS VM storage systems (supported only on modular storage arrays).

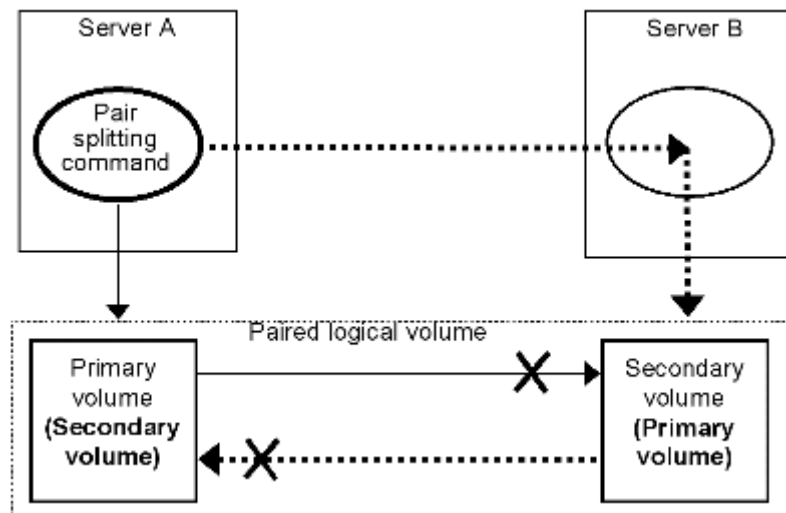


Figure 2-5 Pair Splitting

The primary volume's server is automatically detected by the **pairsplit** command, so the server does not need to be specified in the **pairsplit** command parameters. If the **-S** option (simplex) is used, the volume pair is deleted, the volumes are returned to the simplex state, and the primary and secondary volume status is lost. Paired volumes are split as soon as the **pairsplit** command is issued. If you want to synchronize the volumes, the **pairsplit** command must be issued after write I/Os to the paired volume have completed.

You can create and split ShadowImage pairs simultaneously using the **-split** option of the **paircreate** command (see [paircreate on page 2-3](#)).

You can delete pairs by using the **-S** option of the **pairsplit** command. When the **pairsplit -S** command is issued, the specified pair is deleted, and each volume is changed to SMPL (simplex) mode. If you want to re-establish a pair that has been deleted, you must use the **paircreate** command (not **pairresync**).

Note on Quick Split: If "\$HORCC_SPLT=QUICK" environment variable is set (TagmaStore USP/TagmaStore NSC and later), the **pairsplit** and **paircreate -split** operations are performed as Quick Split regardless of the system option mode 122 setting on the SVP. The \$HORCC_SPLT environment variable is ignored by 9900V.

Syntax

```
pairsplit {-h | -q | -z | -g <group> | -d <pair Vol>
          | -d[g] <raw_device> [MU#] | -FHORC [MU#] | -FMRCF [MU#]
          | -d[g] <seq#> <LDEV#> [MU#] | -r | -rw | -S | -R[S][B] | -P
          | -l | -nomsg | -C <size> | -E | -fq <mode>}
```

Options and parameters

Only one **pairsplit** option (**-r**, **-rw**, **-S**, **-R**, or **-P**) can be specified. If more than one option is specified, only the last option is executed.

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits this command.
-z or -zx	Makes the pairsplit command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option is specified and a HORCM shutdown is detected, interactive mode terminates. OpenVMS cannot use the -zx option
-I [H] [M] [instance#]] or -I [TC] [SI] [instance#]]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name defined in the configuration definition file. This option must always be specified. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	Specifies the paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volumes.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-r or -rw	TrueCopy Async and Universal Replicator only. Specifies a mode of access to the SVOL after paired volumes are split. The -r option (default) allows read-only to the SVOL. The -rw option enables read and write access to the SVOL.
-S	Selects simplex mode (deletes the pair). When the pairing direction is reversed among the hosts (for example, disaster recovery), this mode is established once, and then the <i>paircreate</i> command is issued. When splitting a pair, whether or not you can change the pair status of S-VOL, changing the pair status of P-VOL to SMPL takes priority. Therefore, if the pair status of S-VOL cannot be changed to SMPL, the pair status of P-VOL might not correspond with that of S-VOL. When a path failure has occurred, the pair status of S-VOL cannot be changed to SMPL.

Option	Description
-R [S] [B]	TrueCopy and Universal Replicator only. Brings the secondary volume into the simplex mode forcibly. It is issued by the secondary host, if the host possessing the primary volume is down or has failed. -RS option is used to bring the secondary volume forcibly into SSWS mode. -RB option is used to back the secondary volume forcibly from SSWS into PSUS(PSUE)(SSUS) mode. This allows backing up to the primary volume if you want to back from the secondary host in the SSWS state on Link failure to the primary host.
-P	TrueCopy and Universal Replicator only. For TrueCopy Sync, this option is used to bring the primary volume forcibly into write disabled mode like PSUE with "fence=data". It is issued by the secondary host to disable PVOL data changes by the host possessing the primary volume. For TrueCopy Async/Universal Replicator, this option is used to suspend and purge the remaining data into SideFile/Journal like link failure (PSUE) without updating SVOL. This lets you stop journal operations forcibly when the journal utilization traffic becomes high. This is the same for the case of disaster that S-VOL data is not up to date, but it allows to specify "-rw -P" for writing enable. In that situation, if you are using the SVOL as file system (that is, UFS, NTFS, HANFS), then an FSCK(CHKDSK) is necessary before mounting the volume even after the PVOL is unmounted.
-I	When the remote host cannot be used due to host down, this option enables a pairsplit operation by a local host only. Except the -R option, the target volume of a local host must be P-VOL. (ShadowImage or Copy-on-Write Snapshot volumes are able to split only SVOL.)
-nomsg	Suppresses messages to be displayed when this command is executed. It is used to execute a command from a user program. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.
-C <size>	ShadowImage/Copy-on-Write Snapshot only. Copies difference data retained in the primary volume into the secondary volume, then enables reading and writing from/to the secondary volume after completion of the copying. (This is the default option.) For <size>, specify the copy pace for the pairsplit (range = 1 to 15 track extents). If not specified, the value used for paircreate or pairresync is used.
-E	ShadowImage/Copy-on-Write Snapshot only. Suspends a paired volume forcibly when a failure occurs. Not normally used.
-FHORC [MU#] or -FCA [MU#]	Forcibly specifies a cascading remote copy volume for specified volume pair on local copy environment. If the -I option is specified, a cascading remote copy volume is split on a local host (near site). If the -I option is not specified, a cascading remote copy volume is split on a remote host (far site). The target remote copy volume must be a P-VOL, or "-R[S][B]" option can be specified on SVOL.
-FMRCF [MU#] or -FBC [MU#]	Forcibly specifies a cascading local copy volume for specified volume pair on remote copy environment. If the -I option is specified, a cascading local copy volume is split on a local host (near site). If -I option is not specified, a cascading local copy volume is split on a remote host (far site). The target local copy volume must be a P-VOL, and the -E option cannot be specified.

Option	Description																					
-fq <mode>	ShadowImage only. This option is used to specify the mode whether "pairsplit" is performed or not as "QUICK". <i>mode = normal</i>"pairsplit" is performed as Non quick mode regardless of setting of \$HORCC_SPLT environment variable and/or the <i>system option mode 122</i> via SVP. <i>mode = quick</i>"pairsplit" is performed as <i>Quick Split</i> regardless of setting of \$HORCC_SPLT environment variable and/or the <i>system option mode 122</i> via SVP. If this option is not specified, then performing the "Split" depends on \$HORCC_SPLT environment variable and/or the system option mode setting through the SVP whether the pairsplit operation is <i>Quick Split</i> or not. The relationship between "-fq" option and \$HORCC_SPLT is as shown below. <table><tr><th>-fq option</th><th>\$HORCC_SPLT</th><th>Behavior</th></tr><tr><td colspan="3">-----</td></tr><tr><td>quick</td><td>Don't care</td><td>Quick Split</td></tr><tr><td>normal</td><td>Don't care</td><td>Normal Split</td></tr><tr><td>Unspecified</td><td>QUICK</td><td>Quick Split</td></tr><tr><td>Unspecified</td><td>NORMAL</td><td>Normal Split</td></tr><tr><td>Unspecified</td><td>Unspecified</td><td>Depends on system option mode 122</td></tr></table> Notes: • The -fq option is also validated on TrueCopy-TrueCopy/ShadowImage cascading operation using "-FBC [MU#]" option. • The -fq option is applied for TagmaStore USP/TagmaStore NSC and later. This option is ignored for Lightning 9900 V, in order to maintain compatibility on 9900V, so that you can use the same script adding this option.	-fq option	\$HORCC_SPLT	Behavior	-----			quick	Don't care	Quick Split	normal	Don't care	Normal Split	Unspecified	QUICK	Quick Split	Unspecified	NORMAL	Normal Split	Unspecified	Unspecified	Depends on system option mode 122
-fq option	\$HORCC_SPLT	Behavior																				

quick	Don't care	Quick Split																				
normal	Don't care	Normal Split																				
Unspecified	QUICK	Quick Split																				
Unspecified	NORMAL	Normal Split																				
Unspecified	Unspecified	Depends on system option mode 122																				

Returned values

The *pairsplit* command sets the following returned values during exit allowing you to check the execution results.

Normal termination: 0. When splitting groups, 0 = normal termination for all pairs.

Abnormal termination: other than 0, refer to the error codes for error details.

Error codes

The following table lists and describes the error codes for the *pairsplit* command. Unrecoverable errors are fixed and not resolved, even after re-executing the command. If the command failed, the detailed status is logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

Table 2-1 Specific Error Codes for pairsplit

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	Confirm status using the pairdisplay command. Make sure all volumes in the group have the same fence level and volume attributes.	236
	EX_INCSTG	Inconsistent status in group	Confirm pair status using pairdisplay.	229
	EX_INVVOL	Invalid volume status	Confirm volume status/attribute using pairdisplay -l or 'raidvchkdsp -v aou'. "Aou" (allocation on use) refers to dynamic provisioning.	222
	EX_EVOLCE	Pair Volume combination error	Confirm pair status using pairdisplay, and change combination of volumes.	235
	EX_INVSTP	Invalid pair status	Confirm pair status using pairdisplay.	228
	EX_EWSUSE	Pair suspended at WAIT state	Issue pairresync manually to the identified failed paired volume to try to recover it. If the trouble persists, call the Hitachi Data Systems Support Center.	234

Examples

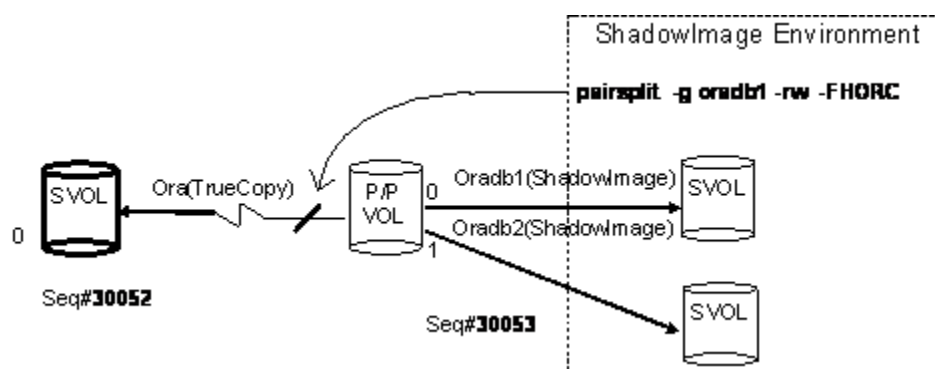


Figure 2-6 Example of -FHORC Option for pairsplit

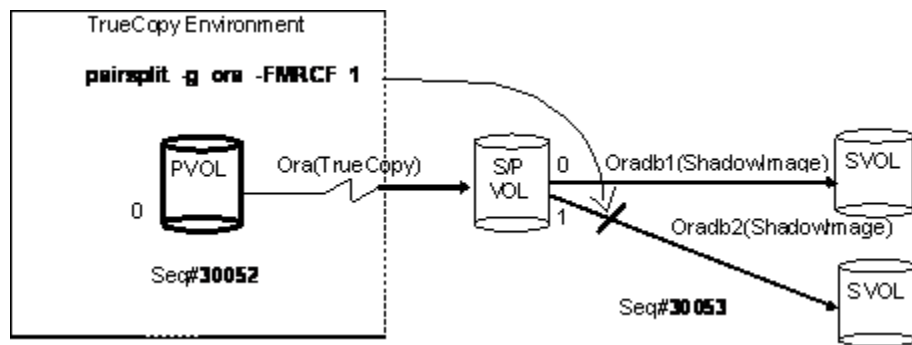


Figure 2-7 Example of -FMRCF Option for pairsplit

pairresync

The **pairresync** command re-establishes a split pair volume and then restarts the update copy operations to the secondary volume. The **pairresync** command can resynchronize either a paired logical volume or a group of paired volumes. The normal direction of resynchronization is from the primary volume to the secondary volume. If the `--restore` option is specified (ShadowImage only), the pair is resynchronized in the reverse direction (that is, secondary volume to primary volume). The primary volume remains accessible during *pairresync*, except when the `-restore` option is specified. The secondary volume becomes write-disabled when the *pairresync* command is issued.

The **pairresync** command terminates before resynchronization of the secondary (or primary) volume is complete. Use the pair event waiting (**pairevtwait**) or **pairdisplay** command to verify that the resync operation completed successfully (status changes from COPY to PAIR). The execution log file also shows completion of the resync operation. The status transition of the paired volume is judged by the status of the primary volume. The fence level is not changed (only for TrueCopy, TrueCopy Async, or Universal Replicator).

If no data was written to the secondary volume while the pair was split, the differential data on the primary volume is copied. If data was written to the secondary volume, the differential data on the primary volume and secondary volume is copied. This process is reversed when the ShadowImage `-restore` option is specified.

Before issuing the *pairresync* command (normal or reverse direction), make sure that the secondary volume is not mounted on any UNIX system. Before issuing a reverse *pairresync* command, make sure that the primary volume is not mounted on any UNIX system.

Note on Quick Resync/Restore: If the `"$HORCC_RSYN=QUICK"` / `"$HORCC_REST=QUICK"` environment variable is set (TagmaStore USP/TagmaStore NSC and later), the *pairresync* operation is performed as Quick Resync regardless of the system option mode 87/80 setting via SVP. The `$HORCC_RSYN` and `$HORCC_REST` environment variables are ignored by 9900V.

TrueCopy only: The swaps(p) option is used to swap volume from the SVOL(PVOL) to PVOL(SVOL) at suspending state on the SVOL(PVOL) side, and resynchronize the NEW_SVOL based on the NEW_PVOL. At the result of this operation, the volume attributes of own host (local host) become the attributes for the NEW_PVOL(SVOL). The **paircreate** command cannot execute copy rejection for an error condition which made the target volume is accompanied by maintenance work.

The swaps(p) option:

Ignores the -l option.

Executes at PAIR state as well as PSUS/PSUE state (not applicable to COPY and SMPL).

If the target volume is already the PVOL (SVOL), the pair operation is skipped.

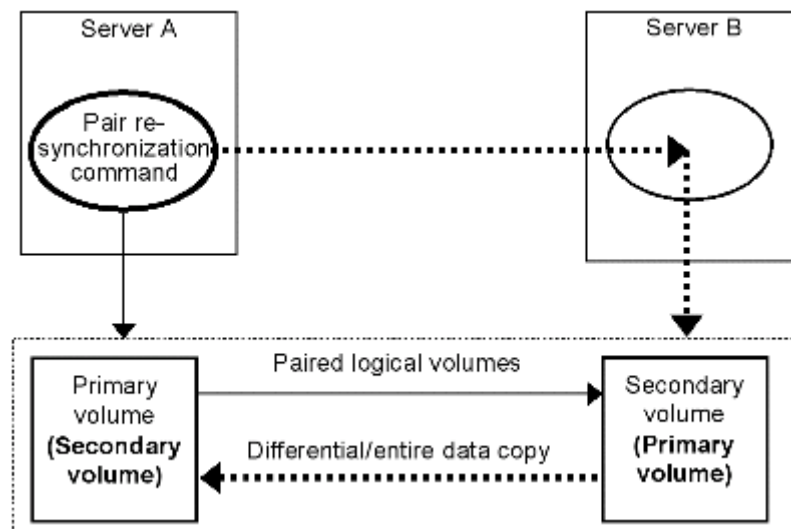


Figure 2-8 Pair Resynchronization

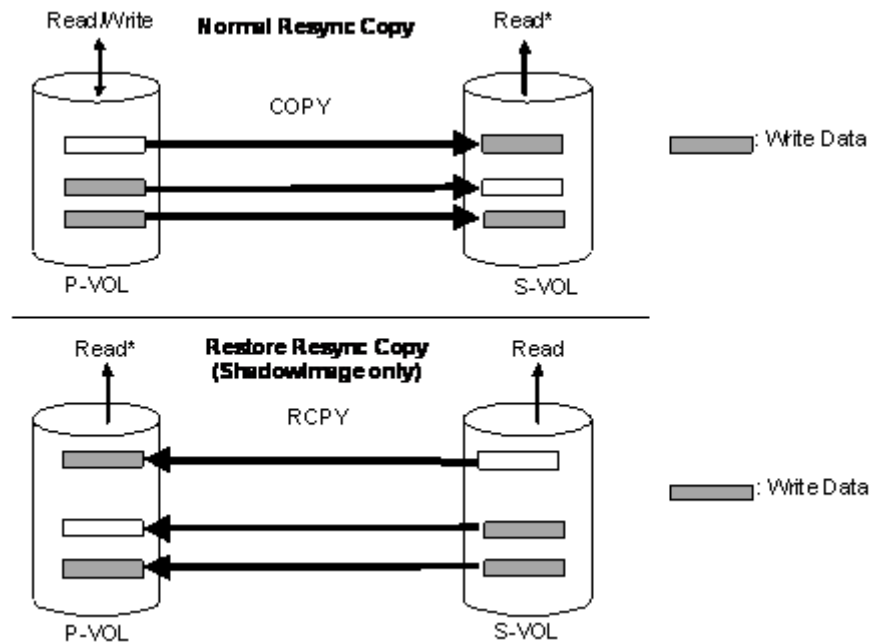


Figure 2-9 Normal Resync and ShadowImage Restore Resync

Syntax

```
pairresync { -h | -q | -z | -g <group> | -d <pair Vol>
| -d[g] <raw device> [MU#] | -FHORC [MU#] | -FMRCF [MU#]
| -d[g] <seq#> <LDEV#> [MU#] | -c <size> | -nomsg | -l
| -restore | -swaps | -swapp | -fq <mode>
| -cto <o-time> <c-time> <r-time> | -f[g] <fence> [CTGID] }
```

Options and parameters

The primary volume's server is automatically detected by the **pairresync** command, so the server does not need to be specified in the **pairresync** command options.

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits this command.
-z or -zx	Makes the <i>pairresync</i> command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I [H] [M] [instance#] or -I [TC] [SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Used to specify a group name defined in the configuration definition file. This option must always be specified. The command is executed for the specified group unless the -d <pair Vol> option is specified.

Option	Description
-d <pair Vol>	Specifies a paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volumes.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-FHORC [MU#] or -FCA [MU#]	Forcibly specifies a cascading remote copy volume for specified pair logical volumes on local copy environment. If the -l option is specified, this option resyncs a cascading remote copy volume on a local host (near site). If no -l option is specified, this option resyncs a cascading remote copy volume on a remote host (far site). The target remote copy volume must be a P-VOL, the -swapp option cannot be specified.
-FMRCF [MU#] or -FBC [MU#]	Forcibly specifies a cascading local copy volume for specified pair logical volumes on remote copy environment. If the -l option is specified, this option resyncs a cascading local copy volume on a local host (near site). If no -l option is specified, this option resyncs a cascading local copy volume on a remote host (far site). The target local copy volume must be a P-VOL.
-swaps - FHORC [MU#]	Swaps the cascading TrueCopy or Universal Replicator volume from the primary node for failback. In failback operation from 3DC Cascade Site Failure, if you want to failback to DC1 from DC3 directly, it is necessary to operate all cascading volume from DC1. In order to make this operation possible, CCI supports the "pairresync -swaps -FHORC" option that swaps the Universal Replicator volume on the cascading TrueCopy Sync/Universal Replicator volume.
-c <size>	TrueCopy/ShadowImage only. Specifies the copy pace for the resync operation (range = 1 to 15 track extents, default = 3). If not specified, the value used for paircreate or pairsplit command is used. In TrueCopy for Mainframe, when you specify a number less than 3, the copy speed is 3 tracks. When you specify a number more than 4, the copy speed is 15 tracks. In ShadowImage, when you specify 1 or 2, the copy speed is slow; when you specify 3, the copy speed is medium; and when you specify 4, the copy speed is fast.
-nomsg	Suppresses messages to be displayed when this command is executed. It is used to execute this command from a user program. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.

Option	Description																		
-l	When this option cannot utilize the remote host for host down, this option enables a pairresync operation by the local host only. The target volume of the local host must be P-VOL. (ShadowImage or Copy-on-Write Snapshot volumes are able to resync only SVOL.)																		
-restore	ShadowImage and Copy-on-Write Snapshot only. Performs reverse resync (from secondary volume to primary volume).																		
-swaps	TrueCopy and Universal Replicator only. Executed from the SVOL side when there is no host on the PVOL side to help. Typically executed in PSUS state to facilitate "fast failback" without requiring a full copy. For both -swaps and -swapp, the delta data from the original SVOL becomes dominant and is copied to the original PVOL, then the S/PVOL designations are swapped.																		
-swapp	TrueCopy and Universal Replicator only. Executes the equivalent of a -swaps from the original PVOL side. Unlike -swaps, -swapp does require the cooperation of hosts at both sides.																		
-fq <mode> SI/Copy-on-Write Snapshot only	ShadowImage/Copy-on-Write Snapshot only. Specifies the mode whether "pairresync" is performed or not as "QUICK". <i>mode = normal</i> pairresync is performed as Non quick mode regardless of setting of \$HORCC_RSYN environment variable and/or the <i>system option mode 87</i> via SVP. <i>mode = quick</i> pairresync is performed as Quick Resync regardless of setting of \$HORCC_RSYN environment variable and/or the <i>system option mode 87</i> via SVP. If this option is specified, then performing pairresync is dependent on \$HORCC_RSYN environment variable and/or the system option mode setting through the SVP whether the pairresync operation is Quick Split or not. The relationship between "-fq" option and \$HORCC_RSYN is as shown below. <table><tr><th>-fq option</th><th>\$HORCC_RSYN</th><th>Behavior</th></tr><tr><td>quick</td><td>Don't care</td><td>Quick split</td></tr><tr><td>normal</td><td>Don't care</td><td>Normal split</td></tr><tr><td>Unspecified</td><td>QUICK</td><td>Quick split</td></tr><tr><td>Unspecified</td><td>NORMAL</td><td>Normal split</td></tr><tr><td>Unspecified</td><td>Unspecified</td><td>Depends on system option mode 87</td></tr></table>	-fq option	\$HORCC_RSYN	Behavior	quick	Don't care	Quick split	normal	Don't care	Normal split	Unspecified	QUICK	Quick split	Unspecified	NORMAL	Normal split	Unspecified	Unspecified	Depends on system option mode 87
-fq option	\$HORCC_RSYN	Behavior																	
quick	Don't care	Quick split																	
normal	Don't care	Normal split																	
Unspecified	QUICK	Quick split																	
Unspecified	NORMAL	Normal split																	
Unspecified	Unspecified	Depends on system option mode 87																	

Option	Description																		
-fq <mode> (In the case of Restore (-restore is specified))	In the case of Restore (-restore is specified): mode = normal The pairresync -restore command is performed as Non quick mode regardless of the setting of the \$HORCC_REST environment variable and/or the system option mode 80 via SVP. mode = quick The pairresync -restore command is performed as Quick Restore regardless of the setting of the \$HORCC_REST environment variable and/or the system option mode 80 via SVP. If this option is not specified, then the performing of the pairresync has being depended on \$HORCC_REST environment variable and/or the system option mode setting through the SVP whether the pairresync operation is Quick Restore or not. The relationship between "-fq" option and \$HORCC_REST are shown as below. <table><tr><th>-fq option</th><th>\$HORCC_REST</th><th>Behavior</th></tr><tr><td>quick</td><td>Does not matter</td><td>Quick restore</td></tr><tr><td>normal</td><td>Does not matter</td><td>Normal restore</td></tr><tr><td>Unspecified</td><td>QUICK</td><td>Quick restore</td></tr><tr><td>Unspecified</td><td>NORMAL</td><td>Normal restore</td></tr><tr><td>Unspecified</td><td>Unspecified</td><td>Depends on system option mode 80</td></tr></table>	-fq option	\$HORCC_REST	Behavior	quick	Does not matter	Quick restore	normal	Does not matter	Normal restore	Unspecified	QUICK	Quick restore	Unspecified	NORMAL	Normal restore	Unspecified	Unspecified	Depends on system option mode 80
-fq option	\$HORCC_REST	Behavior																	
quick	Does not matter	Quick restore																	
normal	Does not matter	Normal restore																	
Unspecified	QUICK	Quick restore																	
Unspecified	NORMAL	Normal restore																	
Unspecified	Unspecified	Depends on system option mode 80																	
-fq <mode> (Notes)	Notes: • This -fq option also is validated on TrueCopy-TrueCopy/ShadowImage cascading operation using "-FBC [MU#]" option. • The -fq option is applied for TagmaStore USP/TagmaStore NSC and later. This option is ignored for Lightning 9900 V, in order to maintain the compatibility on 9900V, so that you can use the same script adding this option. • If this option is combined with "-restore" option in VSP, during the maintenance work in the storage system (SVP is in modify mode), this operation cannot be completed.																		

Option	Description
-cto <o-time> [c-time] [r-time]	TrueCopy Async and Universal Replicator only. These options are valid for only TrueCopy Async/Universal Replicator, if you will specify "-cto <o-time> [c-time] [r-time]" option on TrueCopy sync, then it is ignored. <i>o-time</i>: This option is used when setting "offloading timer" for controlling Inflow of Write I/O to the specified CT group. For TrueCopy Async, <i>o-time</i> can be set from 1 to 255 seconds. If this option is not specified, then "90" seconds is set as default. For Universal Replicator, <i>o-time</i> can be specified from 1 to 600 seconds. If this option is not specified, then "60" seconds is set as default. If "o-time=0" is specified, the inflow of Write I/O becomes invalid. If Sidefile quantity is over limit of Sidefile Area then host side Write I/O is waited for enough space of Sidefile when storing next new write data until this timeout value (1 second to 255(600) seconds). Default timeout value are 90(60)seconds. If the timeout happens with this waiting state then pair state is changed from "PAIR" to "PSUS" state of sidefile(Journal) Full, and its host side Write I/O is continued and Writing data is managed by BITMAP mode. Therefore <i>o-time</i> timeout value should have less a low value than I/O timeout value of the host system [c-time]: (Applicable for only TrueCopy Async) This option is used when setting "Copy Pending timer" to the specified CT group. <i>c-time</i> can be specified from 1 to 15 minutes. If this option is not specified, then this value is set as below. - If CT group is created, then sets 5 minutes as default. If not, it is not changed. [r-time]: (Applicable for only TrueCopy Async) This option is used when specifying "RCU Ready timer" to the specified CT group. <i>r-time</i> can be specified from 1 to 10 minutes. If this option is not specified, then it is not changed. Note: - These options will also be able to set, if all volumes of CT group is suspended. - The propagation and persistence of these parameters are as follows. For TrueCopy Async, these parameters are also forwarded to SVOL side with pairresync command, and are used when SVOL is changed to PVOL. These parameters are maintained until the pair-volumes are changed to SMPL. For Universal Replicator, these parameters are maintained on each journal, therefore it must be set for PVOL and SVOL. For example, to change 30 seconds for PVOL: - pairsplit -g UR - pairresync -g UR -cto 30 For changing a journal of SVOL side, the above operation must be issued after changing from SVOL to PVOL. These parameters are maintained until the journal are broken.
-f[g] <fence> [CTGID]	TrueCopy Async and Universal Replicator only. <i>-f[g] <fence> [CTGID]</i> (TrueCopy only): This option is used to change from existing TrueCopy Sync volumes to TrueCopy Sync CTG without deleting paired-volume. It is possible to change the option (fence level) and the volume attribute as shown below. This option is valid without "-swaps" or "-swapp" option.

Changing the option (fence level) and the volume attribute:

Attribute	Options		
	-f fence	-fg fence	-fg fence CTGID
Sync	Updates fence	Cmd rejected Abnormal term.	Changes to Sync CTG Updates fence*
Sync CTG	Changes to Sync Updates fence	Updates fence	Cmd rejected Abnormal term.
Async	Cmd rejected Abnormal term.	Cmd rejected Abnormal term.	Cmd rejected Abnormal term.
Explanation of terms: fence: data, status, or never ("async" cannot be specified) Cmd rejected/Abnormal term.: Command execution is rejected, and the operation terminates abnormally.			
*If the identical CTGID is specified with the different group name of CCI, then the command is rejected. So different CTGID must be specified for the different group name.			

Returned values

The *pairresync* command sets the following returned values during exit allowing you to check the execution results.

Normal termination: 0. When resynchronizing groups, 0 = normal termination for all pairs.

Abnormal termination: other than 0, refer to the error codes for error details.

Error codes

Unrecoverable errors are fixed and not resolved, even after re-executing the command. If the command failed, the detailed status is logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

The primary and secondary volumes must not be mounted, because the *pairresync* command renews data on both the primary and secondary volumes. This command cannot be executed because it is rejected when the target volume is in a failure accompanying maintenance work (for example, one side cache failure) (TrueCopy/Universal Replicator only).

Table 2-2 Specific Error Codes for pairresync

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	Confirm status using the pairdisplay command. Make sure all volumes in the group have the same fence level and volume attributes.	236
	EX_INCSTG	Inconsistent status in group	Confirm pair status using pairdisplay.	229
	EX_INVVOL	Invalid volume status	Confirm pair status using pairdisplay -l.	222
	EX_INVSTP	Invalid pair status	Confirm pair status using pairdisplay.	228

Examples

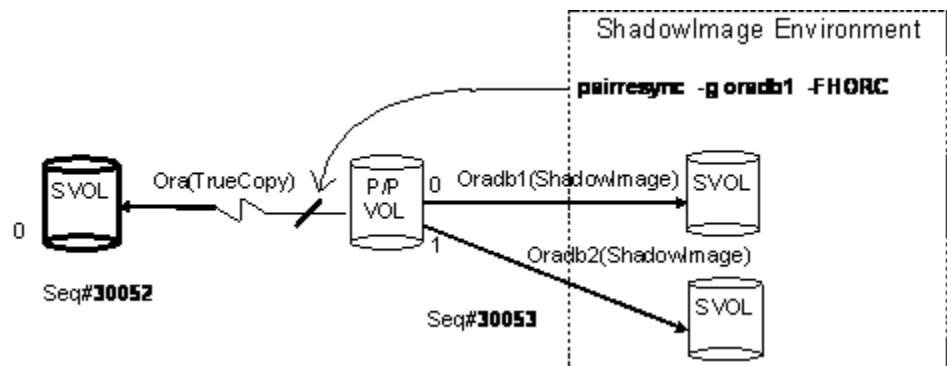


Figure 2-10 Example of -FHORC Option for pairresync

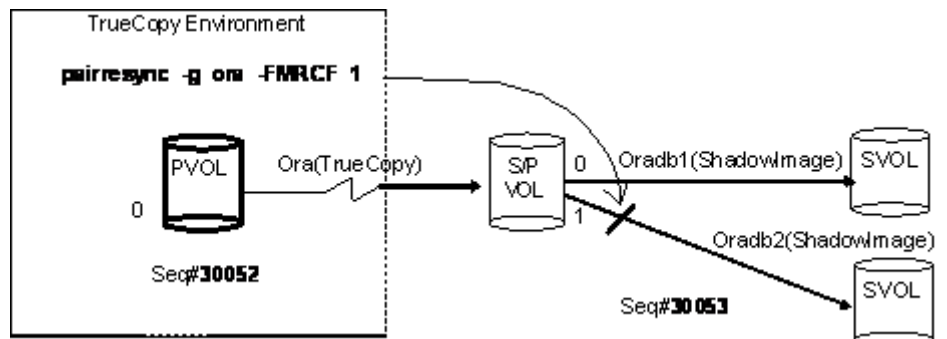


Figure 2-11 Example of -FMRCF Option for pairresync

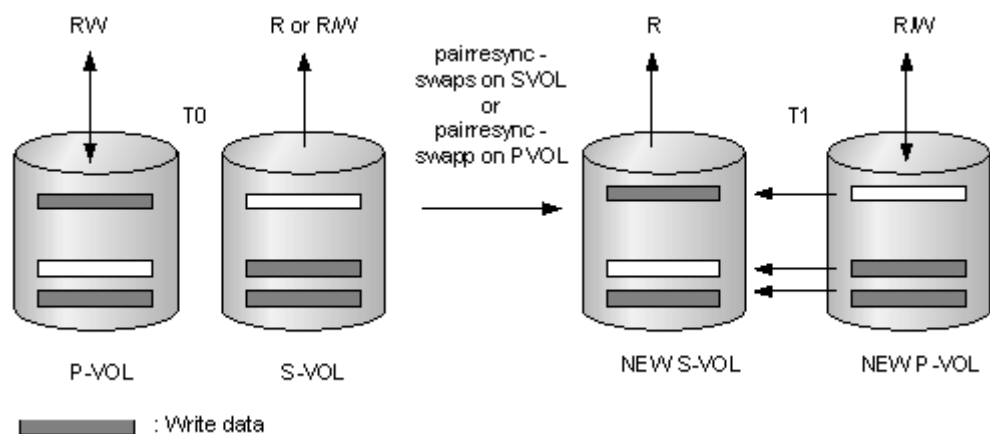


Figure 2-12 Swap Operation

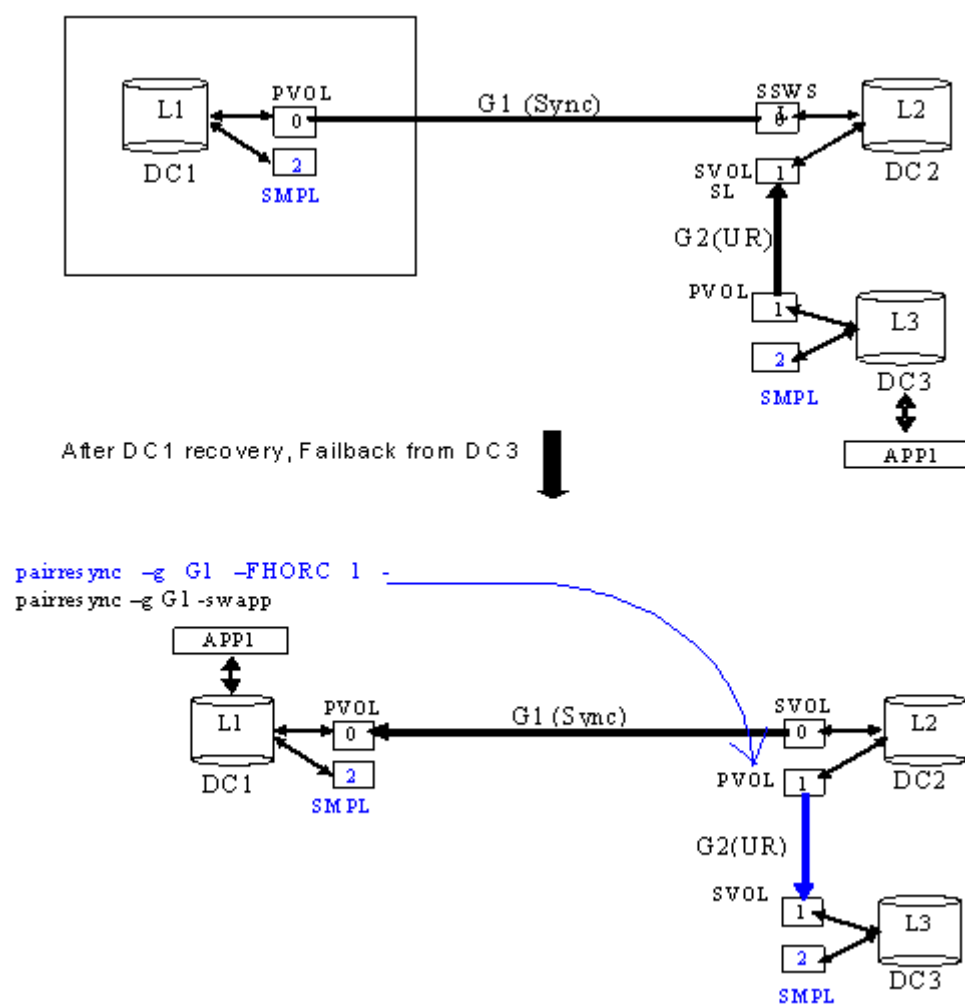


Figure 2-13 Example of -swaps option with -FHORC [MU#]

pairevtwait

The *pairevtwait* (pair event waiting) command is used to wait for completion of pair creation and to confirm the status of pair operations. It waits ("sleeps") until the paired volume status becomes identical to a specified status and then completes. The *pairevtwait* command can be used for a paired logical volume or a group of paired volumes. The primary volume's server is automatically detected by the *pairevtwait* command, so the server does not need to be specified in the *pairevtwait* command parameters.

The *pairevtwait* command waits until the specified status is established, and terminates abnormally if an abnormal status is detected. The transition of the paired volume status is judged by the status of the primary volume. If the *pairevtwait* command is issued for a group, the command waits until the status of each volume in the group changes to the specified status. When the *pairevtwait* command with the *-nowait* option is issued for a group, the status is returned if the status of each volume in the group is identical. For ShadowImage pairs, this command must be used to confirm a pair status transition.

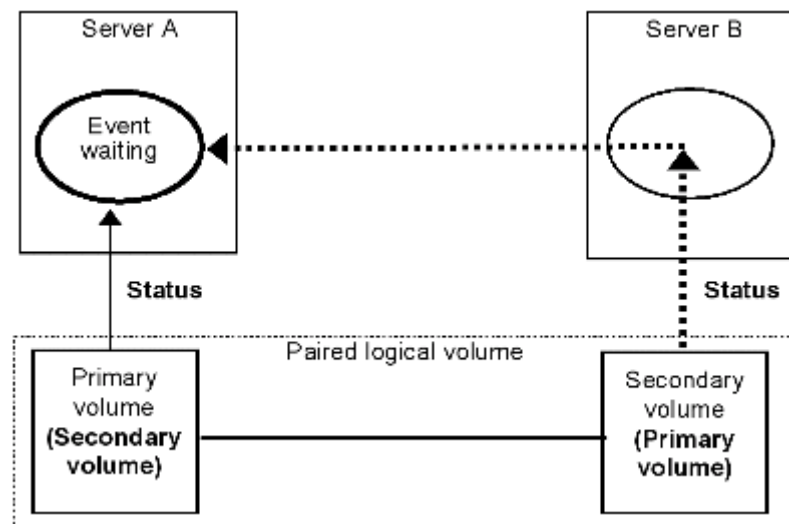


Figure 2-14 Pair Event Waiting

Syntax

```
pairevtwait{ -h | -q | -z | -I[H][M][instance#] or  
I[TC][SI][instance#] | -g <group> | -d <pair Vol>  
| -d[g] <raw device> [MU#] | -FHORC [MU#] | -FMRCF [MU#]  
| -d[g] <seq#> <LDEV#> [MU#] | -s [s] <status> ...  
| -t <timeout>[interval] | -nowait[s] | -l | -nomsg }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits this command.

Option	Description
-z or -zx	Makes the pairevtwait command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name defined in the configuration definition file. This option must always be specified. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	Specifies a paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volumes.
-d[g] <raw_device > [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-FHORC [MU#] or - FCA [MU#]	Forcibly specifies a cascading remote copy volume for specified pair logical volumes on local copy environment. If the -l option is specified, this option tests status of a cascading remote copy volume on a local host (near site). If no -l option is specified, this option tests status of a cascading remote copy volume on a remote host (far site). The target remote copy volume must be a P-VOL, the -swapp option cannot be specified.
-FMRCF [MU#] or - FBC [MU#]	Forcibly specifies a cascading local copy volume for specified pair logical volumes on remote copy environment. If the -l option is specified, this option tests status of a cascading local copy volume on a local host (near site). If no -l option is specified, this option tests status of a cascading local copy volume on a remote host (far site). The target local copy volume must be a P-VOL.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-s <status>	Specifies the waiting status, which is "smpl", "copy(including "RCPY")", "pair", "psus", or "psue". If two or more statuses are specified following -s, waiting is done according to the logical OR of the specified statuses. This option is valid when the -nowait option is not specified.
-ss <status>	Specifies the waiting status, which is "smpl", "copy"("RCPY" is included), "pair", "ssus", "psue" on SVOL. If two or more statuses are specified following -ss, waiting is done according to the logical OR of the specified statuses. This option is valid when the -nowait option is not specified.

Option	Description
-t <timeout> [interval]	Specifies the interval of monitoring a status specified using the -s and -ss option and the time-out period in units of 1 sec. Unless [interval] is specified, the default value (3 seconds) is used. This option is valid when the -nowait option is not specified. If <timeout> is specified more than 1999999, then "WARNING" message appears. If you execute the command in the Out-of-Band method, specify 3 seconds (default value) or more to <timeout>.
-nowait	When this option is specified, the pair status at that time is reported without waiting. The pair status is set as a returned value for this command. When this option is specified, the -t and -s options are not needed.
-nowaits	When this option is specified, the pairing status on SVOL at that time is reported without waiting. The pairing status is set as a returned value for this command. When this option is specified, the -t and -ss options are not needed.
-l	When this command cannot utilize a remote host for host down, this option executes this command by a local host only. The target volume of a local host must be SMPL or P-VOL. (ShadowImage/Copy-on-Write Snapshot volumes are able to specify from SVOL.)
-nomsg	Suppresses messages to be displayed when this command is executed. It is used to execute a command from a user program. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.

Returned values

The *pairevtwait* command sets the following returned values during exit allowing you to check the execution results.

Table 2-3 Pairevtwait Returned Values

Condition	Value
When the -nowait option is specified:	Normal termination: 1:The status is SMPL. 2:The status is COPY or RCPY. 3:The status is PAIR. 4:The status is PSUS. 5:The status is PSUE. When monitoring groups, 1/2/3/4/5 = normal termination for all pairs. Abnormal termination: other than 0 to 127, refer to the error codes for error details.

Condition	Value
When the -nowaits option is specified:	Normal termination: 1:The status is SMPL. 2:The status is COPY or RCPY. 3:The status is PAIR. 4:The status is SSUS (Note that SVOL_PSUS appears as SSUS). 5:The status is PSUE. Abnormal termination: other than 0 to 127, refer to the error codes for error details.
When the -nowait and/or nowaits option is not specified:	Normal termination: 0. When monitoring groups, 0 = normal termination for all pairs. Abnormal termination: other than 0 to 127, refer to the error code for error details.

Error codes

Unrecoverable errors are fixed and not resolved, even after re-executing the command. If the command failed, the detailed status is logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

Table 2-4 Specific Error Codes for pairevtwait

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	Confirm status using the pairedisplay command. Make sure all volumes in the group have the same fence level and volume attributes.	236
	EX_INCSTG	Inconsistent status in group	Confirm pair status using pairedisplay.	229
	EX_INVVOL	Invalid volume status	Confirm pair status using pairedisplay -l.	222
	EX_EVOLCE	Pair Volume combination error	Confirm pair status using pairedisplay, and change combination of volumes.	235
	EX_EWSUSE	Pair suspended at WAIT state	Issue pairresync manually to the identified failed paired volume to try to recover it. If the trouble persists, call the Hitachi Data Systems Support Center	234

Category	Error Code	Error Message	Recommended Action	Value
Timer (Recoverable)	EX_EWSTOT	Timeout waiting for specified status	Increase timeout value using the -t option.	233
	EX_EWSLTO	Timeout waiting for specified status on the local host	Confirm that CCI (HORCM) on the remote host is running.	232

Examples

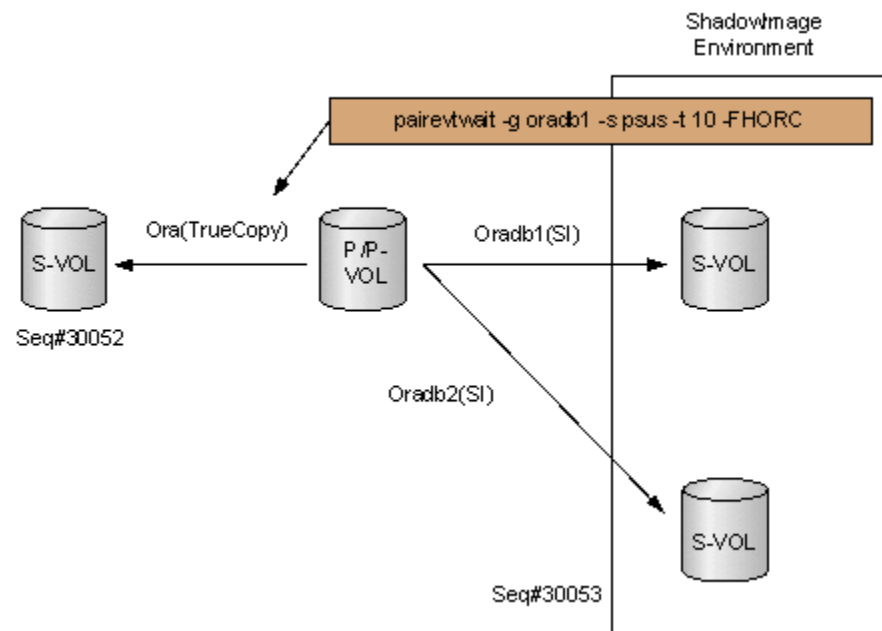


Figure 2-15 Example of -FHORC Option for Pairevtwait

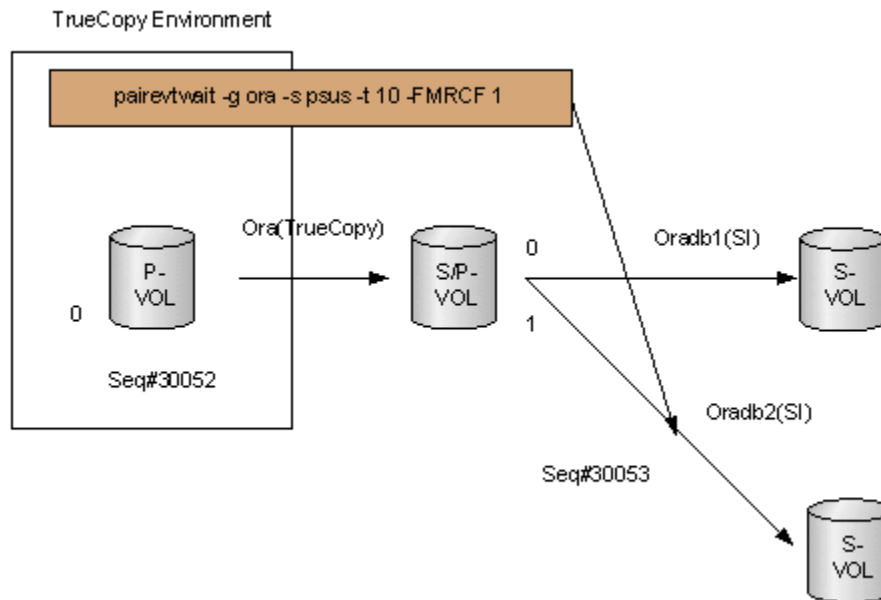


Figure 2-16 Example of -FMRCF Option for Pairevtwait

Using `-ss <status> ...` and `-nowaits` option In PVOL_PSUS & SVOL_COPY state of HOMRCF quick mode, *pairevtwait* will return immediately even if the S-VOL is still in SVOL_COPY state because PVOL is already in PVOL_PSUS state. If you want to wait the SVOL_SSUS state, then use the `-ss <status>` and `-nowaits` options to wait for the pair status on SVOL side. This is needed for operating **pairresync -restore** or **pairsplit -S**.

The figure below shows five examples of waiting until "PVOL_PSUS" & "SVOL_COPY" state is changed to SVOL_SSUS.

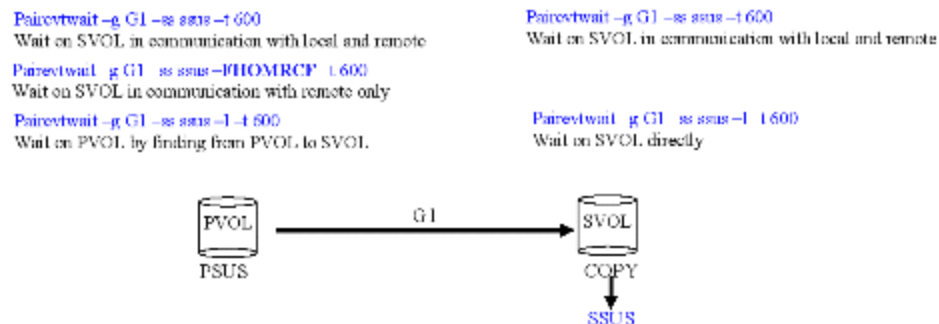


Figure 2-17 Example for waiting on ShadowImage

The **horctakeover** command suspends G2(CA-Jnl) automatically if **horctakeover** returns "Swap-takeover" as an exit code. In DC1 host failure, if APP1 wants to wait until DC3 becomes the suspend state, then they can verify the "SSUS" state by using the **pairevtwait** command as shown below.

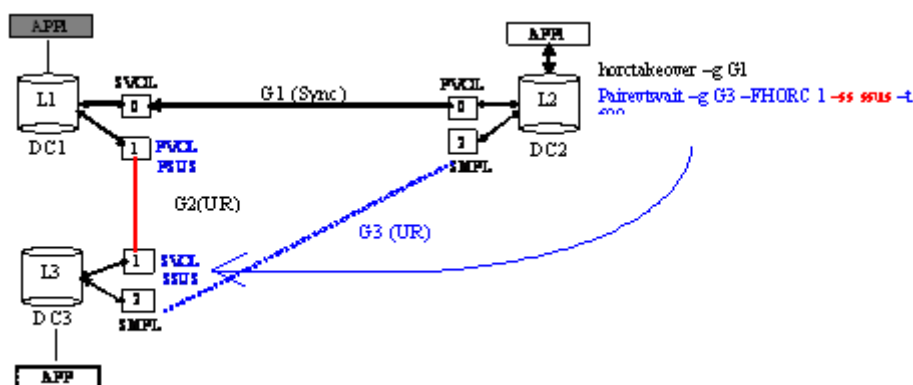


Figure 2-18 Example for waiting "SSUS" on 3DC using TC/UR

pairmon

The *pairmon* (pair monitor) command, which is connected to the HORCM daemon, obtains the pair status transition of each volume pair and reports the status change. If the pair status changes (due to an error or a user-specified command), the *pairmon* command displays a message.

The pair status transition events exist in the HORCM pair state transfer queue. The *-resevt* option (reset event) deletes one/all events from the HORCM pair state transfer queue. If reset event is not specified, the pair state transfer queue is maintained. If the *-s* option is not specified, *pairmon* displays all events for which it receives information from HORCM. If the *-s* option is specified, only the specified status transitions are displayed.

The CCI software supports the error monitoring and configuration confirmation commands for linkage with the system operation management of the UNIX server.

Syntax

```
pairmon { -h | -q | -z | -I[H][M][instance#] or
          I[TC][SI][instance#] | -D | -allsnd | -resevt | -nowait
          | -s <status> ... }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits this command.
-z or -zx	Makes the pairmon command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.

Option	Description
-I[H][M] [instance#]] or -I[TC][SI] [instance#]]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-D	Selects the default report mode. In the default mode, if there is pair status transition information to be reported, one event is reported and the event is reset. If there is no pair status transition information to be reported, the command waits. The report mode consists of the three flags: -allsnd, -resevt, and -nowait options.
-allsnd	Reports all events if there is pair status transition information.
-resevt	Reports events if there is pair status transition information, and then resets all events.
-nowait	When this option is specified, the command does not wait when there is no pair status transition information.
-s <status>...	Specifies the pair status transition to be reported: smpl, copy (includes rcpy), pair, psus, psue. If two or more statuses are specified following -s, masking is done according to the logical OR of the specified statuses. If this option is not specified, pairmon displays all events which received information from HORCM.

Examples

The following shows an example of the *pairmon* command and its output.

```
# pairmon -allsnd -nowait
Group Pair vol Port targ# lun# LDEV#...Oldstat code -> Newstat code
oradb oradb1 CL1-A 1 5 145...SMPL 0x00 -> COPY 0x01
oradb oradb2 CL1-A 1 6 146...PAIR 0x02 -> PSUS 0x04
```

Output of the *pairmon* command:

Group: The group name (dev_group) described in the configuration definition file.

Pair vol: The paired volume name (dev_name) in the specified group that is described in the configuration definition file.

Port targ# lun#: The port ID, TID, and LUN which is described in the configuration definition file. For further information on fibre-to-SCSI address conversion, see the *Hitachi Command Control Interface Installation and Configuration Guide*.

LDEV#: The LDEV ID for the specified device.

Oldstat: The old pair status when the status of the volume is changed.

Newstat: The new pair status when the status of the volume is changed.

code: The storage system-internal code for the specified status.

The following table specifies the results of the *pairmon* command options.

Table 2-5 Results of pairmon command options

-D	- nowait	- resevt	- allsnd	Actions
-D	-	-	-	When HORCM does not have an event, this option waits until an event occurs. If one or more events exist, then it reports one event and resets the event which it reported.
Invalid	-	-	-allsnd	When HORCM does not have an event, this option waits until an event occurs. If one or more events exist, then it reports all events.
Invalid	-	-resevt	-	When HORCM does not have an event, this option waits until an event occurs. If one or more events exist, then it reports one event and resets all events.
Invalid	-	-resevt	-allsnd	When HORCM does not have an event, this option waits until an event occurs. If one or more events exist, then it reports all events and resets all events.
Invalid	-nowait	-	-	When HORCM does not have an event, this option reports event nothing. If one or more events exist, then it reports one event and resets the event which it reported.
Invalid	-nowait	-	-allsnd	When HORCM does not have an event, this option reports event nothing. If one or more events exist, then it reports all events.
Invalid	-nowait	-resevt	-	When HORCM does not have an event, this option reports event nothing. If one or more events exist, then it reports one event and resets all events.
Invalid	-nowait	-resevt	-allsnd	When HORCM does not have an event, this option reports event nothing. If one or more events exist, then it reports all events and resets all events.

pairvolchk

The *pairvolchk* command checks the attributes and status of a pair volume. It acquires and reports the attribute of a volume or group connected to the local host (issuing the command) or remote host. The volume attribute is SMPL (simplex), P-VOL (primary volume), or S-VOL (secondary volume). The -s[s] option reports the pair status in addition to the attribute.

Syntax

```
pairvolchk { -h | -q | -z | -I[H][M][instance#] or
             I[TC][SI][instance#] | -g <group> | -d <pair Vol>
             | -d[g] <raw_device> [MU#] | -FHORC [MU#] | -FMRCF [MU#]
             | -d[g] <seq#> <LDEV#> [MU#] | -c | -ss | -nomsg }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.

Option	Description
-q	Terminates the interactive mode and exits the pair volume check command.
-z or -zx	Makes the pairvolchk command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies the group name defined in the configuration definition file. This option must always be specified. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	Specifies the paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volumes.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-c	Checks the conformability of the paired volumes of the local and remote hosts and reports the volume attribute of the remote host. If this option is not specified, the volume attribute of the local host is reported.
-ss	Used when acquiring the attribute of a volume and the pair status of a volume. If this option is not specified, the volume attribute is reported.
-nomsg	Suppresses messages to be displayed when this command is executed. It is used to execute a command from a user program. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.
-FHORC [MU#] or -FCA [MU#]	Forcibly specifies a cascading remote copy volume for specified pair logical volumes on local copy environment. If no -c option is specified, this option acquires the attributes of a cascading remote copy volume on a local host (near site). If the -c option is specified, this option acquires the attributes of a cascading remote copy volume on a remote host (far site).

Option	Description
-FMRCF [MU#] or -FBC [MU#]:	Forcibly specifies a cascading local copy volume for specified pair logical volumes on remote copy environment. If no -c option is specified, acquires the attributes of a cascading local copy volume on a local host (near site). If the -c option is specified, acquires the attributes of a cascading local copy volume on a remote host (far site).

Returned values

The **pairvolchk** command sets the following returned values during exit allowing you to check the execution results.

Table 2-6 pairvolchk returned values

Condition	Value
When the -ss option is not specified	Normal termination: 1: The volume attribute is SMPL. 2: The volume attribute is P-VOL. 3: The volume attribute is S-VOL. Abnormal termination: Other than 0 to 127, refer to the error codes for error details.
When the -ss option is specified	Normal termination: 11: The status is SMPL. Abnormal termination: specific error codes (see Error Codes) and generic error codes.
For TrueCopy, ShadowImage, Copy-on-Write Snapshot, Volume Migration	22: The status is PVOL_COPY or PVOL_RCPY. 23: The status is PVOL_PAIR. 24: The status is PVOL_PSUS. 25: The status is PVOL_PSUE. 26: The status is PVOL_PDUB (TrueCopy & LUSE volume only). 32: The status is SVOL_COPY or SVOL_RCPY. 33: The status is SVOL_PAIR. 34: The status is SVOL_PSUS. 35: The status is SVOL_PSUE. 36: The status is SVOL_PDUB (TrueCopy & LUSE volume only). To identify TrueCopy Async/Universal Replicator, the pairvolchk command returns a value which is 20 more than the TrueCopy status code and adds PFUL and PFUS states to return code to identify sidefile status of TrueCopy Async or Universal Replicator journal file.

Condition	Value
For TrueCopy Async and Universal Replicator	42: The status is PVOL_COPY. 43: The status is PVOL_PAIR. 44: The status is PVOL_PSUS. 45: The status is PVOL_PSUE. 46: The status is PVOL_PDUB. (TrueCopy & LUSE volume only) 47: The status is PVOL_PFUL. 48: The status is PVOL_PFUS. 52: The status is SVOL_COPY or SVOL_RCPY. 53: The status is SVOL_PAIR. 54: The status is SVOL_PSUS. 55: The status is SVOL_PSUE. 56: The status is SVOL_PDUB. (TrueCopy & LUSE volume only) 57: The status is SVOL_PFUL. 58: The status is SVOL_PFUS.
For Copy-on-Write Snapshot	Copy-on-Write Snapshot needs to show the status of Full of the Copy-on-Write Snapshot Pool as Copy-on-Write Snapshot condition. For this purpose, Copy-on-Write Snapshot also uses PFUL and PFUS status which is the status of Full of the sidefile for TrueCopy Async. The APP can refer this status as the return value. 22: The status is PVOL_COPY or PVOL_RCPY. 23: The status is PVOL_PAIR. 24: The status is PVOL_PSUS. 25: The status is PVOL_PSUE. 26: The status is PVOL_PDUB. (TrueCopy & LUSE volumes only) 27: The status is PVOL_PFUL. (PAIR closing Full status of the Copy-on-Write Snapshot Pool) 28: The status is PVOL_PFUS. (PSUS closing Full status of the Copy-on-Write Snapshot Pool) 32: The status is SVOL_COPY or SVOL_RCPY. 33: The status is SVOL_PAIR. 34: The status is SVOL_PSUS. 35: The status is SVOL_PSUE. 36: The status is SVOL_PDUB. (TrueCopy & LUSE volumes only) 37: The status is SVOL_PFUL. (PAIR closing Full status of the Copy-on-Write Snapshot Pool) 38: The status is SVOL_PFUS. (PSUS closing Full status of the Copy-on-Write Snapshot Pool) You can set the threshold for the specified pool via Storage Navigator. The default value is 80% of pool capacity. PFUS is set when the Copy-on-Write Snapshot pool became over threshold in the PSUS state. PFUL is set when the Copy-on-Write Snapshot pool became over threshold in the PAIR state.

Error codes

Category	Error code	Error message	Recommended action	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	Confirm status using the pairedisplay command. Make sure all volumes in the group have the same fence level and volume attributes.	236
	EX_EVOLCE	Pair volume combination error	Confirm pair status using the pairedisplay command, and change combination of volumes.	235

Examples

Example 1

Display example for ShadowImage/Copy-on-Write Snapshot:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR ]
```

Display example for ShadowImage (specified with "-m grp" option):

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR, CTGID = 1 ]
```

Display example for TrueCopy:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR, fence = DATA,
MINAP = 2 ]
```

Display example for TrueCopy Sync CTG:

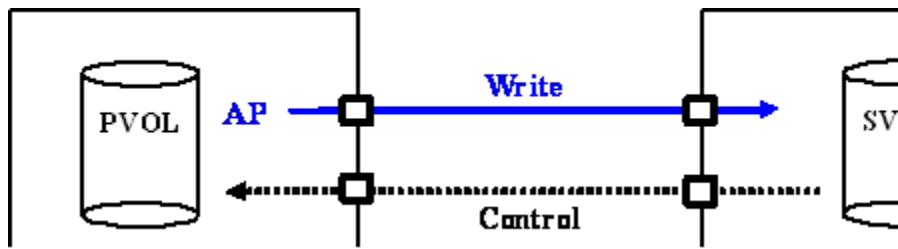
```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR, fence = DATA,
CTGID = 2 MINAP = 2 ]
```

Display example for TrueCopy Async:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR fence = ASYNC
CTGID = 2 MINAP = 2 ]
```

MINAP displays the following two conditions (status) according to the pair status:

PVOL: This shows the minimum in Active Paths on specified group in TrueCopy/TrueCopy Async.



SVOL_ SSUS(SSWS): MINAP shows the result of the suspend operation that indicates whether the remaining data on PVOL was completely passed (synchronized) to SVOL. If MINAP is "one", all data is passed. Otherwise, all data is not passed from PVOL.

Note: If RAID F/W is not supporting the active paths, then the "MINAP" item is not displayed as follows:

```
pairvolchk : Volstat is P-VOL.[status = PAIR fence = ASYNC CTGID = 2]
```

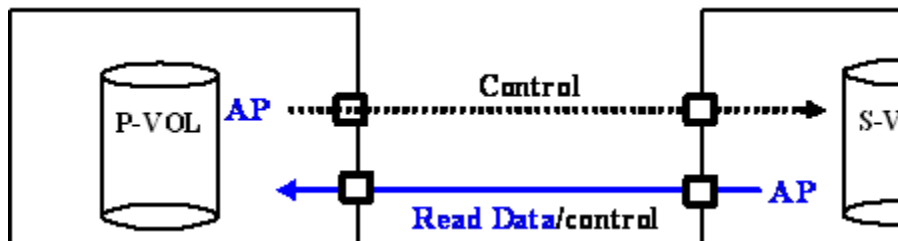
Example 2

Display example for Universal Replicator:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR fence = ASYNC
CTGID = 2 MINAP = 2 ]
```

MINAP displays the following two conditions (status) according to the pair status:

PVOL or SVOL_PAIR (except SSUS(SSWS)): this shows the minimum in Active Paths on specified group in Universal Replicator.



SVOL_ SSUS(SSWS): MINAP shows the result of the suspend operation that indicates whether or not the remaining All data on PVOL were Passed (synchronized) to SVOL completely. If MINAP is "one", All data were passed. If not, all data were not passed from PVOL.

Note: If RAID F/W is not supporting the active paths, then the "MINAP" item is not displayed as follows:

```
pairvolchk : Volstat is P-VOL.[status = PAIR fence = ASYNC
CTGID = 2]
```

Example 3

Display example for LDEV blockading:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR fence = DATA
MINAP = 2  LDEV = BLOCKED]
```

LDEV = BLOCKED: Displays the status of LDEV blockading in order to detect a link failure of E-LUN.

Example 4

The following shows examples of the **pairvolchk** command and its output.

TrueCopy Async:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR fence = ASYNC
CTGID = 2]
```

TrueCopy:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR fence = DATA ]
```

ShadowImage:

```
pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR ]
```

ShadowImage at-time split:

```
# pairvolchk -g oradb
pairvolchk : Volstat is P-VOL.[status = PAIR CTGID = 1]
```

Example 5

The following shows a pairvolchk example that acquires the status (PVOL_PSUS) of the intermediate P/Pvol through specified pair group on ShadowImage environment. The following figure shows a pairvolchk example that acquires the status (PVOL_PSUS) of the intermediate S/Pvol (MU#1) through specified pair group on TrueCopy environment.

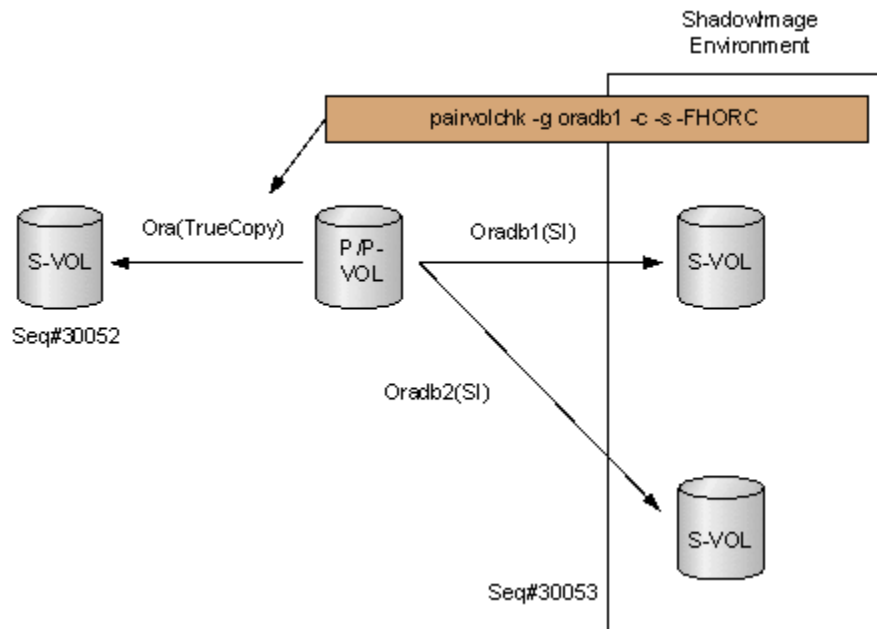


Figure 2-19 Example of -FHORC option for pairvolchk

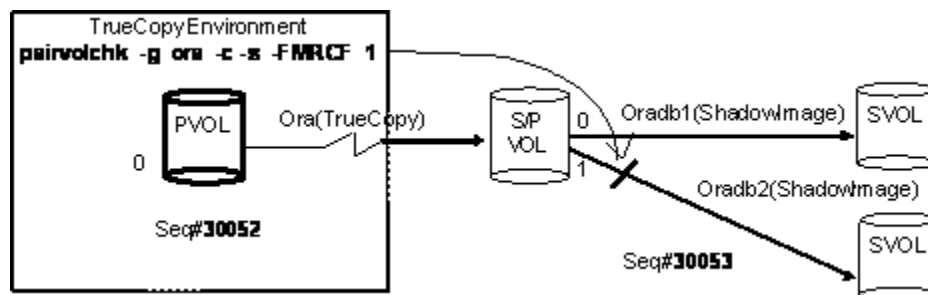


Figure 2-20 Example of -FMRCF option for pairvolchk

The following table shows the truth table for *pairvolchk* group status display.

Table 2-7 Truth table for pairvolchk group status display

Option	COPY/RCPY	PSUE	PDUB	PFUS	PSUS	PFUL	PAIR	Group status
See Note below	Status of each volume in the group							-
	TRUE	x	x	x	x	x	x	COPY/RCPY
	false	TRUE	x	x	x	x	x	PSUE
	false	false	TRUE	x	x	x	x	PDUB
	false	false	false	TRUE	x	x	x	PFUS
	false	false	false	false	TRUE	x	x	PSUS
	false	false	false	false	false	TRUE	x	PFUL
	false	false	false	false	false	false	TRUE	PAIR

Option	COPY/RCPY	PSUE	PDUB	PFUS	PSUS	PFUL	PAIR	Group status
-ss	TRUE	x	x	x	x	x	x	COPY/RCPY
	false	TRUE	x	x	x	x	x	PSUE
	false	false	TRUE	x	x	x	x	PDUB
	false	false	false	x	x	TRUE	x	PFUL
	false	false	false	x	x	false	TRUE	PAIR
	false	false	false	TRUE	false	false	false	PFUS
	false	false	false	false	TRUE	false	false	PSUS
	TRUE	x	x	x	x	x	x	COPY/RCPY

The PFUL state appears as PAIR by all commands (except the -fc option of the *pairdisplay* command), since PFUL indicates PAIR state with sidefile at the HWM.

The PFUS state appears as PSUS by all commands (except the -fc option of the *pairdisplay* command), since PFUS indicates SUSPENDED state due to sidefile full.

The SVOL_PSUS state appears as SSUS by the *pairdisplay* command and other commands.

Note: This option can be used only when 'pairvolchk -s' has "USE_OLD_VCHK" variable.

pairdisplay

The *pairdisplay* command displays the pair status allowing you to verify completion of pair operations (for example, paircreate, pairresync). The *pairdisplay* command is also used to confirm the configuration of the pair volume connection path (the physical link of paired volumes and servers). The *pairdisplay* command can be used for a paired volume or a group of paired volumes.

Syntax

```
pairdisplay{ -h | -q | -z | -I[H][M][instance#] or
             I[TC][SI][instance#]
             | -g <group> | -d <pair Vol> | -d[g] <raw_device> [MU#]
             | -FHORC [MU#] | -FMRCF [MU#] | -d[g] <seq#> <LDEV#> [MU#]
             | -c | -l | -f[xcdmew] | -CLI | -m <mode> | -v jnl[t]
             | -v ctg | -v pid }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the pair volume check command.

Option	Description
-z or -zx	Makes the pairedisplay command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies the group name defined in the configuration definition file. This option must always be specified. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	This option is used to specify the paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volumes.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-FHORC [MU#] or -FCA [MU#]	Forcibly specifies a cascading remote copy volume for specified pair logical volumes on local copy environment. If the -l option is specified, this option displays status of a cascading remote copy volume on a local host (near site). If no -l option is specified, this option displays status of a cascading remote copy volume on a remote host (far site). This option cannot be specified with -m <mode> option on the same command line.
-FMRCF [MU#] or -FBC [MU#]	Forcibly specifies a cascading local copy volume for specified pair logical volumes on remote copy environment. If the -l option is specified, this option displays status of a cascading local copy volume on a local host (near site). If no -l option is specified, this option displays status of a cascading local copy volume on a remote host (far site). This option cannot be specified with -m <mode> option on the same command line.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-c	Checks the configuration of the paired volume connection path (physical link of paired volume among the servers) and displays illegal pair configurations. If this option is not specified, the status of the specified paired volume is displayed without checking the path configuration.
-l	Displays the paired volume status of the local host (which issues this command).
-fx	Displays the LDEV ID as a hexadecimal number.

Option	Description
-fc	Displays copy operation progress, sidefile percentage, bitmap percentage, or Universal Replicator journal percentage. Displays PFUL/PFUS for TrueCopy Async/Universal Replicator. Used to confirm SSWS state as indication of SVOL_SSUS-takeover after.
-fd	Displays the relation between the Device_File and the paired volumes, based on the group (as defined in the local instance configuration definition file). If Device_File column shows "Unknown" to either the local or the remote HOST (instance) then it shows a volume which is not recognized on own HOST, and pair operation are rejected (except the local option such as "-l") in protection mode. Display example: <pre># pairdisplay -g oradb -fd Group PairVol (L/R) Device_File M ,Seq#,LDEV#.P/S,Status, Seq#,P-LDEV# M oradb oradev1(L) c0t3d0 0 35013 17..P-VOL COPY, 35013 18 - oradb oradev1(R) c0t3d1 0 35013 18..S-VOL COPY, 35013 17 -</pre>
-fm	Displays the Bitmap mode to output of M column.

Option	Description
-fe	Displays the serial# and LDEV# of the external LUNs mapped to the LDEV and additional information for the pair volume. This option displays the information above by adding to last column, and then ignores the format of 80 column. This option is invalid if the cascade options (-m all,-m cas) are specified. Display example for remote copy: <pre># pairdisplay -g horc0 -fe Group ... LDEV#.P/S,Status,Fence,Seq#,P-LDEV# M CTG JID AP EM E-Seq# E-LDEV# horc0 ... 41.P-VOL PAIR ASYNC ,63528 40 - 0 - 2 - - - horc0 ... 40.S-VOL PAIR ASYNC ,----- 41 - 0 - - - - -</pre> Display example for local copy: <pre># pairdisplay -g horc0 -fe Group ... Seq#,LDEV#.P/S,Status, Seq#,P-LDEV# M CTG CM EM E-Seq# E-LDEV# horc0 ... 63528 65.P-VOL COPY,63528 64 - - N - - - horc0 ... 63528 64.S-VOL COPY,----- 65 - - N - - -</pre> <i>CTG</i>: For remote copy, the CT group ID when the Fence is shown as ASYNC. For TrueCopy Sync CTG, displays the CT group ID when the Fence is shown as DATA/STATUS/NEVER. For ShadowImage, the CT group ID on at-time split volumes using ShadowImage. <i>JID</i>: The journal ID for PVOL or SVOL. 'NOT Universal Replicator volume' is shown as '-'. <i>AP</i>: The number of active paths for Universal Replicator links on PVOL, and it displays the number of active paths for Universal Replicator links on PVOL and SVOL.'Unknown'is shown as '-'. Refer to "MINAP" information that is displayed by running the pairvolchk command. <i>CM</i>: The Copy mode • N: Non SnapShot • S: SnapShot. In the SMPL state, this shows that pair-volume is created as SnapShot. • C: Cruising Copy <i>EM</i>: The external connection mode • H: Mapped E-lun as hidden from the host. • V: Mapped E-lun as visible to the host • ' - ': Unmapped to the E-lun • BH: Mapped E-lun as hidden from the host, but LDEV blockading. • BV: Mapped E-lun as visible to the host, but LDEV blockading • B: Unmapped to the E-lun, but LDEV blockading <i>E-Seq#</i>: The production (serial) number of the external LUN, 'Unknown' is shown as '-'. <i>E-LDEV#</i>: The LDEV# of the external LUN, 'Unknown' is shown as '-'.

Option	Description
-fw	Used when displaying the WWN setting (defined by "50060E80+RAID Type,Serial#,Port#)) to the port instead of a port name. If this option is specified with the "-fe" option at the same line, then "LUN WWN" appears as shown below. If WWN is not computed, then "Unknown" appears (for example, SCSI). Display example: <pre># pairdisplay -g PG01 -fw Group PairVol (L/R) (WWN, LU-M), Seq#, LDEV#, P/S, Status, Seq#, P- LDEV# M PG01 ora01(L) (500060e804f42001, 3-0) 62496 67. P-VOL COPY, 62496 69 - PG01 ora01(R) (500060e804f42001, 5-0) 62496 69. S-VOL COPY, - ---- 67 - PG01 ora02(L) (500060e804f42001, 4-0) 62496 68. P-VOL COPY, 62496 64 - PG01 ora02(R) (500060e804f42001, 6-0) 62496 64. S-VOL COPY, - ---- 68 -</pre> Display example: <pre># pairdisplay -IH -g PG01 -CLI -l -fweGroup PairVol L/R WWN LU Seq# LDEV# P/S Status Fence Seq# P-LDEV# M CTG JID AP EM E-Seq# E-LDEV# LUN-WWN PG01 oradb01 L 500060e804fa0f01 1 64015 11 P-VOL PAIR ASYNC 62496 11 - 5 - 1 - - - 60060e8005fa0f000000fa0f0000000b PG01 oradb02 L 500060e804fa0f01 2 64015 12 P-VOL PAIR ASYNC 62496 12 - 5 - 1 - - - 60060e8005fa0f000000fa0f0000000c</pre>
-CLI	Used when specifying display for command line interface (CLI). This option displays to the same position that defined number of columns, and displays one header. The delimiters between columns are displayed as spaces or hyphens (-). Display example: <pre>Group PairVol L/R Port# TID LU-M Seq# LDEV# P/S Status Seq# P-LDEV# M homrcf1 deva0 L CL1-D 3 5 0 30053 271 P-VOL PAIR 30053 263 - homrcf1 deva1 L CL1-D 3 5 1 30053 271 SMPL - - - - homrcf1 deva2 L CL1-D 3 5 2 30053 271 SMPL - - - -</pre>
-m <mode>	Used when displaying a paired status of each mirror descriptors for the specified pair logical volume, and used for paired status indication of the cascading volume. The <mode> option can be designated "cas" or "all" : - The "cas" option is used when displaying a paired status of specified group that is registered to the mirror descriptor (MU#) on the cascading configuration file. - The "all" option is used when displaying a paired status of all mirror descriptors (MU#). This option (-m <mode>) is not affected with command execution environment (local and remote copy), and displays the paired status. This option cannot be specified with the -FHORC/-FMRCF option on the same command line.

Option	Description
-v jnl[t]	Displays the JNL status for the local and remote interconnected to the group. Also finds the journal ID for each local and remote interconnected to the group via the specified group or <raw_device>, and displays information of each journal ID corresponding the local and remote. The first line shows the journal information for the local host, second line shows the journal information for the remote host. The item for displaying is the same as raidvchkscan -v jnl[t]. Example: <pre># pairdisplay -g VG01 -v jnl JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ(BLK) Seq# Nnm LDEV# 001 0 2 PJNN 4 21 43216fde 30 512345 62500 2 265 002 0 2 SJNN 4 95 3459fd43 52000 512345 62538 3 270</pre> Example: <pre># pairdisplay -g VG01 -v jnlt JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ(BLK) Seq# DOW PBW APW 001 1 2 PJNN 4 21 43216fde 30 512345 62500 20 300 40 002 1 2 SJNN 4 95 3459fd43 52000 512345 62538 20 300 40</pre> Example: <pre># pairdisplay -g VG01 -v jnl -FCA 1 JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ(BLK) Seq# Nnm LDEV# 003 1 2 PJNN 4 21 43216fde 30 512345 62500 2 265</pre> Notes: - This option can be specified with following options on the same command line: <pre>{-g<group> -d <pair Vol> -d[g] <raw_device> [MU#] -FCA [MU#] -d[g] <seq#> <LDEV#> [MU#] -l -f[x] }</pre> - The "-FHORC [MU#]" or "-FCA [MU#]" option is used when displaying the journal information of cascading Universal Replicator volume, and then it shows the journal information for the remote host only. - This option displays nothing if the target volume is NOT a Universal Replicator volume.

Option	Description
-v ctg	This option finds the CT group for each local and remote interconnected to the group via the specified group or <raw_device>, and displays any information of each CT group corresponding the local and remote. The first line shows the CT group information for the local host, second line shows the CT group information for the remote host. Example: <pre># pairdisplay -g VG01-v ctg CTG P/S Status AP U(%) Q-Marker QM-Cnt SF(%) Seq# IFC OT/s CT/m RT/m 001 P-VOL PAIR 2 0 00000080 3 50 63528 ON 90 5 5 001 S-VOL PAIR - 0 0000007d - 50 63528 - - - -</pre> CTG: Displays the CT group ID. P/S: The attribute of a volume in first LDEV of the specified group. Status: The status of the paired volume in first LDEV of the specified group. AP: Displays the number of Active Path in Universal Replicator links on PVOL, also displays the number of active path in Universal Replicator links on PVOL and SVOL, 'Unknown' is shown as '-'. U(%): The usage sidefile/ journal data, it is valid at PAIR state. For TrueCopy Async: The sidefile percentage for CT Group in relationship to a 100% full sidefile in cache. For Universal Replicator: The usage rate of the current journal data as 100% of the journal data space. Q-Marker: In PVOL, the latest sequence # of the MCU PVol when the write command was received. In SVOL, the latest sequence # of the DFW on RCU. This item is valid at PAIR state. QM-Cnt: The number of remaining Q-Marker within CT group of the Unit. TrueCopy Async sends a token called "dummy recordset" at regular interval time, therefore QM-Cnt always shows "2" or "3" even if host has NO writing. This item is valid at PAIR state. SF(%): The usage of cache setting as the sidefile regardless of Universal Replicator and TrueCopy Async. Seq#: The serial number of the RAID storage system. IFC: Shows "ON"/ "OFF" for controlling Inflow. OT/s: The "offloading timer" (in unit of Sec.) setting to CT group for TrueCopy Async/Universal Replicator. In Universal Replicator, this is the same as "DOW" item shown by raidvchksan -v jnlt or pairdisplay -v jnlt. CT/m: The "Copy Pending timer" (in unit of Min.) setting to CT group for only TrueCopy Async. RT/m: The "RCU Ready timer" (in unit of Min) setting to CT group for only TrueCopy Async. Note: This option displays nothing if the target volume is NOT TrueCopy Async/Universal Replicator volume. The "-FHORC [MU#]" or "-FCA [MU#]" option is used when displaying the information of cascading TrueCopy Async/Universal Replicator volume, and then it shows the CT group information for the remote host only.

Option	Description
-v pid	Finds the pool ID for each local and remote interconnected to the group via the specified group or <raw_device>, and displays any information of each pool ID corresponding the local and remote. The first line shows the pool information for the local host, second line shows the pool information for the remote host. The displayed items are the same as for raidvchkscan -v pid. Example: <pre># pairdisplay -g VG01 -v pid PID POLS U(%) SSCNT Available(MB) Capacity(MB) Seq# Num LDEV# H(%) 127 POLN 0 6 3000 3000 63528 2 864 80 127 POLN 0 6 3000 3000 63528 2 864 80</pre> # pairdisplay -g VG01 -v pid -l <pre>PID POLS U(%) SSCNT Available(MB) Capacity(MB) Seq# Num LDEV# H(%) 127 POLN 0 6 3000 3000 63528 2 864 80</pre> H(%): Displays the threshold rate being set to the Copy-on-Write Snapshot pool as High water mark. 'Unknown' is shown as '-'. Note: This option displays nothing if the target volume is NOT Copy-on-Write Snapshot volume.
-v pid -FMRCF	The "-FBC [MU#]" option is used for displaying the pool information of cascading Copy-on-Write Snapshot volume, so that you can know/monitor the pool status on remote host connected to cascading TrueCopy_PVOL to TrueCopy_SVOL/Copy-on-Write Snapshot_PVOL. It shows the pool information for the remote host only. Example: <pre># pairdisplay -g VG01 -v pid -FMRCF PID POLS U(%) SSCNT Available(MB) Capacity(MB) Seq# Num LDEV# H(%) 127 POLN 0 6 3000 3000 63528 2 864 80</pre>

Returned values

The **pairdisplay** command sets the following returned values during exit allowing you to check the execution results.

Normal termination:

- 1: The volume attribute is SMPL.
- 2: The volume attribute is P-VOL.
- 3: The volume attribute is S-VOL. When displaying groups, 1/2/3 = normal termination for all pairs.

Abnormal termination (other than 0 to 127): refer to the error codes for error details.

Examples

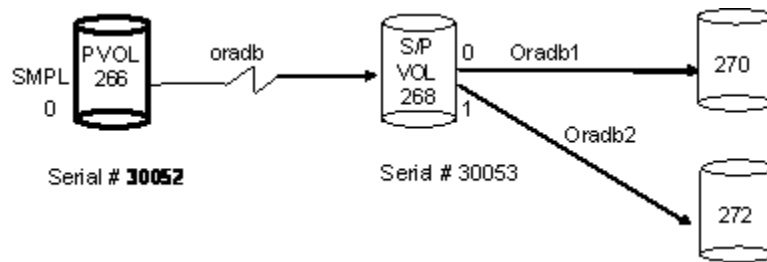
TrueCopy/Universal Replicator **pairdisplay** command example:

```
# pairdisplay -g oradb -fcx
Group Pair Vol(L/R) (P,T#,L#), Seq#, LDEV#..P/S, Status,
Fence, Copy%, P-LDEV# M
oradb oradb1(L) (CL1-B, 1,0) 1234 64..P-VOL PAIR
Never, 75 C8 -
oradb oradb1(R) (CL1-A, 1,0) 5678 C8..S-VOL PAIR
Never, ---- 64 -
```

ShadowImage/Copy-on-Write Snapshot **pairdisplay** command example:

```
# pairdisplay -g oradb
Group Pair Vol(L/R) (Port#,TID,LU-M), Seq#, LDEV#..P/S, Status,
Fence, Seq#, P-LDEV# M
oradb oradb1(L) (CL1-A, 1,0) 30053 18..P-VOL PAIR
Never, 30053 19 -
oradb oradb1(R) (CL1-D, 1,0) 30053 19..S-VOL PAIR
Never, ---- 18 -
```

Examples of **pairdisplay -m**



Display example for -m cas:

```
# pairdisplay -g oradb -m cas
Group PairVol(L/R) (Port#,TID,LU-M), Seq#, LDEV#..P/S, Status,
Seq#, P-LDEV# M
oradb oradev1(L) (CL1-D , 3, 0-0) 30052 266....SMPL ----,
----- -
oradb oradev1(L) (CL1-D , 3, 0) 30052 266....P-VOL COPY,
30053 268 -
oradb1 oradev11(R) (CL1-D , 3, 2-0) 30053 268....P-VOL COPY,
30053 270 -
oradb2 oradev21(R) (CL1-D , 3, 2-1) 30053 268....P-VOL PSUS,
30053 272 W
oradb oradev1(R) (CL1-D , 3, 2) 30053 268....S-VOL COPY,
----- 266 -
```

Display examples for -m all:

```
# pairdisplay -g oradb -m all
Group PairVol(L/R) (Port#,TID,LU-M), Seq#, LDEV#..P/S, Status,
Seq#, P-LDEV# M
oradb oradev1(L) (CL1-D , 3, 0-0) 30052 266....SMPL ----,
----- -
----- (L) (CL1-D , 3, 0-1) 30052 266....SMPL ----,
----- -
----- (L) (CL1-D , 3, 0-2) 30052 266....SMPL ----,
----- -
oradb oradev1(L) (CL1-D , 3, 0) 30052 266....P-VOL PAIR,
30053 268 -
oradb1 oradev11(R) (CL1-D , 3, 2-0) 30053 268....P-VOL COPY,
30053 270 -
oradb2 oradev21(R) (CL1-D , 3, 2-1) 30053 268....P-VOL PSUS,
30053 272 W
----- (R) (CL1-D , 3, 2-1) 30053 268....SMPL ----,
----- -
oradb oradev1(R) (CL1-D , 3, 2) 30053 268....S-VOL COPY,
```

```

----- 266      -

# pairdisplay -d /dev/rdisk/c0t3d0 -l -m all
Group  PairVol(L/R) (Port#,TID,LU-M), Seq#,  LDEV#...P/S,  Status,
Seq#, P-LDEV# M
oradb  oradev1(L)   (CL1-D , 3, 0-0) 30052 266....SMPL ----,
-----
----- (L)       (CL1-D , 3, 0-1) 30052 266....SMPL ----,
-----
----- (L)       (CL1-D , 3, 0-2) 30052 266....SMPL ----,
-----
oradb  oradev1(L)   (CL1-D , 3, 0) 30052 266....P-VOL PAIR,
30053 268      -

```

Output of the **pairdisplay** command:

Group = group name (dev_group) as described in the configuration definition file

Pair Vol(L/R) = paired volume name (dev_name) as described in the configuration definition file. (L) = local host; (R) = remote host

(P,T#,L#) (TrueCopy/Universal Replicator) = port, TID, and LUN as described in the configuration definition file.

(Port#,TID,LU-M) (ShadowImage/Copy-on-Write Snapshot) = port number, TID, LUN, and MU number as described in the configuration definition file.

Seq# = serial number of the RAID storage system

LDEV# = logical device number

P/S = volume attribute

Status = status of the paired volume

Fence (TrueCopy/Universal Replicator) = fence level

% = copy operation completion, or percent pair synchronization

Vol.	Copy	Pair	Other	Copy	Pair	Other	Copy	Pair	Pvol_psus Svol_copy	Other
	TrueCopy Async			TrueCopy Sync status			ShadowImage/Copy-on-Write Snapshot status			
PVOL	CR	SF	BMP	CR	BMP	BMP	CR	CR	BMP	CR
SVOL	-	SF	BMP	-	BMP	BMP	CR	CR	CR	CR

Volume	Copy	Pair	PSUS/SSUS (PJNS/SJNS)	Other
	Universal Replicator status			
PVOL	CR	JF	JF	BMP
SVOL	-	JF	JF	BMP

Volume	Copy	Pair	PSUS/SSUS (PJNS/SJNS)	Other
CR: Shows the copy operation rate (identical rate of a pair). BMP: Shows the identical percentage of BITMAP both PVOL and SVOL. SF: Shows sidefile percentage of each CT group as sidefile 100% on cache of both PVOL and SVOL. Following is an arithmetic expression using the high water mark (HWM) as 100% of a sidefile space: $\text{HWM}(\%) = \text{HWM}(\%) / \text{Sidefile space (30 to 70)} \times 100$ JF: Shows the usage rate of the current journal data as 100% of the journal data space.				

P-LDEV# = LDEV number of the partner volume of the pair

M

For P-VOL and "PSUS" state:

M="W" shows that S-VOL is suspending with R/W enabled through the pairsplit.

M="-" shows that S-VOL is suspending with Read only through the pairsplit.

For S-VOL and "SSUS" state:

M="W" shows that S-VOL has been altered since entering SSUS state.

M="-" shows that S-VOL has NOT been altered since entering SSUS state.

For "COPY/RCPY/PAIR/PSUE" state:

M="N" shows that its volume are Read-disabled through the paircreate '-m noread'.

paircurchk

The **paircurchk** command is used to check the currency of the TrueCopy secondary volume(s) by evaluating the data consistency based on pair status and fence level.

The following table specifies the data consistency for each possible state of a TrueCopy volume. A paired volume or group can be specified as the target of the **paircurchk** command. The **paircurchk** command assumes that the target is an S-VOL. If the **paircurchk** command is specified for a group, the data consistency of each volume in the group is checked, and all inconsistent volumes are found in the execution log file and displayed. The **paircurchk** command is also executed as part of the **horctakeover** command (see next section).

Table 2-8 Data consistency displayed by the paircurchk command

Object Volume			Currency	
Attribute	Status	Fence	Paircurchk	SVOL_takeover
SMPL	-	-	To be confirmed	-
P-VOL	-	-	To be confirmed	-

Object Volume			Currency	
Attribute	Status	Fence	Paircurchk	SVOL_takeover
S-VOL	COPY	Data	Inconsistent	Inconsistent
		Status		
		Never		
		Async	Inconsistent	Inconsistent
	PAIR	Data	OK	OK
		Status	OK	OK
		Never	To be analyzed	To be analyzed
	PAIR	Async	To be analyzed	OK (assumption)
	PFUL		To be analyzed	OK (assumption)
	PSUS	Data	Suspected	Suspected
		Status	Suspected	Suspected
		Never	Suspected	Suspected
	PSUS	Async	Suspected	Suspected
	PFUS		Suspected	OK (assumption)
	PSUE	Data	OK	OK
	PDUB	Status	Suspected	Suspected
		Never	Suspected	Suspected
		Async	Suspected	OK (assumption)
	SSWS	Data	Suspected	-
		Status	Suspected	
		Never	Suspected	
		Async	Suspected	

Legend:
To be confirmed = It is necessary to check the object volume, since it is not the secondary volume.
Inconsistent = Data in the volume is inconsistent because it was being copied.
OK (assumption) = Mirroring consistency is not assured, but as S-VOL of TrueCopy Async/Universal Replicator, the sequence of write data is ensured.

Syntax

```
paircurchk { -h | -q | -z | -I[H][M][instance#] or
I[TC][SI][instance#]
    | -g <group> | -d <pair Vol> | -d[g] <raw_device> [MU#]
    | -d[g] <seq#> <LDEV#> [MU#] | -nomsg }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.

Option	Description
-z or -zx	Makes the paircurchk command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name defined in the configuration definition file. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	Specifies paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volume.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-nomsg:	Suppresses messages to be displayed when this command is executed. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.

Returned values

The paircurchk command sets the following returned values during exit allowing you to check the execution results.

Normal termination (data is consistent): 0

Abnormal termination: other than 0, refer to the error codes for error details.

Error codes

The following table lists and describes the error codes for the *paircurchk* command. Unrecoverable errors are fixed and is not resolved, even after re-executing the command. If the command fails, the detailed status is logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

Table 2-9 Specific error code for paircurchk

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_VOLCUR	S-VOL currency error	Check volume list to see if an operation was directed to the wrong S-VOL.	225

Examples

The following shows an example of the *paircurchk* command for a group and the resulting display of inconsistent volumes in the specified group.

```
# paircurchk -g oradb
Group Pair vol Port targ# lun# LDEV# Volstatus Status Fence
To be...
oradb oradb1 CL1-A 1 5 145 S-VOL PAIR NEVER
Analyzed
oradb oradb2 CL1-A 1 6 146 S-VOL PSUS STATUS
Suspected
```

horctakeover

The **horctakeover** command is a scripted command for executing several takeover operations. The **horctakeover** command checks the specified volume's or group's attributes (**paircurchk**), decides the takeover function based on the attributes, executes the chosen takeover function, and returns the result. The four takeover functions designed for HA software operation are (see *Horctakeover command functions* in the *User and Reference Guide*): takeover-switch, swap-takeover, PVOL-takeover, and SVOL-takeover. A paired volume or a group can be specified as the target of the TrueCopy takeover command. If SVOL-takeover is specified for a group, the data consistency check is executed for all volumes in the group, and all inconsistent volumes are found in the execution log file and displayed (same as **paircurchk** command). You can execute the **horctakeover** command only for remote copy pairs.

The **horctakeover** command allows swapping of the primary and secondary volumes, so that if the primary or secondary volume is switched due to a server error or package transfer, duplex operations can be continued using the reversed volumes. When control is handed over to the current node, swapping the volumes again eliminates the need to copy them. The **horctakeover** command also allows the secondary volume to be separated for disaster recovery operations.

Syntax

```
horctakeover { -h | -q | -z | -I[H][M][instance#] or
               I[TC][SI][instance#] | -g <group> | -d <pair Vol>
               | -d[g] <raw_device> [MU#] | -d[g] <seq#> <LDEV#> [MU#]
               | -S | -l | -t <timeout> | -nomsg }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the horctakeover command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used to specify the CCI instance number.
-g <group>	Specifies a group name defined in the configuration definition file. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	Specifies paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volume.
-d[g] <raw_device > [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-S	Selects and executes SVOL-takeover. The target volume of the local host must be an S-VOL. If this option is specified, then the following "-l" option is invalid.
-l	Enables read and write to the primary volume(s) by a local host only without a remote host, and executes PVOL-takeover when the primary volume cannot be used because it is fenced (fence = DATA or STATUS, state = PSUE or PDUB, or PSUE or PDUB volume is contained in the group). If the primary volume can be accessed, nop-takeover is executed. The target volume of the local host must be a P-VOL.
-t <timeout>	Can be specified for asynchronous pairs only, ignored for synchronous pairs. Specifies the maximum time to wait (in seconds) for swap-takeover and SVOL-takeover operation to synchronize the P-VOL and S-VOL. If this timeout occurs, the horctakeover command fails with EX_EWSTOT. To avoid timeout, set this value less than or equal to the start-up timeout value of the HA control script.
-nomsg	Suppresses messages to be displayed when this command is executed. This option must be specified at beginning of a command argument. The command execution log is not affected by this option.

Returned values

The **horctakeover** command sets the following returned values during exit allowing you to check the execution results.

Normal termination:

0: Nop-takeover (no operation).

1: Swap-takeover was successfully executed.

2: SVOL-takeover was successfully executed.

3: PVOL-SMPL-takeover was successfully executed.

4: PVOL-PSUE-takeover was successfully executed. (This value depends on the microcode level.)

5: SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)

Abnormal termination: other than 0-5, refer to the error codes for error details.

Error codes

The following table lists and describes the error codes for the *horctakeover* command. Unrecoverable errors are fixed and not resolved, even after re-executing the command. If the command fails, the detailed status is logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

Table 2-10 Specific error codes for horctakeover

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	Confirm status using pairedisplay command. Make sure all volumes in the group have the same fence level and volume attributes.	236
	EX_INCSTG	Inconsistent status in group	Confirm pair status using pairedisplay.	229
	EX_EVOLCE	Pair Volume combination error	Confirm pair status using pairedisplay, and change combination of volumes.	235
	EX_VOLCUR	S-VOL currency error	Check volume list to see if an operation was directed to the wrong S-VOL.	225
	EX_VOLCUE	Local Volume currency error	Confirm pair status of the local volume.	224
	EX_VOLCRE	Local and Remote Volume currency error	Confirm pair status of remote and local volumes using pairedisplay command.	223
Timer (Recoverable)	EX_EWSTOT	Timeout waiting for specified status	Increase timeout value using -t option.	233

raidscan

The **raidscan** command displays configuration and status information for the specified port/TID(s)/LUN/MU#. The information is acquired directly from the storage system (not the configuration definition file).

Syntax

```
raidscan { -h | -q | -z | -I[H][M][instance#] or  
          -I[TC][SI][instance#] | -p <port> [hgrp] | -pd[g] <raw_device>  
          | -s <Seq#> | -t <targ> | -l <lun> | [ -f[xfgde] ] | -CLI  
          | -find[g] [op] [MU#] | [-g <group>] | -pi <strings>  
          | -m <MU#> }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidscan command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-p <port> [hgrp]	Specifies the port ID of the port to be scanned. Valid ports are CL1-A to CL1-R and CL2-A to CL2-R (excluding CL1-I, CL1-O, CL2-I, CL2-O). • For HUS VM: CL3-a to CL3-f, or CL8-a to CL8-d for the expanded port. • For VSP: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. • For USP V/VM: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. • For TagmaStore USP: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. • For TagmaStore NSC: CL3-a to CL3-h, or CL8-a to CL8-h for the expanded port. • For 9900V: CL3-a to CL3-r, or CL4-a to CL4-r for the expanded port. The port is not case sensitive (for example, CL1-A= cl1-a= CL1-a= cl1-A, CL3-a= CL3-A= cl3-a= cl3-A). This option must be specified if "-find" or "-pd <raw_device>" option is not specified. [hgrp] is specified to display only the LDEVs mapped to a host group on a port (9900V and later).

Option	Description
-pd[g] <raw_device>	Specifies the raw device name. This option finds Seq# and port_name of the storage system to which the specified device can be connected, and scans the port of the storage system which corresponds with the unit ID that searches the unit ID from Seq#. This option must be specified if the "-find" option is not specified. If this option is specified, the following -s <Seq#> option is invalid. The -pdg option is used when displaying a LUN on the host view by finding a host group (9900V and later).
-s <Seq#>	Used to specify the Seq# (serial#) of the storage system when this option cannot specify the unit ID which is contained for "-p <port>" option. This option scans the port specified by "-p <port>" option of the storage system which corresponds with the unit ID that searches the unit ID from Seq#. If this option is specified, then the unit ID that is contained in "-p <port>" option is invalid.
-t <targ>	Specifies the target ID of the specified port. If this option is not specified, the command applies to all target IDs.
-l <lun>	Specifies the LUN of the specified target ID. If this option is not specified, the command applies to all LUNs. If this option is specified, the TID must also be specified.
-f or -ff	Specifies display of volume-type for a display column. If this is specified, -f[g] [d] option is invalid.
-fx	Displays the LDEV number in hexadecimal notation.
-fg	Specifies display of group_name for a display column. This option searches a group on the configuration definition file (local CCI instance) from the scanned LDEV, and displays a group_name when the scanned LDEV is contained in the group. If this option is specified, the -f[f] option is not allowed and the -f[d] option is invalid.
-fd	Displays the Device_File that was registered to the group of the HORCM in the output, based on the LDEV (as defined in local instance config. def. file). If this option is specified, -f[f][g] option is not allowed.
-fe	Displays the serial# (E-Seq#) and LDEV# (E-LDEV#) of the external LUNs only mapped to the LDEV. If the external LUN mapped to the LDEV on a specified port does not exist, then this option will do nothing. Also if this option is specified, -f[f][g][d] option is not allowed. Display example: # raidscan -p cl1-a-0 -fe -CLI PORT# /ALPA/C TID# LU# Seq# Num LDEV# P/S Status Fence E-Seq# E-LDEV# CL1-A-0 ef 0 0 48 62468 2 256 SMPL - - 30053 17 CL1-A-0 ef 0 0 49 62468 2 272 SMPL - - 30053 23 CL1-A-0 ef 0 0 50 62468 1 288 SMPL - - 30053 28

Option	Description
-CLI	Specifies display for command line interface (CLI). This option displays to the same position that defined number of columns, and displays one header. The delimiters between columns are displayed as spaces or hyphens (-). Display example: <pre> Port# TargetID# Lun# Seq# Num LDEV# P/S Status Fence P- Seq# P-LDEV# CL1-C 1 0 30053 1 274 SMPL - - - - CL1-C 2 2 30053 1 260 P-VOL PAIR NEVER 30053 268 CL1-C 2 3 30053 1 261 P-VOL PAIR NEVER 30053 269 </pre>
-m <MU#	Displays only the cascading mirror specified by -m <MU#> option. To display the cascading mirror descriptor for Universal Replicator, -m <MU#> must be specified in TrueCopy command environment. If you want to display all cascading mirror descriptor, specify "-m all" for displaying all MUs.
-pi <strings>	Changes a strings via STDIN for -find option to "<strings>". If this option is specified, the -find option is ignored a raw device file provided via STDIN, and <strings> is used as input. A <strings> must be specified within 255 characters.
-find [op] [MU#]	Executes the specified [op] using a raw device file provided via STDIN. If the -pi <strings> option is specified, this option does not use a strings via STDIN, and -pi <strings> is used as input. Restrictions: Special files via STDIN are specified in the following ways: • HP-UX: /dev/rdisk/* or /dev/rdisk/disk* • Solaris: /dev/rdisk/*s2 or c*s2 • Linux: /dev/sd... or /dev/rd..., /dev/raw/raw*. • zLinux: /dev/sd... or /dev/dasd... or /dev/rd... /dev/raw/raw*. • IBM® AIX®: /dev/rhdisk* or /dev/hdisk* or hdisk* • DIGITAL or Tru64: /dev/rrz*c or /dev/rdisk/dsk*c or /dev/cport/scp* • DYNIX: /dev/rdisk/sd* or sd* for only unpartitioned raw device • IRIX64 : /dev/rdisk/*vol or /dev/rdisk/node_wwn/*vol/* or /dev/dsk/*vol or /dev/dsk/node_wwn/*vol/* • Windows: hdX-Y,\$LETALL,\$Volume,\$Phys, D:\Vol(Dms,Dmt,Dmr)X\DskY, \Vol(Dms,Dmt,Dmr)X\DskY For further information on LDM volumes for Windows systems, see <i>Volume Discovery Function</i> in the <i>User and Reference Guide</i>. • OpenVMS: \$1\$* or DK* or DG* or GK* Lines starting with '#' via STDIN are interpreted as comments. Lines starting with 'quit' via STDIN are interpreted as exit.

Option	Description																																				
-find[g]	Displays the port, target ID, and LUN (RAID storage system notation) which was mapped for LDEV using a special file (raw device file) provided via STDIN. If target ID and LUN are Unknown for the target device file, you should start CCI without any description for HORCM_DEV and HORCM_INST, and should describe the shown port, target ID, and LUN for HORCM_DEV. This option also uses the -fx option to display the LDEV numbers in hexadecimal. The -findg option is used to show a LUN on the host view by finding a host group.																																				
-find inst	Registers the Device File name (raw device file provided via STDIN) to all mirror descriptors of the LDEV map table for HORCM, permits the matching volumes on horcm.conf in protection mode, and is started automatically. Therefore, you will not need to use this option normally. This option will also be terminated to avoid wasteful scanning when the registration has been finished with based on HORCM. Therefore if HORCM does not need the registration any more, then nothing is done and it exits. This option can be used with "-fx" option to display LDEV numbers in hexadecimal. Example for HP-UX: <pre># ioscan -fun grep rdsd raidscan -find inst</pre> <table><tr><th>DEVICE_FILE</th><th>Group</th><th>PairVol</th><th>PORT</th><th>TARG</th><th>LUN</th><th>M</th><th>SERIAL</th><th>LDEV</th></tr><tr><td>/dev/rdsd/c0t3d0</td><td>oradb</td><td>oradev1</td><td>CL1-D</td><td>3</td><td>0</td><td>-</td><td>35013</td><td>17</td></tr><tr><td>/dev/rdsd/c0t3d0</td><td>oradb</td><td>oradev1</td><td>CL1-D</td><td>3</td><td>0</td><td>0</td><td>35013</td><td>17</td></tr><tr><td>/dev/rdsd/c0t3d0</td><td>oradb1</td><td>oradev2</td><td>CL1-D</td><td>3</td><td>0</td><td>1</td><td>35013</td><td>17</td></tr></table> Note: When multiple device files share the same LDEV, the first device file is registered to the LDEV map table. <i>Group</i>: Displays the group name (dev_group) defined in the configuration definition file. <i>PairVol</i>: Displays the paired volume name (dev_name) within the group defined in the configuration definition file. <i>PORT</i>: Displays the port number (port#) defined in the configuration definition file. <i>TARG</i>: Displays the targetID (TargetID) defined in the configuration definition file. <i>LUN</i>: Displays the LUN (LU#) defined in the configuration definition file. <i>M</i>: Displays the MUN (MU#) defined in the configuration definition file. MU# for TrueCopy are shown as "-", and MU# for ShadowImage/Copy-on-Write Snapshot are shown as "0", "1", "2". <i>SERIAL</i>: Displays the production (serial#) number of the RAID storage system. <i>LDEV</i>: Displays the LDEV# within the RAID storage system.	DEVICE_FILE	Group	PairVol	PORT	TARG	LUN	M	SERIAL	LDEV	/dev/rdsd/c0t3d0	oradb	oradev1	CL1-D	3	0	-	35013	17	/dev/rdsd/c0t3d0	oradb	oradev1	CL1-D	3	0	0	35013	17	/dev/rdsd/c0t3d0	oradb1	oradev2	CL1-D	3	0	1	35013	17
DEVICE_FILE	Group	PairVol	PORT	TARG	LUN	M	SERIAL	LDEV																													
/dev/rdsd/c0t3d0	oradb	oradev1	CL1-D	3	0	-	35013	17																													
/dev/rdsd/c0t3d0	oradb	oradev1	CL1-D	3	0	0	35013	17																													
/dev/rdsd/c0t3d0	oradb1	oradev2	CL1-D	3	0	1	35013	17																													

Option	Description																																																																
-find verify [MU#]	Displays the relation between Group on the configuration definition file and Device_File registered to the LDEV map tables, based on the Device File name (raw device file provided via STDIN). This option can be used with "-fx" and "-fd" options. This option is affected by the command execution environment (HORCC_MRCF). <pre># ioscan -fun grep rdsd raidscan -find verify</pre> <table><tr><th>DEVICE_FILE</th><th>Group</th><th>PairVol</th><th>PORT</th><th>TARG</th><th>LUN</th><th>M</th><th>SERIAL</th><th>LDEV</th></tr><tr><td>/dev/rdsd/c0t3d0</td><td>oradb</td><td>oradev1</td><td>CL1-D</td><td>3</td><td>0</td><td>0</td><td>35013</td><td>17</td></tr><tr><td>/dev/rdsd/c0t3d1</td><td>oradb</td><td>oradev2</td><td>CL1-D</td><td>3</td><td>1</td><td>0</td><td>35013</td><td>18</td></tr><tr><td>/dev/rdsd/c0t3d2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>0</td><td></td><td>35013</td><td>19</td></tr></table> <pre># ioscan -fun grep rdsd raidscan -find verify 1 -fd</pre> <table><tr><th>DEVICE_FILE</th><th>Group</th><th>PairVol</th><th>Device_File</th><th>M</th><th>SERIAL</th><th>LDEV</th></tr><tr><td>/dev/rdsd/c0t3d0</td><td>oradb</td><td>oradev1</td><td>c0t3d0</td><td>1</td><td>35013</td><td>17</td></tr><tr><td>/dev/rdsd/c0t3d1</td><td>oradb</td><td>oradev2</td><td>Unknown</td><td>1</td><td>35013</td><td>18</td></tr><tr><td>/dev/rdsd/c0t3d2</td><td>-</td><td>-</td><td>-</td><td>1</td><td>35013</td><td>19</td></tr></table> Note: If the device name is different between DEVICE_FILE and Device_File, then it shows shared LDEV among multiple device files. • <i>Group</i>: Displays the group name (dev_group) defined in the configuration definition file. • <i>PairVol</i>: Displays the paired volume name (dev_name) within the group defined in the configuration definition file. • <i>PORT</i>: Displays the port number (port#) defined in the configuration definition file. • <i>TARG</i>: Displays the targetID (TargetID) defined in the configuration definition file. • <i>LUN</i>: Displays the LUN (LU#) defined in the configuration definition file. • <i>M</i>: Displays the MUN (MU#) defined in the configuration definition file. MU# for TrueCopy are shown as "-", and MU# for ShadowImage/Copy-on-Write Snapshot are shown as "0", "1", "2". • <i>Device_File</i>: Displays Device_File which is registered to the LDEV map tables into the CCI. • <i>SERIAL</i>: Displays the production (serial#) number of the RAID storage system. • <i>LDEV</i>: Displays the LDEV# within the RAID storage system.	DEVICE_FILE	Group	PairVol	PORT	TARG	LUN	M	SERIAL	LDEV	/dev/rdsd/c0t3d0	oradb	oradev1	CL1-D	3	0	0	35013	17	/dev/rdsd/c0t3d1	oradb	oradev2	CL1-D	3	1	0	35013	18	/dev/rdsd/c0t3d2	-	-	-	-	0		35013	19	DEVICE_FILE	Group	PairVol	Device_File	M	SERIAL	LDEV	/dev/rdsd/c0t3d0	oradb	oradev1	c0t3d0	1	35013	17	/dev/rdsd/c0t3d1	oradb	oradev2	Unknown	1	35013	18	/dev/rdsd/c0t3d2	-	-	-	1	35013	19
DEVICE_FILE	Group	PairVol	PORT	TARG	LUN	M	SERIAL	LDEV																																																									
/dev/rdsd/c0t3d0	oradb	oradev1	CL1-D	3	0	0	35013	17																																																									
/dev/rdsd/c0t3d1	oradb	oradev2	CL1-D	3	1	0	35013	18																																																									
/dev/rdsd/c0t3d2	-	-	-	-	0		35013	19																																																									
DEVICE_FILE	Group	PairVol	Device_File	M	SERIAL	LDEV																																																											
/dev/rdsd/c0t3d0	oradb	oradev1	c0t3d0	1	35013	17																																																											
/dev/rdsd/c0t3d1	oradb	oradev2	Unknown	1	35013	18																																																											
/dev/rdsd/c0t3d2	-	-	-	1	35013	19																																																											

Option	Description
-find[g] conf [MU#] [-g <group>]	Displays the Port, target ID, LUN in horcm.conf image by using a special file (raw device file) provided via STDIN. If <i>target ID & LUN are Unknown</i> for the target device file, you must start CCI without any description for HORCM_DEV and HORCM_INST, and should be described the shown the Port, targetID, LUN for HORCM_DEV. This option can be used with the "-fx" option. <i>[-g <group>]</i> specifies the group for "dev_group" on horcm.conf. If omitted, the group applies "VG" as default. The <i>-findg</i> option is used when displaying a LUN on the host view by finding a host group. <pre># cat /etc/horcmperm.conf raidscan -find conf 0 -g ORA HORCM_DEV #dev_group dev_name port# TargetID LU# MU# # /dev/rdisk/c23t0d0 SER = 61456 LDEV = 192 [FIBRE FCTBL = 4] ORA ORA_000 CL2-J 0 0 0 # /dev/rdisk/c23t0d1 SER = 61456 LDEV = 193 [FIBRE FCTBL = 4] ORA ORA_001 CL2-J 0 1 0 # /dev/rdisk/c23t0d2 SER = 61456 LDEV = 194 [FIBRE FCTBL = 4] ORA ORA_002 CL2-J 0 2 0 # /dev/rdisk/c23t0d3 SER = 61456 LDEV = 195 [FIBRE FCTBL = 4] ORA ORA_003 CL2-J 0 3 0 # ERROR [CMDDEV] /dev/rdisk/c23t0d7 SER = 61456 LDEV = 259 [OPEN-3-CM]</pre> If the target device has shared an LDEV among multiple device files and an LDEV is displayed by another target device already, then its target device is suppressed as a comment as shown below: <pre># ERROR [LDEV LINK] /dev/rdisk/c24t0d3 SER = 61456 LDEV = 195 [FIBRE FCTBL = 4]</pre> If the target device does not have a valid MU#, then its target device is suppressed as a comment as shown below: <pre># ERROR [INVALID MUN (2 < 1)] /dev/rdisk/c24t0d3 SER = 61456 LDEV = 195 [OPEN-3]</pre> If the target device is mixed with a different RAID TYPE, then its target device is suppressed as a comment as shown below: <pre># ERROR [MIXING RAID TYPE] /dev/rdisk/c24t0d3 SER = 61456 LDEV = 195 [OPEN-3]</pre>

Option	Description
-find sync[d] [MU#] [-g <group>]	Flushes the system buffer associated to a logical drive which corresponds to a [-g <group>] through the KEY WORD(\$Volume,\$LETALL, \$Physical) provided via STDIN. [-g <group>] specifies the group for "dev_group" on horcm.conf. If this option is not specified, then flushes the system buffer associated to all groups for the local instance. Example of flushing the system buffer associated to ORB group through \$Volume (Windows): <pre>echo \$Volume raidscan -find sync -g ORB or raidscan -pi \$Volume -find sync -g ORB</pre> [SYNC] : ORB ORB_000[-] -> \Dmt1\Dsk1 : Volume{bf48a395-0ef6-11d5-8d69-00c00d003b1e} [SYNC] : ORB ORB_001[-] -> \Dmt1\Dsk2 : Volume{bf48a395-0ef6-11d5-8d69-00c00d003b1e} [SYNC] : ORB ORB_002[-] -> \Dmt1\Dsk3 : Volume{bf48a395-0ef6-11d5-8d69-00c00d003b1e} Example of flushing the system buffer associated to all groups for the local instance (Windows): <pre>echo \$Volume raidscan -find sync or raidscan -pi \$Volume -find sync</pre> [SYNC] : ORA ORA_000[-] -> \Vol44\Dsk0 : Volume{56e4954a-28d5-4824-a408-3ff9a6521e5d} [SYNC] : ORA ORA_000[-] -> \Vol45\Dsk0 : Volume{56e4954a-28d5-4824-a408-3ff9a6521e5e} [SYNC] : ORB ORB_000[-] -> \Dmt1\Dsk1 : Volume{bf48a395-0ef6-11d5-8d69-00c00d003b1e} [SYNC] : ORB ORB_001[-] -> \Dmt1\Dsk2 : Volume{bf48a395-0ef6-11d5-8d69-00c00d003b1e} [SYNC] : ORB ORB_002[-] -> \Dmt1\Dsk3 : Volume{bf48a395-0ef6-11d5-8d69-00c00d003b1e} Notes: (1) The option cannot be specified the device object name as follows: D:\Vol(Dms,Dmt,Dmr)X\DskY,\Vol(Dms,Dmt,Dmr)X\DskY (2) Sync executes the following behavior under any conditions: • If the logical drive which corresponds to a [-g <group>] is not open by any applications, then <i>sync</i> flushes the system buffer to a drive and makes the dismount state for this drive. • If the logical drive which corresponds to a [-g <group>] is already opened by any applications, then <i>sync</i> flushes only the system buffer to a drive. This is allowed to flush the system buffer before pairsplit without unmounting the PVOL (opening state), and indicates the behavior as [FLUSH] below: [FLUSH] : ORA ORA_000[-] -> \Vol44\Dsk0 : Volume{56e4954a-28d5-4824-a408-3ff9a6521e5d}

Returned values

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Error codes

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Examples

raidscan command examples for fibre-channel ports

```
# raidscan -p cl1-r
PORT#/ALPA/C,TID#,LU#Num(LDEV#...)P/S,Status,Fence,LDEV#,P-Seq#P-
LDEV#
CL1-R/  ce/15,15, 7 5(100,101..)P-VOLPAIRNEVER100,5678    200
CL1-R/  ce/15,15, 6 5(200,201..)SMPL-----
-----

# raidscan -p cl1-r -f
PORT#/ALPA/C,TID#,LU#Num(LDEV#...)P/S,Status,Fence,LDEV#,Vol.Type
CL1-R/  ce/15,15, 7 5(100,101..)P-VOLPAIRNEVER100,OPEN-3
CL1-R/  ce/15,15, 6 5(200,201..)SMPL-----OPEN-3
```

Example of -find option for raidscan

```
# ls /dev/rdsk/* | raidscan -findDEVICE_FILE      UID S/F  PORT
TARG LUN SERIAL LDEV      PRODUCT ID/dev/rdsk/c0t0d4  0    S CL1-M
0    4   31168   216 OPEN-3-CVS-CM/dev/rdsk/c0t0d1  0    S CL1-M    0
1   31168   117 OPEN-3-CVS/dev/rdsk/c1t0d1   -    - CL1-M    -   -
31170   121 OPEN-3-CVS
```

Output of the raidscan command:

Port#, ALPA/C, TID#, LU#: port ID, arbitrated loop physical address, target ID, LUN.

For ShadowImage, raidscan displays the MU# for each LUN (for example, LUN 7-0, 7-1, 7-2).

Num(LDEV#...): number of LDEVs and LDEV ID for a LUSE volume

P/S: volume attribute

Status: status of the paired volume

Fence: fence level (TrueCopy only)

P-Seq#: serial # of the storage system which contains the partner volume of the pair

P-LDEV#: LDEV number of the partner volume of the pair

Vol.Type: logical unit (LU) type (for example, OPEN-V, OPEN-9)

Group: group name (dev_group) as described in the configuration definition file

UID: Displays the unit ID for multiple storage system configuration. If UID appears as '-', the command device for HORCM_CMD is not found.

S/F: Displays whether the port is SCSI or fibre

PORT: Displays the RAID storage system port number

TARG: Displays the target ID (that was converted by the fibre conversion table)

LUN: Displays the LUN (that was converted by the fibre conversion table)

SERIAL: Displays the production (serial#) number of the RAID storage system

LDEV: Displays the LDEV# within the RAID storage system

PRODUCT_ID: Displays product-id field in the STD inquiry page

raidar

The **raidar** command displays configuration, status, and I/O activity information for the specified port/TID(s)/LUN at the specified time interval. The configuration information is acquired directly from the storage system (not from the configuration definition file).

The I/O activity of a TrueCopy/Universal Replicator S-VOL in the COPY or PAIR state includes TrueCopy/Universal Replicator remote I/Os (update copy operations) in addition to host-requested I/Os. The I/O activity of a ShadowImage/Copy-on-Write Snapshot S-VOL in the COPY or PAIR state includes only host-requested I/Os (ShadowImage/Copy-on-Write Snapshot update copy operations are excluded). The I/O activity of a P-VOL or simplex volume includes only host-requested I/Os. If state changed into SMPL in S-VOL (COPY, PAIR) I/O actively, and then I/O activity of the between is reported in the SMPL state.

Syntax

```
raidar { -h | -q | -z | -I[H][M][instance#] or  
        I[TC][SI][instance#]  
        | -p <port> <targ> <lun> [mun] | -pd[g] <raw_device>  
        | -s [interval] [count] }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidar command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.

Option	Description
-p <port> <targ> <lun> [mun]....	Monitors one or more (up to 16) devices at a time. • <port>: Specifies the port to be reported: CL1-A to CL1-R and CL2-A to CL2-R (excluding CL1-I, CL1-O, CL2-I, CL2-O). For HUS VM: CL3-a to CL3-f, or CL8-a to CL8-d for the expanded port. For VSP: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. For USP V/VM: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. For TagmaStore USP: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. For TagmaStore NSC: CL3-a to CL3-h, or CL8-a to CL8-h for the expanded port. For 9900V: CL3-a to CL3-r, or CL4-a to CL4-r for the expanded port. The port is not case sensitive (for example, CL1-A= cl1-a= CL1-a= cl1-A, CL3-a= CL3-A= cl3-a= cl3-A). • <targ>: Specifies the SCSI TID of the specified port. • <lun>: Specifies the LUN on the specified TID. • [mun]: Specifies the MU number of the specified LUN (ShadowImage or Copy-on-Write Snapshot only).
-pd[g] <raw_device >	Allows designation of an LDEV by raw device file name. The -pdg option is used to show a LUN on the host view by finding a host group (9900V and later).
-s [interval] or -sm [interval]	Designates the time interval in seconds.
-s	Interprets the time interval as seconds.
-sm	Interprets the time interval as minutes.
[interval]	Designates the time interval value (1 to 60). If not specified, the default interval (3) is used.
[count]	Designates number of repeats. When omitted, this command repeats until CNTL-C.

Returned values

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Error codes

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Examples

The following shows an example of the **raidar** command and its output.

```
# raidar -p cl1-a 15 6 -p cl1-b 14 5 -p cl1-a 12 3 -s 3
TIME[03]PORTTLVOLSTATUSIOPSHIT(%)W(%)IOCNT
13:45:25-----
13:45:28CL1-A156SMPL--200.080.040.0600
CL1-B145P-VOLPAIR133.335.013.4400
CL1-A123P-VOLPSUS200.035.040.6600
```

Output of the **raidar** command:

IOPS: # of I/Os (read/write) per second (total I/O rate).

HIT(%): Hit rate for read I/Os (read hit rate).

W(%): Ratio of write I/Os to total I/Os (percent writes).

IOCNT: number of write and read I/Os.

raidqry

The **raidqry** command (RAID query) displays the configuration of the connected host and RAID storage system.

Syntax

```
raidqry { -h | -q | -z | -I[H][M][instance#] or  
         I[TC][SI][instance#] | -l | -r <group> | [ -f ] | -g }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidqry command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-l	Displays the configuration information for the local host and the local RAID storage system.
-r <group>	Displays the configuration information for the remote host and the remote storage system which contains the specified group.
-f	Displays the host name (ip_address) as specified in the configuration definition file. Use this option if "floatable IP address" is used for the host name (ip_address) in the configuration file.
-g	This option is used when displaying the lists of group name (dev_group) which described in the configuration file of a local host (instance).

Returned values

--

Error codes

--

Examples

Example 1

The following shows an example of the **raidqry** command and its output.

```
# raidqry -l
No Group Hostname   HORCM_ver  Uid  Serial#  Micro_ver  Cache(MB)
1   ---   HOSTA    01-22-03/06  0    30053  50-04-00/00  256
1   ---   HOSTA    01-22-03/06  1    30054  50-04-00/00  256

# raidqry -r oradb
No Group Hostname   HORCM_ver  Uid  Serial#  Micro_ver  Cache(MB)
1 oradb   HOSTA    01-22-03/06  0    30053  50-04-00/00  256
2 oradb   HOSTB    01-22-03/06  0    30053  50-04-00/00  256
1 oradb   HOSTA    01-22-03/06  1    30054  50-04-00/00  256
2 oradb   HOSTB    01-22-03/06  1    30054  50-04-00/00  256

# raidqry -l -f
No Group Floatable Host  HORCM_ver  Uid  Serial#  Micro_ver  Cache(MB)
1   ---           FH001 01-22-03/06  0    30053  50-04-00/00  256
```

Output of the **raidqry** command:

No: This column shows the order when the group name (dev_group) which is described in the configuration definition file has multiple remote hosts.

Group: When the *-r* option is used, this column shows the group name (dev_group) which is described in the configuration definition file.

Floatable Host: When the *-f* option is used, this column shows the host name (ip_address) which is described in the configuration definition file. Up to 30 host names can be displayed. The *-f* option interprets the host name as utilizing floatable IP for a host.

HORCM_ver: This column shows the version of the HORC Manager on the local or remote host. The *-l* option specifies local host. The *-r* option specifies remote host.

Uid Serial# Micro_ver: This column shows unitID, serial number, and (DKCMAIN) microcode version of the storage system which is connected to the local or remote host. The *-l* option specifies local host. The *-r* option specifies remote host.

Cache(MB): Shows the logical cache capacity (in MB) of the storage system connected to the local or remote host. The *-l* option specifies local host, and *-r* specifies remote host.

Example 2

```
# raidqry -g
GNo  Group      RAID_type  IV/H  IV/M  MUN/H  MUN/M
1    ora      HTC_RAID   12    9     4     64
2    orb      XP_RAID    12    9     4     64
3    orc      HTC_DF     8     6     1     1
```

GNo: The order of the group name (dev_group) described in the configuration definition file.

Group: The group name (dev_group) described in the configuration definition file.

RAID_type: The type of RAID configured in the group.

IV/H: The interface version for TrueCopy/Universal Replicator in a group, and this is used for maintenance.

IV/M: The interface version for ShadowImage/Copy-on-Write Snapshot/Volume Migration i in a group, and this is used for the maintenance.

MUN/H: The number of maximum MUs for Universal Replicator in a group.

MUN/M: The number of maximum MUs for ShadowImage/Copy-on-Write Snapshot in a group.

raidvchkset

The **raidvchkset** command sets the parameters for validation checking of the specified volumes, and can also be used to turn off all validation checking without specifying [type]. Unit of checking for the validation is based on the group of CCI configuration definition file.

This command is controlled as protection facility. This command is rejected with EX_ERPERM by connectivity checking between CCI and the RAID storage system.

Syntax

```
raidvchkset { -h | -q | -z | -I[H][M][instance#] or  
             I[TC][SI][instance#]  
             | -g <group> | -d <pair Vol> | -d[g] <raw_device> [MU#]  
             | -d[g] <seq#> <LDEV#> [MU#] | -nomsg | -vt [type]  
             | -vs < bsize> [slba] [elba] | -vg [type]... [rtime]  
             | -vext <size> }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidvchkset command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name written in the configuration definition file.

Option	Description
-d <pair Vol>	Specifies paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volume.
-d[g] <raw_device > [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-nomsg	Suppresses messages to be displayed when this command is executed. It is used to execute this command from a user program. This option must be specified at the beginning of a command argument. The command execution log is not affected by this option.
-vt [type]	Specifies the following data type that assumes the target volumes as Oracle® database. If [type] is not specified, then this option will disable all of the checking. <i>redo8</i>: The target volumes sets the parameter for validation checking as Oracle redo log files (including archive logs) prior Oracle9I. This option sets <bsize> to 1(512bytes) or 2(1024bytes). <i>data8</i>: The target volumes sets the parameter for validation checking as Oracle data files (including control files) prior Oracle9I. <i>redo9</i>: The target volumes sets the parameter for validation checking as Oracle redo log files (including archive logs) for Oracle9IR2 or later. This option sets <bsize> to 1 (512 bytes) or 2 (1024 bytes). <i>data9</i>: The target volumes sets the parameter for validation checking as Oracle data files (including control files) for Oracle9IR2 later. For Oracle for Tru64 or Windows, set the parameter in the init.ora file to "_HARD_PROTECTION = TRUE ". If not so, a parameter for validation must be changed by using the following "-vmf we" option: raidvchkset -vt data9 -vmf we <i>rd10g</i>: The target volumes sets the parameter for validation checking as Oracle ALL files (including redo and data and RMAN backup piece) for Oracle10gR2 or later. This option sets <bsize> to 1 (512 bytes) or 2 (1024 bytes). This option sets to the low 5 bits DBA for checking regarding CHK-F2.

Option	Description
-vs <bsize> [slba] [elba]	Specifies the data block size of Oracle I/O and a region on a target volume for validation checking. • <bsize> is used when specifying the data block size of Oracle I/O, in units of 512 bytes. <bsize> is able to specify between 1 (512 bytes) and 64 (32 KB) (effective size for Oracle is also 1-64). • [slba] [elba] is used when specifying a region defined between Start_LBA (0 based) and End_LBA on a target volume for checking, in units of 512 bytes. • [slba] [elba] can be specified in hexadecimal (by addition of "0x ") or decimal notation. If this option is not specified, then a region for a target volume is set as all blocks (slba=0,elba=0).
-vg [type]...[rtime]]	Specifies the following guard type to the target volumes for Data Retention Utility (Open LDEV Guard on 9900V). If [type] is not specified, this option will release all of the guarding. The following values are available to specify on [type]. • <i>inv</i>: The target volumes are concealed from SCSI Inquiry command by responding "unpopulated volume". • <i>sz0</i>: The target volumes replies with "SIZE 0" through SCSI Read capacity command. • <i>rwd</i>: The target volumes are prohibited from reading and writing. • <i>wtd</i>: The target volumes are prohibited from writing. • <i>svd</i>: If the target volume is SMPL, it is protected from paircreate (from becoming an SVOL). If the target volume is PVOL, it is protected from pairresync restore or pairresync swaps(p). If the target volume is SVOL_PSUS(SSUS), it is protected from pairresync synchronous copy. svd option can be used with the other option (inv, sz0, rwd, wtd) in parallel. For example, if you want to protect the absolute volume from the writting executed by the copy series program product and the host access, set the both wtd and svd options. The only setting of wtd option cannot protect the absolute volume from the writing by the copy processing of the copy series program product. [rtime]: Specifies the retention time, in units of day. If [rtime] is not specified, the default time defined by the storage system is used. The default time is "zero" in 9900V microcode version 21-08-xx. This option is ignored (default = infinite) in 9900V microcode version 21-06-xx or 21-07-xx. • This option sets each four flags for guarding type as follows: <i>typeINQRCAPREADWRITE inv1111Sz00111rwd0011wtd0001</i>

Option	Description
-vext <size>	Used when extending the LUN capacity of Dynamic Provisioning volume. <size> is used when specifying the extension data size in units of "G,g,M,m,K,k". If <size> is specified without unit, it is assumed to be 1 block size (512 bytes). Examples for extending 1GB (gigabyte) are: -vext 1G, -vext 1g, -vext 1024M, -vext 1024m, -vext 1048576K, -vext 1048576k, -vext 2097152 Examples for extending 1KB (kilobyte) are: -vext 1K, -vext 1k, -vext 2 LUN capacity and usage rate for Dynamic Provisioning volume can be verified by referring "LU_CAP" of the "raidvchkdsp -v aou" or "raidvchkdsp -v aoub" command. "Aou" (allocation on use) refers to dynamic provisioning. Note: When a group operation is specified, a warning message appears, and this command enters the interactive mode.

Returned values

The *raidvchkset* command sets the following returned values during exit allowing you to check the execution results.

Normal termination: 0

Abnormal termination: see Error Codes.

Error codes

The *raidvchkset -vg* option command returns the following error code as well as generic error codes.

Table 2-11 Specific error code for *raidvchkset -vg* option

Category	Error Code	Error Message	Recommended Action	Value
Volume Status (Unrecoverable)	EX_EPRORT	Mode changes denied due to retention time	Please confirm the retention time for a target volume by using <i>raidvchkscan -v gflag</i> command.	208

Examples

Sets volumes in oralog group as redolog file prior to Oracle9I:

```
raidvchkset -g oralog -vt redo8
```

Sets volumes in oradat group as data file that Oracle block size is 8KB:

```
raidvchkset -g oradat -vt data8 -vs 16
```

Sets volumes in oradat group as data file that Oracle block size is 16KB:

```
raidvchkset -g oradat -vt data8 -vs 32
```

Releases all checking to volumes in oralog group:

```
raidvchkset -g oralog -vt
```

Sets Oracle10g volumes for oralog group as redolog file:

```
raidvchkset -g oralog -vt rd10g
```

Sets Oracle10g volumes for oradat group as data file with block size of 8KB:

```
raidvchkset -g oradat -vt rd10g -vs 16
```

Disables writing to volumes in oralog group:

```
raidvchkset -g oralog -vg wtd
```

Disables writing and sets retention time to volumes in oralog group:

```
raidvchkset -g oralog -vg wtd 365
```

Releases all guarding to volumes in oralog group:

```
raidvchkset -g oralog -vg
```

raidvchkdsp

The **raidvchkdsp** command displays the parameters for validation checking of the specified volumes. Unit of checking for the validation is based on the group of CCI configuration definition file.

Syntax

```
raidvchkdsp { -h | -q | -z | -I[H][M][instance#] or  
             I[TC][SI][instance#] | -g <group> | -d <pair Vol>  
             | -d[g] <raw_device> [MU#] | -d[g] <seq#> <LDEV#> [MU#]  
             | -f[xde] | -v <op> | -c }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidvchkdsp command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name written in the configuration definition file.
-d <pair Vol>	Specifies paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volume.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.

Option	Description
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-fx	Displays the LDEV/STLBA/ENLBA number in hexadecimal.
-fd	Displays the relation between the Device_File and the paired volumes, based on the group (as defined in the local instance configuration definition file). If Device_File column shows "Unknown" to HOST (instance), then the volume is not recognized on own HOST, and <i>raidvchkdsp</i> command is rejected in protection mode. Non-permitted volume is shown without LDEV# information (LDEV# "-").
-fe	Displays the serial# and LDEV# of the external LUNs mapped to the LDEV for the target volume by adding to last column (ignores the format of 80 column).

Option	Description
-c	When CCI starts, <i>HORCM_DEV</i> in <i>horcm.conf</i> is translated from Port/target/lun numbers to the CU:Ldev information, on one hand <i>HORCM_LDEV</i> in <i>horcm.conf</i> is translated from the CU:Ldev information to Port/target/lun numbers, because RAID needs to specify "Port#, Targ#, Lun#" and "LDEV" for specifying the target device, and then HORCM keeps this information as internal database for the configuration. If a storage administrator changes the LDEV to LUN/port mapping, such as - a new/different LDEV is mapped to a previously used port/LUN, or - an LDEV is mapped to a different/new port then pair operations might be rejected because the new mapping is different from the mapping information the database in the running HORCM instance. A <i>pairdisplay</i> command shows the real LDEV mapping at the time of the command execution and hence shows different information than what is stored in the internal database of the HORCM instance. The "-c" option for <i>raidvchkdsp</i> allows you to see if there is a difference between the current running HORCM instance information and the real mapping. This indication should be used to find such issues which indicate that: - the HORCM instance should be restarted to discover and use the new mapping information, or - a configuration change occurred without changing the affected configuration files of the HORCM instance. <i>Example change from LDEV#785 to LDEV#786:</i> <pre># raidvchkdsp -g VG000 -c Group PairVol Port# TID LU Seq# LDEV# LDEV#(conf) -change- > LDEV# VG000 vg0001 CL4-E-0 0 17 63528 786 785(conf) -change- > 786 # raidvchkdsp -g VG000 -c -fx Group PairVol Port# TID LU Seq# LDEV# LDEV#(conf) -change- > LDEV# VG000 vg0001 CL4-E-0 0 17 63528 312 311(conf) -change- > 312 <i>Example remove LDEV#785 from a port:</i> # raidvchkdsp -g VG000 -c Group PairVol Port# TID LU Seq# LDEV# LDEV#(conf) -change- > LDEV# VG000 vg0001 CL4-E-0 0 17 63528 - 785(conf) -change-> NO LDEV # raidvchkdsp -g VG000 -c -fx Group PairVol Port# TID LU Seq# LDEV# LDEV#(conf) -change- > LDEV# VG000 vg0001 CL4-E-0 0 17 63528 - 311(conf) -change-> NO LDEV</pre> Note: If there have not been any changes to the specified volumes, this option displays nothing.

Option	Description
-v [op]	Specifies the following operation that displays each parameter for validation checking: • cflag: Displays all flags for checking regarding data block validation for target vols. • offset: Displays the range setting for data block size of Oracle I/O and a region on a target volume for validation checking. • errcnt: Displays the statistical information counted as an error for each checking on the target volumes. Each statistical information counted as an error is cleared when the individual flag for validation checking is disabled. • gflag: Displays the parameter for guarding on the specified target volumes. • pool: This option displays the capacity and the usable capacity of the Copy-on-Write Snapshot pool corresponding to the group. Usually, this option displays the pool capacity and the usable capacity for the pool ID of which the group is belonging because pool ID is specified in pair creation with group. This is needed to help the decision whether the restore operation is possible or not, because the pool capacity is consumed by the restore operation of the Copy-on-Write Snapshot. • aou[b]: Displays the LUN capacity and usage rate for Dynamic Provisioning volume corresponding to the group of RM configuration file, and displays the ID of the pool to which LDEV belongs. • aoub: Displays the LUN capacity in units of block(512 bytes).

Returned values

--

Error codes

--

Examples

Example 1

Example of raidvchkdsp command with -fd option:

```
raidvchkdsp -g vg01 -fd -v cflag
Group PairVol Device_File Seq# LDEV# BR-W-E-E MR-W-B BR-W-B
SR-W-B-S
vg01 oradb1 Unknown 2332 - - - - - - - - - -
- - - -
vg01 oradb2 c4t0d3 2332 3 D E B R D D D D E E
D E D D
```

Example 2

Example of raidvchkdsp command with -fe option and its output:

```
# raidvchkdsp -g horc0 -v gflag -fe
Group... TID LU Seq# LDEV# GI-C-R-W-S PI-C-R-W-S R-Time EM E-Seq#
E-LDEV#
horc0... 0 20 63528 65 E E E E E E E E E E 0 - -
-
horc0... 0 20 63528 66 E E E E E E E E E E 0 - -
-
```

Output of the **raidvchkdsp** command with **-fe** option:

EM: external connection mode.

- H = Mapped E-lun is hidden from the host.
- V = Mapped E-lun is visible to the host.
- — = Unmapped to the E-lun.
- BH = Mapped E-lun as hidden from the host, but LDEV blockading.
- BV = Mapped E-lun as visible to the host, but LDEV blockading.
- B = Unmapped to the E-lun, but LDEV blockading.

E-Seq#: production (serial) number of the external LUN ('Unknown' shown as '-').

E-LDEV#: LDEV# of the external LUN ('Unknown' shown as '-').

Example 3

Example of raidvchkdsp command with **-v cflag** option and its output:

```
raidvchkdsp -g vg01 -fd -v cflag
Group PairVol Device_File Seq# LDEV# BR-W-E-E MR-W-B
BR-W-B-Z SR-W-B-S
vg01 oradb1 c4t0d2 2332 2 D E B R D D D
D E E E D E D D
vg01 oradb2 c4t0d3 2332 3 D E B R D D D
D E E E D E D D
```

Output of the **raidvchkdsp** command with **-v cflag** option:

BR-W-E-E: Displays the flags for checking data block size.

R=E: Checking for data block size on Read is enabled.

R=D: Checking for data block size on Read is disabled.

W=E: Checking for data block size on Write is enabled.

W=D: Checking for data block size on Write is disabled.

E=L: Data block on Read/Write is interpreted as little endian format.

E=B: Data block on Read/Write is interpreted as big endian format.

E=W: This shows the Warning that Read/Write is not rejected when validation error is detected.

E=R: This shows the Reject that Read/Write is rejected when validation error is detected.

MR-W-B: Displays the flags for checking CHK-F3 in the data block.

R=E: Checking for CHK-F3 on Read is enabled.
 R=D: Checking for CHK-F3 on Read is disabled.
 W=E: Checking for CHK-F3 on Write is enabled.
 W=D: Checking for CHK-F3 on Write is disabled.
 B=E: Checking for CHK-F3 in the data block #0 is enabled.
 B=D: Checking for CHK-F3 in the data block #0 is disabled.
 BR-W-B-Z: Displays the flags for checking regarding CHK-F2 in the data block.
 R=E: Checking for CHK-F2 on Read is enabled.
 R=D: Checking for CHK-F2 on Read is disabled.
 W=E: Checking for CHK-F2 on Write is enabled.
 W=D: Checking for CHK-F2 on Write is disabled.
 B=E: Comparing for CHK-F2 in the data block is enabled. D: Comparing for CHK-F2 in the data block is disabled.
 Z=E: The NON zero checking for CHK-F2 in the data block shows to being enabled.
 Z=D: The NON zero checking for CHK-F2 in the data block shows to being disabled.
 SR-W-B-S: Displays the flags for checking regarding CHK-F1 in the data block.
 R=E: Checking for CHK-F1 on Read is enabled.
 R=D: Checking for CHK-F1 on Read is disabled.
 W=E: Checking for CHK-F1 on Write is enabled.
 W=D: Checking for CHK-F1 on Write is disabled.
 B=E: Checking for CHK-F1 in the data block #0 is enabled.
 B=D: Checking for CHK-F1 in the data block #0 is disabled.
 S=E: Referring for CHK-F1 flag contained in the data block is enabled.
 S=D: Referring for CHK-F1 flag contained in the data block is disabled.

Example 4

Example of **raidvchkdsp** command with **-v offset** option and its output:

```
# raidvchkdsp -g vg01 -fd -v offset
Group  PairVol Device File Seq# LDEV# Bsize STLBA ENLBA BNM
vg01   oradb1  c4t0d2  2332  2    1024    1  102400  9
vg01   oradb2  c4t0d3  2332  3    1024    1  102400  9
```

Output of the *raidvchkdsp* command with **-v offset** option:

Bsize: Displays the data block size of Oracle I/O, in units of bytes.

STLBA: Displays the start of LBA on a target volume for checking, in units of 512 bytes.

ENLBA: Displays the end of LBA on a target volume for checking, in units of 512 bytes.

Note: If STLBA and ENLBA are both zero, this means to check all blocks.

BNM: Displays the number of bits for checking regarding CHK-F2, in units of bits. If BNM is zero, this means the checking for CHK-F2 is disabled.

Example 5

Example of **raidvchkdsp** command with **-v errcnt** option and its output:

```
# raidvchkdsp -g vg01 -fd -v errcnt
Group PairVol Device File Seq# LDEV# CfEC MNEC SCEC BNEC
vg01   oradb1   c4t0d2  2332  2      0      0      0      0
vg01   oradb2   c4t0d3  2332  3      0      0      0      0
```

Output of the *raidvchkdsp* command with **-v errcnt** option:

CfEC: Displays the error counter for checking of block size validation.

MNEC: Displays the error counter for checking of CHK-F3 validation.

SCEC: Displays the error counter for checking of CHK-F1 validation.

BNEC: Displays the error counter for checking of CHK-F2 validation.

Example 6

Example of **raidvchkdsp** command with **-v gflag** option and its output:

```
# raidvchkdsp -g vg01 -fd -v gflag
Group PairVol Device File Seq# LDEV# GI-C-R-W-S PI-C-R-W-S R-Time
vg01   oradb1   c4t0d2  2332  2  E E D D E  E E D D E  365
vg01   oradb2   c4t0d3  2332  3  E E D D E  E E D D E  -
```

Output of the *raidvchkdsp* command with **-v gflag** option:

GI-C-R-W-S: Displays the flags for guarding as for the target volume.

I=E: Enabled for Inquiry command.

D: Disabled for Inquiry command.

C=E: Enabled for Read Capacity command.

D: Disabled for Read Capacity command.

R=E: Enabled for Read command.

D: Disabled for Read command.

W=E: Enabled for Write command.

D: Disabled for Write command.

S=E: Enabled for becoming the SVOL.

D: Disabled for becoming the SVOL.

PI-C-R-W-S: Displays the permission flags that show whether each mode flag can be changed to enable or not.

I=E: "I" flag can be changed to enable.

D: "I" flag cannot be changed to enable.

C=E: "C" flag can be changed to enable.

D: "C" flag cannot be changed to enable.

R=E: "R" flag can be changed to enable.

D: "R" flag cannot be changed to enable.

W=E: "W" flag can be changed to enable.

D: "W" flag cannot be changed to enable.

S=E: "S" flag can be changed to enable.

D: "S" flag cannot be changed to enable.

R-Time: Displays the retention time for write protect, in units of day. The hyphen (-) shows that the retention time is infinite. The application knows whether the target volume is denied to change to writing enable by referring "R-Time".

R-time (Rtime) is identical to rtime, and both of them indicate Retention Time. This setting value can normally be identified as a value of R-time that is output by raidvchkdsp (the logging format is Rtime=xxxx). However, R-time (Rtime) is indicated as the value of 'Retention Time + 1000000' when the expiration lock is enabled. The setting of raidvchkset command in this status will be denied.

Audit lock status is shown as the retention time plus 1000000. "R-Time + 1000000" shows the retention time with Audit lock status.

Example 7

Example of **raidvchkdsp** command with **-v pool** option and its output:

```
raidvchkdsp -g vg01 -v pool
Group PairVol Port# TID LU Seq# LDEV# Bsize Available Capacity
Vg01 oradb1 CL2-D 2 7 62500 167 2048 100000 1000000000
Vg01 oradb2 CL2-D 2 10 62500 170 2048 100000 1000000000
```

Output of the **raidvchkdsp** command with **-v pool** option:

Bsize: Displays the data block size of the pool in units of block (512 bytes).

Available(Bsize): Displays the available capacity for the volume data on the Copy-on-Write Snapshot pool in units of Bsize.

Capacity(Bsize): Displays the total capacity in the Copy-on-Write Snapshot pool in units of Bsize.

Example 8

Example of **raidvchkdsp** command with **-v aou** option and its output ("aou" (allocation on use) refers to dynamic provisioning):

```
[Display example]
# raidvchkdsp -v aou -g AOU
Group  PairVol Port# TID LU Seq# LDEV# Used(MB) LU_CAP(MB) U(%)
T(%)  PID
AOU    AOU_001 CL2-D  2   7 62500  167   20050  1100000   10
70     1
AOU    AOU_002 CL2-D  2  10 62500  170  110000  1100000   10
70     1
```

Output of the **raidvchkdsp** command with the **-v aou** option:

Used(MB): Displays the usage size of the allocated block on this LUN.

Range: $0 \leq \text{Used (MB)} < \text{LU_CAP(MB)} + 42 \text{ MB}$

LU_CAP(MB): Displays the LUN capacity responded to the "Readcapacity" command as SCSI interface.

LU_CAP(BLK): Displays the LUN capacity (in block/512 bytes) responded to the "Readcapacity" command as SCSI interface.

U(%): Displays the usage rate of the allocated block on the Dynamic Provisioning pool containing this LU.

T(%): Displays the threshold rate being set to the Dynamic Provisioning pool as high water mark.

PID: Displays the Dynamic Provisioning pool ID assigned to this Dynamic Provisioning volume.

raidvchkscan

The *raidvchkscan* command displays the fibre port of the storage system (9900V and later), target ID, LDEV mapped for LUN# and MU#, and status of LDEV, regardless of the configuration definition file.

Note: This command is rejected with EX_ERPERM by connectivity checking between CCI and the RAID storage system.

Syntax

```
raidvchkscan { -h | -q | -z | -I[H][M][instance#] or
               I[TC][SI][instance#] | -p <port> [hgrp] | -pd[g] <raw_device>
               | -s <seq#> | -t <target> | -l <lun> | [ -f[x] ] | -v <op> }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.

Option	Description
-z or -zx	Makes the raidvchkscan command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name written in the configuration definition file.
-p <port> [hgrp]	Specifies the port ID of the port to be scanned. Valid ports are CL1-A to CL1-R and CL2-A to CL2-R (excluding CL1-I, CL1-O, CL2-I, CL2-O). In addition: For VSP: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. For USP V/VM: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. For TagmaStore USP: CL3-a to CL3-r, or CLG-a to CLG-r for the expanded port. For TagmaStore NSC: CL3-a to CL3-h, or CL8-a to CL8-h for the expanded port. For 9900V: CL3-a to CL3-r, or CL4-a to CL4-r for the expanded port. The port is not case sensitive (for example, CL1-A= cl1-a= CL1-a= cl1-A, CL3-a= CL3-A= cl3-a= cl3-A). This option must be specified if "-find" or "-pd <raw_device>" option is not specified. Specify [hgrp] to display only the LDEVs mapped to a host group on a port.
-pd[g] <raw_device> >	Specifies the raw device name. This option finds Seq# and port_name of the storage system to which the specified device can be connected, and scans the port of the storage system which corresponds with the unit ID that searches the unit ID from Seq#. This option must be specified if the "-find" option is not specified. If this option is specified, the following -s <Seq#> option is invalid. -pdg (9900V and later): Shows a LUN on the host view by finding a host group.
-s <Seq#>	Used to specify the Seq# (serial#) of the storage system when this option cannot specify the unit ID which is contained for "-p <port>" option. This option scans the port specified by "-p <port>" option of the storage system which corresponds with the unit ID that searches the unit ID from Seq#. If this option is specified, then the unit ID which is contained in "-p <port>" option is invalid.
-t <target>	Specifies a target ID (0 to 15) of the specified port. If this option is not specified, the command applies to all target IDs.
-l <lun>	Specifies a LUN (0 to 7) of the specified target ID. If this option is not specified, the command applies to all LUNs. If this option is specified, the TID must also be specified.
-fx	Displays the LDEV/STLBA/ENLBA number in hexadecimal notation.

Option	Description
-v [op]	Specifies the following operation that displays each parameter for validation checking: cflag: Displays all flags for checking regarding data block validation for target vols. offset: Displays the range setting for data block size of Oracle I/O and a region on a target volume for validation checking. errcnt: Displays the statistical information counted as an error for each checking on the target volumes. Each statistical information counted as an error is cleared when the individual flag for validation checking is disabled. gflag: Displays the parameter for guarding on the specified target volumes. pool: This option displays the pool capacity and the usable capacity for the pool ID to which the LDEV belongs. This is needed to help the decision whether the restore operation is possible or not, because the pool capacity is consumed by the restore operation of the Copy-on-Write Snapshot. aou[b]: Displays the LUN capacity and usage rate for only Dynamic Provisioning volume mapped to the specified port, and displays the ID of the pool to which LDEV belongs. aoub: Displays the LUN capacity in units of block(512 bytes).

Returned values

--

Error codes

--

Examples

Example 1

Example of **raidvchkscan** command with **-v cflag** option

```
# raidvchkscan -p CL1-A -v cflag
PORT# /ALPA/C TID# LU# Seq# Num LDEV# BR-W-E-E MR-W-B BR-W-
B-Z SR-W-B-S
CL1-A / ef/ 0 0 0 2332 1 0 D E B R D D D D E
E E D E D D
CL1-A / ef/ 0 0 1 2332 1 1 D E B R D D D D E
E E D E D D
```

Output of the **raidvchkscan** command with **-v cflag** option:

BR-W-E-E: Displays the flags for checking regarding data block size.

R =E: Checking for data block size on Read is enabled.

D: Checking for data block size on Read is disabled.

W =E: Checking for data block size on Write is enabled.

D: Checking for data block size on Write is disabled.

E =L: Data block on Read/Write is interpreted as little endian format.

B: Data block on Read/Write is interpreted as big endian format.

E =W: This shows the Warning that Read/Write is not rejected when validation error is detected.

R: This shows the Reject that Read/Write is rejected when validation error is detected.

MR-W-B: Displays the flags for checking regarding CHK-F3 in the data block.

R =E: Checking for CHK-F3 on Read is enabled.

D: Checking for CHK-F3 on Read is disabled.

W =E: Checking for CHK-F3 on Write is enabled.

D: Checking for CHK-F3 on Write is disabled.

B =E: Checking for CHK-F3 in the data block #0 is enabled.

D: Checking for CHK-F3 in the data block #0 is disabled.

BR-W-B-Z: Displays the flags for checking regarding CHK-F2 in the data block.

R =E: Checking for CHK-F2 on Read is enabled.

D: Checking for CHK-F2 on Read is disabled.

W =E: Checking for CHK-F2 on Write is enabled.

D: Checking for CHK-F2 on Write is disabled.

B =E: Comparing for CHK-F2 in the data block is enabled. D: Comparing for CHK-F2 in the data block is disabled.

Z =E: The NON zero checking for CHK-F2 in the data block is enabled.

D: The NON zero checking for CHK-F2 in the data block is disabled.

SR-W-B-S: Displays the flags for checking regarding CHK-F1 in the data block.

R =E: Checking for CHK-F1 on Read is enabled.

D: Checking for CHK-F1 on Read is disabled.

W =E: Checking for CHK-F1 on Write is enabled.

D: Checking for CHK-F1 on Write is disabled.

B =E: Checking for CHK-F1 in the data block #0 is enabled.

D: Checking for CHK-F1 in the data block #0 is disabled.

S =E: Referring for CHK-F1 flag contained in the data block is enabled.

D: Referring for CHK-F1 flag contained in the data block is disabled.

Example 2

Example of **raidvchkscan** command with **-v offset** option

```
# raidvchkscan -p CL1-A -v offset
PORT# /ALPA/C TID# LU# Seq# Num LDEV# Bsize STLBA
ENLBA BNM
CL1-A / ef/ 0 0 0 2332 1 0 1024 1
102400 9
CL1-A / ef/ 0 0 1 2332 1 1 1024 1
102400 9
CL1-A / ef/ 0 0 2 2332 1 2 1024 1
102400 9
CL1-A / ef/ 0 0 3 2332 1 3 1024 1
102400 9
CL1-A / ef/ 0 0 4 2332 1 4 1024 1
102400 9
```

Output of the **raidvchkscan** command with **-v offset** option:

Bsize: Displays the data block size of Oracle I/O, in units of bytes.

STLBA: Displays the Start of LBA on a target volume for checking, in units of 512 bytes.

ENLBA: Displays the End of LBA on a target volume for checking, in units of 512 bytes.

Note: If STLBA and ENLBA are both zero, this means to check all blocks.

BNM: Displays the number of bits for checking regarding CHK-F2, in units of bits. If BNM is zero, this means the checking for CHK-F2 is disabled.

Example 3

Example of **raidvchkscan** command with **-v errcnt** option

```
# raidvchkscan -p CL1-A -v errcnt
PORT# /ALPA/C TID# LU# Seq# Num LDEV# CfEC MNEC
SCEC BNEC
CL1-A / ef/ 0 0 0 2332 1 0 0 0
0 0
CL1-A / ef/ 0 0 1 2332 1 1 0 0
0 0
CL1-A / ef/ 0 0 2 2332 1 2 0 0
0 0
CL1-A / ef/ 0 0 3 2332 1 3 0 0
0 0
CL1-A / ef/ 0 0 4 2332 1 4 0 0
0 0
```

Output of the **raidvchkscan** command with **-v errcnt** option:

CfEC: Displays the error counter for checking of block size validation.

MNEC: Displays the error counter for checking of CHK-F3 validation.

SCEC: Displays the error counter for checking of CHK-F1 validation.

BNEC: Displays the error counter for checking of CHK-F2 validation.

Example 4

Example of **raidvchkscan** command with **-v gflag** option

```
# raidvchkscan -p CL1-A -v gflag
PORT# /ALPA/C TID# LU# Seq# Num LDEV# GI-C-R-W-S PI-C-R-W-S
R-Time
CL1-A / ef/ 0 0 0 2332 1 0 E E D D E E E D D E
365
CL1-A / ef/ 0 0 1 2332 1 1 E E D D E E E D D E
-
CL1-A / ef/ 0 0 2 2332 1 2 E E D D E E E D D E
0
```

Output of the **raidvchkscan** command with **-v gflag** option:

GI-C-R-W-S: Displays the flags for guarding as for the target volume.

I=E: Enabled for Inquiry command.

D: Disabled for Inquiry command.

C=E: Enabled for Read Capacity command.

D: Disabled for Read Capacity command.

R=E: Enabled for Read command.

D: Disabled for Read command.

W=E: Enabled for Write command.

D: Disabled for Write command.

S=E: Enabled for becoming the SVOL.

D: Disabled for becoming the SVOL.

PI-C-R-W-S: Displays the permission flags that show whether each mode flag can be changed to enable or not.

I=E: "I" flag can be changed to enable.

D: "I" flag cannot be changed to enable.

C=E: "C" flag can be changed to enable.

D: "C" flag cannot be changed to enable.

R=E: "R" flag can be changed to enable.

D: "R" flag cannot be changed to enable.

W=E: "W" flag can be changed to enable.

D: "W" flag cannot be changed to enable.

S=E: "S" flag can be changed to enable.

D: "S" flag cannot be changed to enable.

R-Time: Displays the retention time for write protect, in units of day. The hyphen (-) shows that the retention time is infinite. The application knows whether the target volume is denied to change to writing enable by referring "R-Time".

Audit lock status is shown as the retention time plus 1000000. "R-Time + 1000000" shows the retention time with Audit lock status.

Example 5

Example of **raidvchkscan** command with **-v pool** option

```
# raidvchkscan -v pool -p CL2-d-0
PORT# /ALPA/C TID# LU# Seq# Num LDEV# Bsize Available
Capacity
CL2-D-0 /e4/ 0 2 0 62500 1 160 2048 100000
1000000000
CL2-D-0 /e4/ 0 2 1 62500 1 161 2048 100000
1000000000
```

Output of the **raidvchkscan** command with **-v pool** option:

Bsize: Displays the data block size of the pool, in units of block (512 bytes).

Available(Bsize): Displays the available capacity for the volume data on the Copy-on-Write Snapshot pool in units of Bsize.

Capacity(Bsize): Displays the total capacity in the Copy-on-Write Snapshot pool in units of Bsize.

Example 5

Example of **raidvchkscan** command with **-v aou** option ("aou" (allocation on use) refers to dynamic provisioning)

```
# raidvchkscan -v aou -p CL2-d-0
PORT# /ALPA/C TID# LU# Seq# Num LDEV# Used(MB) LU_CAP(MB)
U(%) T(%) PID
CL2-D-0 /e4/ 0 2 0 62500 1 160 20050 1100000
1 60 1
CL2-D-0 /e4/ 0 2 1 62500 1 161 200500 1100000
18 60 2
```

Output of the **raidvchkscan** command with **-v aou** option:

Used(MB): Displays the usage size the allocated block on this LUN. Range: $0 \leq \text{Used (MB)} < \text{LU_CAP(MB)} + 42\text{MB}$

LU_CAP(MB): Displays the LUN capacity responded to the "Readcapacity" command as SCSI interface.

LU_CAP(BLK): Displays the LUN capacity (in block/512 bytes) responded to the "Readcapacity" command as SCSI interface.

U(%): Displays the usage rate of the allocated block on the Dynamic Provisioning pool containing this LU.

T(%): Displays the threshold rate being set to the Dynamic Provisioning pool as high water mark.

PID: Displays the Dynamic Provisioning pool ID assigned to this Dynamic Provisioning volume.

raidvchksan for Universal Replicator

The **raidvchksan** command supports the (-v jnl [t] [unit#]) option to find the journal volume list. It also displays any information for the journal volume.

Syntax

```
raidvchksan { -h | -q | -z | -I[H][M][instance#] or  
              I[TC][SI][instance#] | -v jnl [t] [unit#] | [ -s <Seq#>]  
              | [ -f[x] ] | }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidvchksan command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-s <Seq#>	Used to specify the Seq# (serial#) of the storage system when this option cannot specify unitID which is contained for "-v jnl" option. If this option is specified, the unitID which is contained in "-v jnl" is invalid.
-fx	Displays the LDEV number in hexadecimal notation.
-v jn	Displays information for the journal volume.
-v jnlt	Displays the <i>DOW</i> , <i>DPW</i> , and <i>APW</i> time-out values for controlling the journal.

Returned values

--

Error codes

--

Examples

Example 1

Example of **raidvchksan** command with **-v jnl 0** option

```
# raidvchkscan -v jnl 0
JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ (BLK) Seq# Nnm
LDEV#
001 0 1 PJNN 4 21 43216fde 30 512345 62500 2
265
002 1 2 PJNF 4 95 3459fd43 52000 512345 62500 3
270
002 2 2 SJNS 4 95 3459fd43 52000 512345 62500 3
270
003 0 3 PJSN 4 0 - - 512345 62500 1
275
004 0 4 PJSF 4 45 1234f432 78 512345 62500 1
276
005 0 5 PJSE 0 0 - - 512345 62500 1
277
006 - - SMPL - - - - 512345 62500 1
278
007 0 6 SMPL 4 5 345678ef 66 512345 62500 1
278
```

Output of the **raidvchkscan** command with **-v jnl 0** option:

JID: journal ID

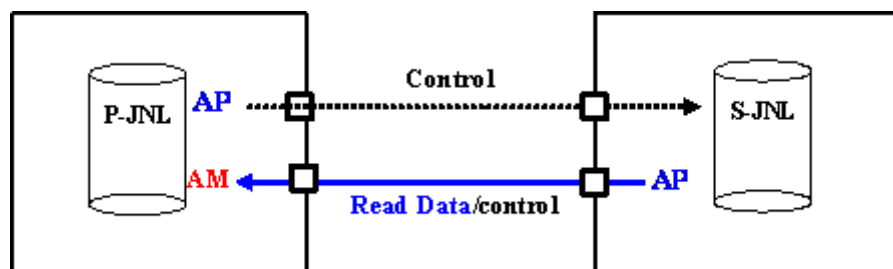
MU: mirror descriptions on Universal Replicator

CTG: CT group ID

JNLS: Status of the journal:

- SMPL: This means the journal volume which does not have a pair, or in the state of deleting.
- P(S)JNN: This means "P(S) Journal Volume is in Normal status".
- P(S)JSN: This means "P(S) Journal Volume is suspended in Normal status".
- PJNF: This means "P(S) Journal Volume is in Full status".
- P(S)JSF: This means "P(S) Journal Volume is suspended in Full status".
- P(S)JSE: This means "P(S) Journal Volume is suspended by an error (including link failures)".
- AP: Displays the following two conditions (status) according to the pair status.

Shows the number of active paths on the initiator port in Universal Replicator links. 'Unknown' is shown as '-'.
 Shows the number of active paths on the initiator port in Universal Replicator links. 'Unknown' is shown as '-'.



AM: The activity monitor that detects whether or not there is a request for data from the initiator at regular intervals. If AM detects a time-out, the P-JNL state is changed from P-JNN to PJSE.

Note: The same path information is used for AP for three commands (pairvolchk, pairdisplay, raidvchkscan). The differential is that pairvolchk and pairdisplay are to show a special meaning with SSUS(SSWS) state.

Q-Marker: Displays the sequence # of the journal ID, called the Q-marker. For P-JNL, Q-Marker shows the latest sequence # on the P-JNL volume. For S-JNL, the Q-Marker shows the latest sequence # of the cache(DFW).

Q-CNT: Displays the number of remaining Q-Markers within each journal volume.

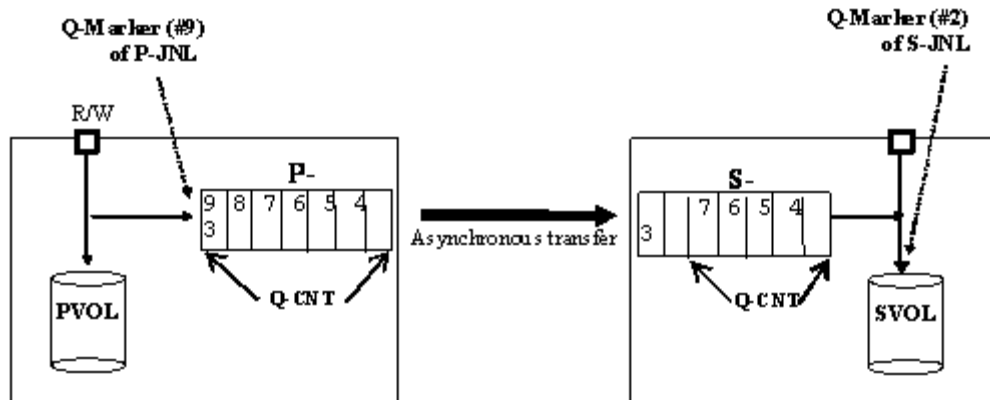


Figure 2-21 Example of Q-Marker and Q-CNT

U(%): Displays the usage rate of the journal data.

D-SZ: Displays the capacity for the journal data on the journal volume.

Seq#: Displays the serial number of the RAID storage system.

Num: Displays the number of LDEV configured the journal volume.

LDEV#: Displays the first number of the LDEV that is configured for the journal volume. Using a combination of JNLS status and other information, the application will know the following detail state.

The following table lists information about the different journal volume statuses. QCNT=0 indicates that the number of remaining Q-Markers is '0'. The letter 'N' indicates a non-zero.

Table 2-12 Detailed Status of the Journal Volume

JNLS		Other Information		Description
P-JNL	S-JNL	QCNT	AP	
SMPL		0	-	Configured as journal volume, but NOT pair
		N	-	Deleting the journal volume
PJNN (PJNS)	SJNN (SJNS)	0	-	Normal state of the journal volume without data
PJNN (PJNS)	-	N	-	Normal state of the journal volume with data

JNLS		Other Information		Description
P-JNL	S-JNL	QCNT	AP	
-	SJNN (SJNS)	N	N	Normal state of the journal volume with data
			0	Still normal state of the journal volume at Link failure
PJSN	SJSN	0	-	Suspended journal volume via operation
		N	-	Suspending the journal volume
PJNF	-	N	-	High water mark state
PJSF	SJSF	0	-	Suspended journal volume due to full journal
		N	-	Suspending the journal volume due to full journal
PJSE	-	0	-	Suspended journal volume due to failure/Link failure
		N	-	Suspending the journal volume due to failure/Link failure
-	SJSE	0	N	Suspended journal volume due to failure
			0	Suspended journal volume due to Link failure
		N	N	Suspending the journal volume due to failure
			0	Suspending the journal volume due to Link failure

Example 2

Example of **raidvchkscan** command with **-v jnl** option

```
# raidvchkscan -v jnl
JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ (BLK) Seq#
DOW PBW APW
001 0 1 PJNN 4 21 43216fde 30 512345 63528
20 300 40
002 1 2 PJNF 4 95 3459fd43 52000 512345 63528
20 300 40
003 0 3 PJSN 4 0 - - 512345 63528
20 300 40
```

Output of the **raidvchkscan** command with **-v jnl** option:

DOW: Data Overflow Watch" timer (in unit of Sec.) setting per the Journal.

PBW: "Path Blockade Watch" (in unit of Sec.) timer setting per the Journal.
Also this is shown as "0" on "SMPL" state.

APW: This shows "Active Path Watch" timer (in unit of Sec.) for detecting Link failure.

raidvchkscan for Thin Image, Copy-on-Write Snapshot, and Dynamic Provisioning

The **raidvchkscan** command supports the option (**-v pid[a] [unit#]**) to find the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool settings via SVP, and displays information for the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

Syntax

```
raidvchkscan { -h | -q | -z | -I[H][M][instance#] or  
               I[TC][SI][instance#] | -v pid[a][s] [unit#]  
               | [ -s <Seq#> ] | [ -f[x] ] | }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidvchkdsp command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#]] or -I[TC][SI] [instance#]]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-s <Seq#>	Used to specify the Seq# (serial#) of the storage system when this option cannot specify unitID which is contained for "-v jnl[a]" option. If this option is specified, the unitID which is contained in "-v jnl[a]" is invalid.
-fx	Displays the LDEV number in hexadecimal notation.
-v pid[s]	Displays information for the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.
-v pid[a]	Displays information for the Dynamic Provisioning pool.

Returned values

--

Error codes

--

Examples

Example of **raidvchkscan** command example with **-v pid option**

```
# raidvchkscan -v pid 0
PID POLS U(%) SSCNT Available(MB) Capacity(MB) Seq# Num
LDEV# H(%)
001 POLN 10 330 10000000 1000000000 62500 2
265 80
002 POLF 95 9900 100000 1000000000 62500 3
270 70
003 POLS 100 10000 100 1000000000 62500 1
275 70
004 POLE 0 0 0 0 62500 0
0 80
```

Output of the **raidvchkscan** command with **-v pid** option:

PID: Displays the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool ID.

POLS: Displays the following status of the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool:

POLN = "Pool Normal"

POLF = "Pool Full". Pool utilization exceeds the depletion threshold.

POLS = "Pool Suspend"

POLE = "Pool failure". In this state, information for the pool has no meaning and is displayed as "0".

U(%): Displays the usage rate of the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

SSCNT: Displays the number of Thin Image or Copy-on-Write Snapshot volumes in the Thin Image or Copy-on-Write Snapshot pool, or the total number of Dynamic Provisioning volumes in the Dynamic Provisioning pool.

Available(MB): Displays the available capacity for the volume data on the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

Capacity(MB): Displays the total capacity in the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

Seq#: Displays the serial number of the RAID storage system.

Num: Displays the number of LDEV configured the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

LDEV#: Displays the first number of LDEV configured the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool.

H(%): Displays the threshold rate being set to the Thin Image, Copy-on-Write Snapshot, or Dynamic Provisioning pool as High water mark. 'Unknown' is shown as '-'.

Example of **raidvchkscan** command example with **-v pida** option

```
# raidvchkscan -v pida 0
PID POLS U(%) AV_CAP(MB) TP_CAP(MB) W(%) H(%) Num LDEV# LCNT
TL_CAP(MB)
001 POLN 10 45000000 50000000 50 80 2 265 33
65000000
002 POLF 95 10000 100000000 50 80 3 270 900
```

```

100000000
004 POLN 0 10000000 100000000 80 90 2 280 0
0

```

Output of the **raidvchkscan** command with **-v pida** option:

PID: Displays the Dynamic Provisioning pool ID.

POLS: Displays the following status of the Dynamic Provisioning pool:

- **POLN** = "Pool Normal"
- **POLF** = "Pool Full". Pool utilization exceeds the depletion threshold.
- **POLS** = "Pool Suspend"
- **POLE** = "Pool failure". In this state, information for the pool has no meaning and is displayed as "0".

U(%): Displays the usage rate of the Dynamic Provisioning pool.

AV_CAP(MB): Displays the available capacity for the Dynamic Provisioning volumes mapped to this pool.

TP_CAP(MB): Displays the total capacity of the Dynamic Provisioning pool.

W(%): Displays the threshold value for "WARNING" set for this Dynamic Provisioning pool.

H(%): Displays the threshold rate set for the Dynamic Provisioning pool as high water mark.

Num: Displays the number of LDEVs configured the Dynamic Provisioning pool.

LDEV#: Displays the first number of LDEV configured the Dynamic Provisioning pool.

LCNT: Displays the total number of Dynamic Provisioning volumes mapped to this Dynamic Provisioning pool.

TL_CAP(MB): Displays the total capacity of all Dynamic Provisioning volumes mapped to this Dynamic Provisioning pool.

horcmstart

The **horcmstart** command is a script that starts HORCM. This script also sets the environment variables for HORCM as needed (for example, HORCM_CONF, HORCM_LOG, HORCM_LOGS).

Syntax

```

horcmstart.sh { inst ... }    (UNIX systems)
horcmstart.exe { inst ... }   (Windows systems)

```

Options and parameters

Option	Description
inst	Specifies the HORCM instance number (numerical value). When this option is specified, the horcmstart shell script sets the environment variables (HORCMINST, HORCM_CONF, HORCM_LOG, HORCM_LOGS) corresponding to the instance number, and starts the specified HORCM instance. (Environment variables set by the user become invalid.) When this option is not specified, the horcmstart shell script starts 1 HORCM and uses the environment variables set by the user. If you have designated full environment variables, use horcmstart.sh without any arguments. If you did not designate environment variables (HORCM_CONF, HORCM_LOG, HORCM_LOGS), then this shell script sets the environment variables as follows: For UNIX-based platforms: If HORCMINST is specified: HORCM_CONF = /etc/horcm*.conf (* is instance number) HORCM_LOG = /HORCM/log*/curlog HORCM_LOGS = /HORCM/log*/tmplog If HORCMINST is not specified: HORCM_CONF = /etc/horcm.conf HORCM_LOG = /HORCM/log/curlog HORCM_LOGS = /HORCM/log/tmplog For Windows platform: If HORCMINST is specified: HORCM_CONF = %windir%\horcm*.conf (* is the instance number) HORCM_LOG = \HORCM\log*\curlog HORCM_LOGS = \HORCM\log*\tmplog If HORCMINST is not specified: HORCM_CONF = %windir%\horcm.conf HORCM_LOG = \HORCM\log\curlog HORCM_LOGS = \HORCM\log\tmplog [environmental variable] The HORCM_LOGS environment variable is used when specifying the log file directory for automatic storing. When HORCM starts up, the log files created in the operation are stored automatically in the HORCM_LOGS directory. This log directory must give an equality class with HORCM_LOG HORCMSTART_WAIT (for waiting the CCI instance with start-up). Horcmgr does fork/exec() horcmd_XX as daemon process, and verifies/waits until HORCM become ready state. The timeout is used for only avoiding infinite loop, currently the default time is 200 sec in consideration of maximum LDEV. However, it may be needed to change the default timeout value for starting HORCM under high-loading of the server, or the remote command device. In such a case, this environmental variable is used when changing a timeout value (in units of Sec) from the current default value (200 sec), this value must be specified more than 5 seconds and multiple of 5 seconds. For example, setting 500 sec: HORCMSTART_WAIT=500 Export HORCMSTART_WAIT For OpenVMS platform: OpenVMS needs to make the Detached LOGINOUT.EXE Process as a JOB in the background by using the 'RUN / DETACHED' command. For details see <i>Requirements and restrictions for OpenVMS</i> (item 4) in the <i>Installation and Configuration Guide</i>.

horcmshutdown

The **horcmshutdown** command is a script for stopping HORCM.

Syntax

```
horcmshutdown.sh {inst...}      (UNIX systems)
horcmshutdown.exe {inst...}     (Windows systems)
```

Options and parameters

Option	Description
inst	Specifies the HORCM (CCI) instance number (numerical value). When this option is specified, the command stops the specified HORCM instance. When this option is not specified, the command refers to the instance (environment variable HORCMINST) of the execution environment of this shell script and stops the following the HORCM instance. When HORCMINST is specified, this command stops the HORCM instance of the execution environment of this shell script. When HORCMINST is not specified, this command stops the HORCM having no instance setting.

horcctl

The HORCM software have logs that identify the cause of software and/or hardware errors as well as a tracing function for investigating such errors. The location of the log files depends on the user's command execution environment and the HORCM execution environment. The command trace file and core file reside together under the directory specified in the HORCM execution environment.

The **horcctl** command can be used for both maintenance and troubleshooting on TrueCopy. The **horcctl** command allows you to change and display the internal trace control parameters (for example, level, type, buffer size) of the HORC Manager and/or TrueCopy commands. If a new value for a parameter is not specified, the current trace control parameter is displayed.

Caution: Do not change the trace level unless directed to do so by a Hitachi Data Systems representative. Level 4 is the normal trace level setting. Levels 0-3 are for troubleshooting. Setting a trace level other than 4 may impact problem resolution. If you request a change of the trace level using the **horcctl -l <level>** command, a warning message appears, and this command enters interactive mode.

Syntax

```
horcctl { -h | -q | -z | -I[H][M][instance#] or
          I[TC][SI][instance#] | -d | -c | -l <level> | -b <y/n>
          | -s <size(KB)> | -t <type> | -S | -D[I] | -C
          | [-u <-unitid> | -ND | -NC | -g <group> ] }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the horcctl command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#]] or -I[TC][SI] [instance#]]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-d	Interprets the control options following this option (-l <level>, -b <y/n>, -s <size(KB)>, and -t <type>) as the parameters of the TrueCopy commands.
-c	Interprets the control options following this option (-l <level>, -b <y/n> and -t <type>) as the parameters of the HORC Manager (HORCM).
-l <level>	Sets the trace level (range = 0 to 15). If a negative value is specified, the trace mode is canceled. A negative value "n" must be specified as "--n". Caution: Do not change the trace level unless directed to do so by a Hitachi Data Systems representative. Level 4 is the normal trace level setting. Levels 0-3 are for troubleshooting. Setting a trace level other than 4 may impact problem resolution. If you request a change of the trace level using the horcctl -l <level> command, a warning message appears, and this command enters interactive mode.
-b <y/n>	Sets the trace writing mode: Y = buffer mode, N = synchronous mode.
-t <type>	Sets the trace type (range = 0 to 511). When this option is used, only traces of the specified type are output. One or more values can be specified.
-s <size(KB)>	Sets the trace buffer size in units of 1024 bytes (default = 1 MB).
-S	Shuts down HORCM.
-D	Displays the command device name currently used by HORCM. If the command device is blocked due to online maintenance (microcode replacement) of the storage system, you can check the command device name in advance using this option.

Option	Description
-c	Changes the command device name being used by HORCM and displays the new command device name. If the command device is blocked due to online maintenance (microcode replacement) of the storage system, you can change the command device in advance using this option. Note: horcctl -D -C command designates a protection mode command device by adding '*' to the device file name as follows: <i>HP-UX example with command device security:</i> <pre># horcctl -D</pre> Current control device = /dev/rdisk/c0t0d0* "horcctl -DI" command shows the number of CCI instances of when HORCM has being started as follows: <i>HP-UX example without command device security:</i> <pre># horcctl -DI</pre> Current control device = /dev/rdisk/c0t0d0 AI = 14 TI = 0 CI = 1 where AI : NUM of actual instances in use TI : NUM of temporary instances in RAID CI : NUM of instances using current (own) instance
-u <unitid>	Used when specifying the unit ID of a command device as the target. This option is effective when the -D or -C option is specified. If this option is not specified, the unit ID is 0.
-ND -g <group>	Displays the network address and port name being used by HORCM. The -g <group> option is used when specifying the group name defined in the configuration definition file.
-NC -g <group>	Changes the network address and port name being used by HORCM and displays the new network address name. The -g <group> option specifies the group name defined in the configuration definition file.

horctakeoff

This is a scripted command for executing several HORC operation commands combined. It checks the volume attribute (optionally specified) and decides a takeover action. The **horctakeoff** operation is defined to change from 3DC multi-target to 3DC multi-hop with the state of running APP, after that the **horctakeover** command will be able to configure 3DC multi-target on the remote site without stopping the APP. The granularity of either a logical volume or volume group can be specified with this command.

Syntax

```
horctakeoff | -h | -q | -z | -I[H][M][instance#] or
I[TC][SI][instance#] | -g[s] <group> | -d[s] <pair Vol>
| -d[g][s] <raw_device> [MU#] | -d[g][s] <seq#> <LDEV#> [MU#]
| -jp <id> | -js <id> | [-t <timeout> ] | -nomsg }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.
-z or -zx	Makes the raidvchkdsp command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I[H][M] [instance#] or -I[TC][SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g[s] <group>	Specifies a group name (defined in the configuration definition file). The command is executed for the specified group unless the -d <pair Vol> option shown below is specified.
-d[s] <pair Vol>	Specifies a logical (named) volume (defined in the configuration definition file). When this option is specified, the command is executed for the specified paired logical volume.
-d[g][s] <raw_device> [MU#]	Searches the configuration definition file (local instance) for a volume that matches the specified raw device. If a volume is found, the command is executed on the paired volume (-d) or group (-dg). This option is effective without specification of the "-g <group>" option. If the specified raw_device is listed in multiple device groups, this will apply to the first one encountered.
-d[g][s] <seq#> <LDEV#> [MU#]	Searches the configuration definition file (local instance) for a volume that matches the specified sequence # and LDEV. If a volume is found, the command is executed on the paired logical volume (-d) or group (-dg). This option is effective without specification of the "-g <group>" option. If the specified LDEV is listed in multiple device groups, this will apply to the first one encountered. <seq #> <LDEV #> can be specified in a hexadecimal (by addition of "0x") or decimal.
-jp <id> (HORC/ UR only)	Horctakeoff command can change 3DC configuration from 3DC multi-target to 3DC multi-hop. To create a 3DC multi-hop (TC_Sync to TC_Sync/UR_PVOL to UR), you must specify a journal ID for UR_PVOL. So this option is used for that purpose. If this option is not specified, a journal ID for UR_PVOL used for 3DC multi-target is inherited automatically.
-js <id> (HORC/ UR only)	Horctakeoff command can be changed 3DC configuration from 3DC multi-target to 3DC multi-hop. To create a 3DC multi-hop (TC_Sync to TC_Sync/UR to UR_SVOL), you must specify a journal ID for UR_SVOL. So this option is used for that purpose. If this option is not specified, a journal ID for UR_SVOL used with 3DC multi-target is inherited automatically. The CTGID is also inherited automatically for the internal paircreate command.
-t <timeout>	Specifies the maximum time to wait for the Sync_PVOL to Sync_SVOL delta data resynchronizing operation. Used for the internal pairresync command with the time-out period in units of seconds. If this option is not specified, the default timeout value (7200 sec) is used.

Option	Description
-noms	Suppresses messages when this command is executed from a user program. This option must be specified at the beginning of the command arguments.

Returned values

The **horctakeoff** command sets the following returned values during exit allowing you to check the execution results.

Normal termination: 0

Abnormal termination: The **horctakeoff** command returns the following error codes as well as generic error.

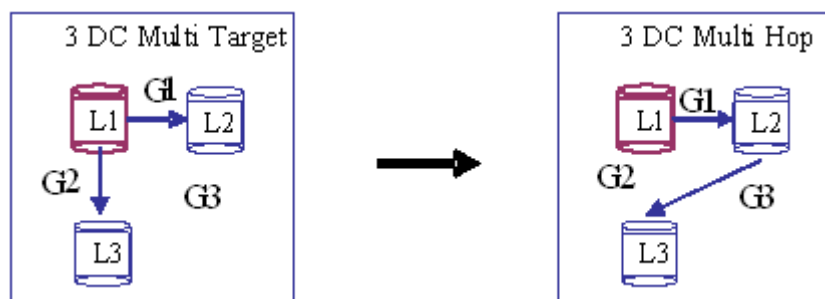
Error codes

Unrecoverable error should have been done without re-execute by handling of an error code. If the command failed, then the detailed status is logged in CCI command log (\$HORCC_LOG), even though the user script has no error handling.

Category	Error Code	Error Message	Value
Volume status (Unrecoverable)	EX_ENQVOL	Unmatched volume status within the group	236
	EX_INCSTG	Inconsistent status in group	229
	EX_EVOLCE	Pair Volume combination error	235
	EX_VOLCRE	Local and Remote Volume currency error	223
Timer (Recoverable)	EX_EWSTOT	Timeout waiting for specified status	233

Examples

Example 1



horctakeoff command on L1 local site

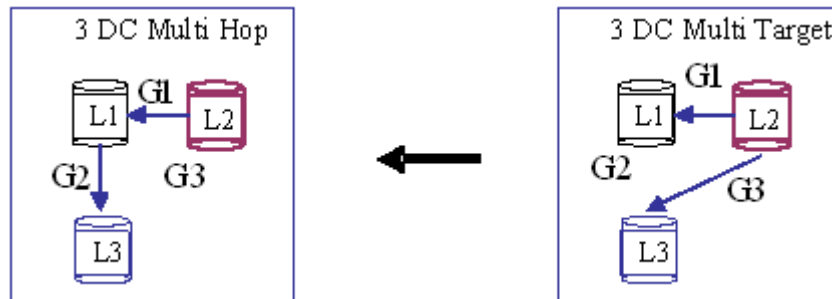
```
# horctakeoff -g G1 -gs G2
horctakeoff : 'pairsplit -g G1 -S -FHORC 2' is in progress
horctakeoff : 'pairsplit -g G1' is in progress
horctakeoff : 'pairsplit -g G2 -S' is in progress
horctakeoff : 'paircreate -g G1 -gs G2 -FHORC 2 -nocopy -f async
-jp 0 -js 1' is in progress
horctakeoff : 'pairsplit -g G1 -FHORC 2' is in progress
```

```

horctakeoff : 'pairresync -g G1' is in progress
horctakeoff : 'pairresync -g G1 -FHORC 2' is in progress
horctakeoff : horctakeoff done

```

Example 2



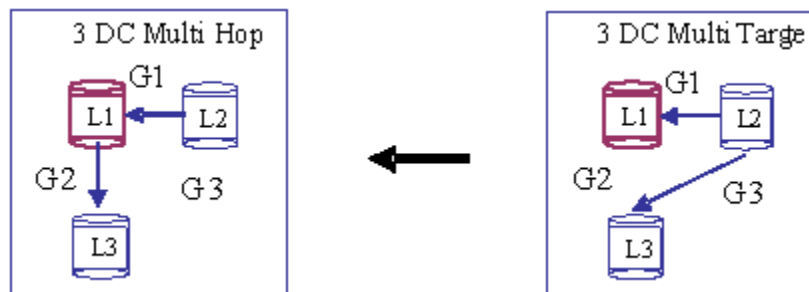
horctakeoff command on L2 local site

```

# horctakeoff -g G1 -gs G3
horctakeoff : 'pairsplit -g G1 -S -FHORC 1' is in progress.
horctakeoff : 'pairsplit -g G1' is in progress.
horctakeoff : 'pairsplit -g G3 -S' is in progress.
horctakeoff : 'paircreate -g G1 -gs G3 -FHORC 1 -nocopy -f async
-jp 0 -js 1' is in progress.
horctakeoff : 'pairsplit -g G1 -FHORC 1' is in progress.
horctakeoff : 'pairresync -g G1' is in progress.
horctakeoff : 'pairresync -g G1 -FHORC 1' is in progress.
horctakeoff : horctakeoff done.

```

Example 3



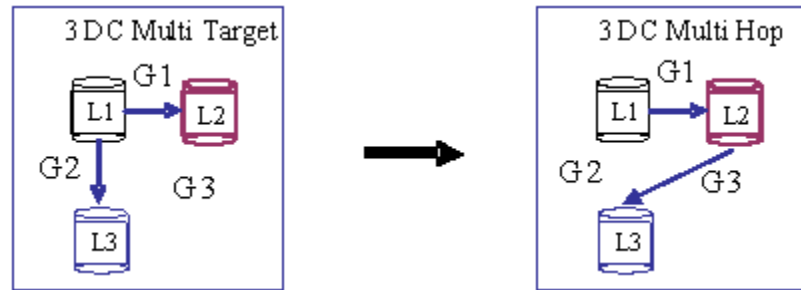
horctakeoff command on L1 remote site

```

# horctakeoff -g G1 -gs G2
horctakeoff : 'pairsplit -g G2 -S' is in progress.
horctakeoff : 'pairsplit -g G1' is in progress.
horctakeoff : 'pairsplit -g G1 -FHORC 2 -S' is in progress.
horctakeoff : 'paircreate -g G2 -vl -nocopy -f async -jp 0
-js 1' is in progress.
horctakeoff : 'pairsplit -g G2' is in progress.
horctakeoff : 'pairresync -g G1' is in progress.
horctakeoff : 'pairresync -g G2' is in progress.
horctakeoff : horctakeoff done.

```

Example 4



horctakeoff command on L2 remote site

```
# horctakeoff -g G1 -gs G3
horctakeoff : 'pairsplit -g G3 -S' is in progress.
horctakeoff : 'pairsplit -g G1' is in progress.
horctakeoff : 'pairsplit -g G1 -FHORC 1 -S' is in progress.
horctakeoff : 'paircreate -g G3 -vl -nocopy -f async -jp 0
-js 1' is in progress.
horctakeoff : 'pairsplit -g G3' is in progress.
horctakeoff : 'pairresync -g G1' is in progress.
horctakeoff : 'pairresync -g G3' is in progress.
horctakeoff : horctakeoff done.
```

pairsyncwait

The **pairsyncwait** command is used to confirm data consistency between the TrueCopy Async/Universal Replicator P-VOL and S-VOL by confirming that required writing was stored in the DFW area of RCU, and confirming whether the last writing just before this command reached the RCU DFW area.

This command gets the latest sequence # of the MCU sidefile (PVOL latest sequence # within the CT group ID) and the sequence # of the RCU DFW within the CT group ID corresponding to the *<group>* or *<raw_device>* specified by **pairsyncwait**, and compares the MCU with the RCU sequence # at that time and at regular intervals. If the RCU sequence # is over the value of the MCU sequence # within the term specified by **pairsyncwait**, this command displays the return code 0 with the meaning of completion of synchronization. The **-nowait** option shows the latest sequence # (Q-marker) of MCU PVol and CTGID. The marker is a 10-digit hexadecimal number.

When a client issues the **pairsyncwait** command, this command is placed on the queue buffer for waiting in the HORCM daemon as a command request. HORCM gets the latest sequence # from the MCU sidefile and the sequence # whose block was transferred and stored in the DFW area of RCU with data consistency, and compares the latest sequence # of MCU sidefile with the sequence # of the RCU DFW area within the term. HORCM replies return codes to this command, when the write of MCU sidefile was stored in RCU DFW area.

Using this function, a client can confirm that a commit() has reached the remote site, and also the backup utility on a remote site can split the cascading ShadowImage volumes (TrueCopy Async/Universal Replicator to TrueCopy Async/ShadowImage/Universal Replicator) without splitting TrueCopy Async/Universal Replicator.

More robust systems need to confirm the data consistency between the TrueCopy Async/Universal Replicator PVol and SVOL. In DB operations (for example, Oracle), the commit() of DB transaction (see the following figure) is needed to confirm that a last writing for the commit() on a local site reached the remote site by using CCI-unique API command.

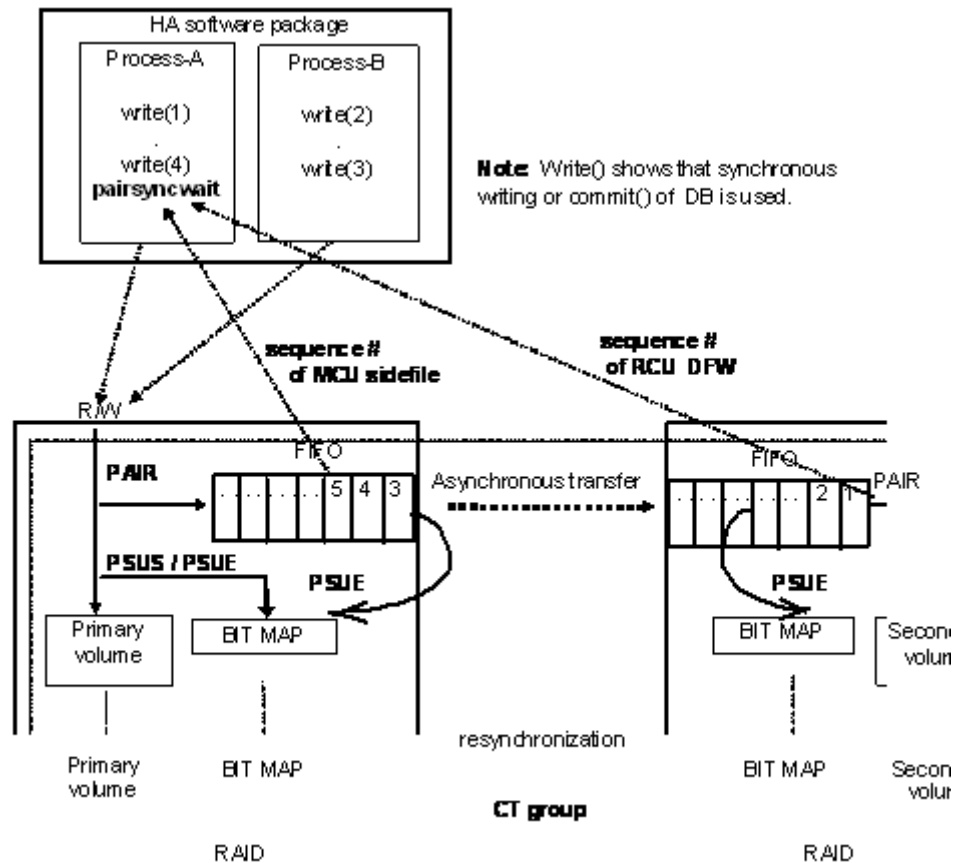


Figure 2-22 Synchronization for TrueCopy Async/Universal Replicator

Syntax

```
pairsyncwait{ -h | -q | -z | -g <group> | -d <pair Vol>
              | -d[g] <raw_device> [MU#] | -d[g] <seq#> <LDEV#> [MU#]
              | -m <marker> | -t <timeout> | -nowait | -nomsg | -fq }
```

Options and parameters

Option	Description
-h	Displays Help/Usage and version information.
-q	Terminates the interactive mode and exits the command.

Option	Description
-z or -zx	Makes the <i>raidar</i> command enter the interactive mode. The -zx option guards performing of the HORCM in the interactive mode. When this option detects a HORCM shut down, interactive mode terminates. OpenVMS cannot use the -zx option.
-I [H] [M] [instance#] or -I [TC] [SI] [instance#]	Specifies the command as [HORC]/[HOMRCF] or [TrueCopy]/[ShadowImage], and used when specifying the CCI instance number.
-g <group>	Specifies a group name defined in the configuration definition file. The command is executed for the specified group unless the -d <pair Vol> option is specified.
-d <pair Vol>	Specifies paired logical volume name defined in the configuration definition file. When this option is specified, the command is executed for the specified paired logical volume.
-d[g] <raw_device> [MU#]	Searches whether the specified raw_device is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of -g <group> option. If the specified raw_device is contained in two or more groups, the command is executed for the first group.
-d[g] <seq#> <LDEV#> [MU#]	Searches whether the specified LDEV is included in a group on the configuration definition file (local instance). If it is in the group, the target volume is executed as the paired logical volume (-d) or group (-dg). This option is effective without specification of "-g <group>" option. If the specified LDEV is contained in two or more groups, the command is executed on the first group. The <seq #> <LDEV #> values can be specified in hexadecimal (add the "0x" prefix) or decimal notation.
-m <marker>	Specifies the sequence # of MCU PVOL, called the Q-marker. If the application gets Q-marker as the result of execution of pairsyncwait because of timeout or "-nowait", the application can reconfirm the completion of Async transfer by using pairsyncwait with Q-marker. If the application does not specify Q-marker, CCI uses the latest sequence # when CCI receives pairsyncwait. It is also possible to wait for the completion from SVOL side with this option. Q-Marker format: iisssssss, where ii = regeneration # of pair volume, and sssssss = latest sequence # on the side of PVOL.
-t <timeout>	Specifies the timeout value to wait for the completion of RCU DFW area. The unit is 100 ms. MCU gets the latest sequence # from RCU at regular interval.
-nowait	Gets the latest sequence # of MCU PVol and CTGID without waiting. When this option is specified, the latest sequence # of MCU PVol is reported immediately, and -t <timeout> option is ignored.
-nomsg	Suppresses messages to be displayed when this command is executed from a user program. This option must be specified at the beginning of the command arguments.

Option	Description
-fq	Displays the number of remaining Q-Markers within the CT group by adding "QM-Cnt" to the last column. "QM-Cnt" is shown as follows: - When specifying "-nowait -fq" "QM-Cnt" is shown as the number of remaining Q-Marker at this time within CT group. - When specifying "-nowait -m <marker> -fq" "QM-Cnt" is shown as the number of remaining Q-Marker from the specified <marker> within CT group. - When specifying "TIMEOUT" without "-nowait" "QM-Cnt" is shown as the number of remaining Q-Marker at this timeout within CT group. "QM-Cnt" is shown as "-", if the status for Q-Marker is invalid (that is, status is "BROKEN" or "CHANGED"). <i>Example:</i> <pre># pairsyncwait -g oradb -nowait -fq UnitID CTGID Q-Marker Status Q-Num QM-Cnt 0 3 01003408ef NOWAIT 2 120 # pairsyncwait -g oradb -nowait -m 01003408e0 -fq UnitID CTGID Q-Marker Status Q-Num QM-Cnt 0 3 01003408e0 NOWAIT 2 105 # pairsyncwait -g oradb -t 50 -fq UnitID CTGID Q-Marker Status Q-Num QM-Cnt 0 3 01003408ef TIMEOUT 2 5</pre>
Restriction	Specified <group> volume must be PVol with status PAIR. Other cases reply with error (EX_INVVOL). It is possible to issue pairsysncwait from SVOL side with -m <marker>.

Returned values

The **pairsyncwait** command sets the following returned values during exit allowing you to check the execution results.

Condition	Returned Value
When the -nowait option is specified	- Normal termination: 0: The status is NOWAIT. - Abnormal termination: other than 0 to 127, refer to the error code for error details.
When the -nowait option is not specified	- Normal termination: 0: The status is DONE (completion of synchronization). 1: The status is TIMEOUT (timeout). 2: The status is BROKEN (Q-marker synchronized process is rejected). 3: The status is CHANGED (Q-marker is invalid due to resynchronize). - Abnormal termination: other than 0 to 127, refer to the error codes for error details.

Error codes

Unrecoverable errors are fixed and not resolved, even after re-executing the command. If the command failed, the detailed status will be logged in the CCI command log (\$HORCC_LOG), even if the user script has no error handling.

Category	Error Code	Error Message	Recommended Action	Value
Volume status (Unrecoverable)	EX_INVVOL	Invalid volume status	Confirm pair status using pairdisplay -l.	222

Examples

The following shows examples of the **pairsyncwait** command with and without the **-nowait** option.

```
# pairsyncwait -g oradb -nowait <==nowait is specified.
UnitID  CTGID  Q-Marker  Status  Q-Num
  0      3    01003408ef  NOWAIT  2
# pairsyncwait -g oradb -t 100 <==nowait is not specified.
UnitID  CTGID  Q-Marker  Status  Q-Num
  0      3    01003408ef  DONE    2
# pairsyncwait -g oradb -t 1
UnitID  CTGID  Q-Marker  Status  Q-Num
  0      3    01003408ef  TIMEOUT 3
# pairsyncwait -g oradb -t 100 -m 01003408ef
UnitID  CTGID  Q-Marker  Status  Q-Num
  0      3    01003408ef  DONE    0
# pairsyncwait -g oradb -t 100
UnitID  CTGID  Q-Marker  Status  Q-Num
  0      3    01003408ef  BROKEN  0
# pairsyncwait -g oradb -t 100 -m 01003408ef
UnitID  CTGID  Q-Marker  Status  Q-Num
  0      3    01003408ef  CHANGED 0
-> "01003408ef" is invalid because the pair volume is already
resynchronized.
```

Output of the **pairsyncwait** command:

UnitID: Unit ID in the case of multiple storage system connection

CTGID: CTGID within Unit ID

Q-Marker: The latest sequence # of MCU PVol (Marker) when the command is received.

Status: The status after the execution of command.

Q-Num: The number of process queues to wait for synchronization within the CTGID.

QM-Cnt: The number of remaining Q-Markers within CT group of the Unit. TrueCopy Async/Universal Replicator sends a token called "dummy recordset" at regular intervals, therefore QM-Cnt always shows "2" or "3" even if Host has NO writing.

Arithmetic expression for determining the remaining data in a CT group:

*Remaining data in CT group = Sidefile capacity * Sidefile percentage / 100*

Sidefile percentage is the rate showed to "%" column with "PAIR" state by Pairedisplay command. Sidefile capacity is the capacity within 30% to 70% of the cache setting as the sidefile.

Arithmetic expression for determining the average data per Q-Marker in a CT group:

Data per Q-Marker = Remaining data in CT group / QM-Cnt

Subcommands

This chapter provides the specifications for the CCI subcommands.

- [Windows subcommands](#)
- [Environment variable subcommands](#)

Windows subcommands

The CCI software provides subcommands for the Windows platforms that are executed as options (**-x <command> <arg>**) of another command. When you specify a subcommand as the only option of a command, you do not need to start HORCM. If another option of the command and the subcommand are specified on the same command line, place the other option after the subcommand.

The Windows subcommands are:

- [findcmddev on page 3-2](#)
- [drivescan on page 3-3](#)
- [portscan on page 3-4](#)
- [sync, syncd on page 3-5](#)
- [mount on page 3-7](#)
- [umount, umountd on page 3-9](#)

findcmddev

The **findcmddev** subcommand searches for command devices within the specified range of disk drive numbers. If it is found, the command device appears in the same format as in the configuration definition file. This subcommand is used when the command device name is not known and when the HORCM is not started.

Caution: The **findcmddev** subcommand must be used when HORCM is not running.

Note: The **findcmddev** subcommand searches for the physical and logical drives associated with the command device. If the command device is indicated as a logical drive in addition to a physical drive, then a drive letter is assigned to the command device. You must delete the drive letter assigned to the command device to prevent utilization by general users.

The "Volume{GUID}" must be made by setting a partition using the disk management without file system format, and is used to keep as the same command device even though the physical drive numbers are changed on every reboot in a SAN environment.

Syntax

```
-x findcmddev drive#(0-N)
```

Argument

drive#(0-N): Specifies the range of disk drive numbers on the Windows system.

Example

The following shows an example of the **findcmddev** subcommand used as an option of the **raidscan** command and its output. This example searches for command devices in the range of disk drive numbers 0 through 20.

```
D:\HORCM\etc> raidscan -x findcmddev hdisk0, 20
cmddev of Ser# 62496 = \\.\PhysicalDrive0
cmddev of Ser# 62496 = \\.\E:
cmddev of Ser# 62496 = \\.\Volume{b9b31c79-240a-11d5-a37f-00c00d003b1e}
```

drivescan

The **drivescan** subcommand displays the relationship between the disk numbers assigned by the Windows system and the LDEVs on the RAID storage system, and also displays attribute and status information for each LDEV.

Syntax

```
-x drivescan drive#(0-N)
```

Argument

drive#(0-N): Specifies the range of disk drive numbers on the Windows system.

Example

The following shows an example of the **drivescan** subcommand used as an option of the **raidscan** command and its output. This example displays the devices for the range of disk drive numbers from 0 to 20.

```
raidscan -x drivescan hddisk0,20
Harddisk 0..Port[1] PhId[0] TId[0] Lun[0] [HITACHI] [DK328H-43WS]
Harddisk 1..Port[2] PhId[4] TId[29] Lun[0] [HITACHI] [OPEN-3]
    Port[CL1-J] Ser#[ 30053] LDEV#[ 9(0x009)]
    HORC=P-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL MU#2 = SMPL]
    RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
Harddisk 2..Port[ 2] PhId[ 4] TId[29] Lun[ 1] [HITACHI] [OPEN-3]
    Port[CL1-J] Ser#[ 30053] LDEV#[ 10(0x00A)]
    HORC=S-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL MU#2 = SMPL]
    RAID5[Group 2- 1] SSID = 0x0004 CTGID = 3
Harddisk 3..Port[2] PhId[4] TId[29] Lun[ 6] [HITACHI] [OPEN-3-CM]
    Port[CL1-J] Ser#[ 30053] LDEV#[ 15(0x00F)]
```

Output of the **drivescan** subcommand:

Harddisk #: Shows the hard disk recognized by the Windows system.

Port: Shows the port number on the device adapter recognized by the Windows system.

Phid: Shows the bus number on the device adapter port recognized by Windows system.

Tid: Shows the target ID of the hard disk(s) on the specified port and bus.

LUN: Shows the LU number of the hard disk on the specified port, bus, and TID.

Port[CLX-Y]: Shows the port number on the storage system.

Ser#: Shows the production number (serial number) of the storage system.

LDEV#: Shows the LDEV ID (hexadecimal) of the specified volume.

HORC: Shows the TrueCopy attribute (P-VOL, S-VOL, SMPL) of the specified volume.

HOMRCF: Shows the ShadowImage/Copy-on-Write Snapshot attribute (P-VOL, S-VOL, or SMPL) and MU number (0-2) of the specified volume.

RAIDX[Group]: Shows the physical location (frame number-parity group number) of the specified volume and the RAID level of this parity group.

SSID: Shows the SSID of the specified volume. The HUS VM does not support SSID but displays the specified value.

CTGID (TrueCopy Async/Universal Replicator only): Shows the consistency group ID of specified volume.

portscan

The **portscan** subcommand displays the devices on the specified port(s).

Syntax

```
-x portscan port#(0-N)
```

Argument

port#(0-N): Specifies the range of port numbers on the Windows system.

Example

The following shows an example of the **portscan** subcommand used as an option of the **raidscan** command and its output. This example displays the devices for the range of ports from 0 to 20.

```
raidscan -x portscan port0,20
PORT[ 0] IID [ 7] SCSI Devices
      PhId[ 0] TId[ 3] Lun[ 0] [MATSHIT] [CD-ROM CR-508]...Claimed
      PhId[ 0] TId[ 4] Lun[ 0] [HP      ] [C1537A      ]...Claimed
PORT[ 1] IID [ 7] SCSI Devices
      PhId[ 0] TId[ 0] Lun[ 0] [HITACHI] [DK328H-43WS ]...Claimed
PORT[ 2] IID [ 7] SCSI Devices
      PhId[ 0] TId[ 5] Lun[ 0] [HITACHI] [OPEN-3      ]...Claimed
      PhId[ 0] TId[ 5] Lun[ 1] [HITACHI] [OPEN-3      ]...Claimed
      PhId[ 0] TId[ 5] Lun[ 2] [HITACHI] [OPEN-3      ]...Claimed
      PhId[ 0] TId[ 6] Lun[ 0] [HITACHI] [3390-3A     ]...Claimed
```

Note: This example displays the devices for the range of ports from 0 to 20.

Output of the **portscan** subcommand:

Port: Shows the port number on the device adapter recognized by the Windows system

IID: Shows the initiator ID on the specified device adapter port

Phid: Shows the BUS number on the specified device adapter port

Tid: Shows the target ID of the hard disk(s) on the specified adapter port and bus.

LUN: Shows the LU number of each hard disk on the specified device adapter port/bus. This item shows LDEV# of the partner who becomes a pair in or among the RAID storage system.

sync, syncd

The **sync** (synchronization) subcommand sends unwritten data remaining on the Windows server to the specified device(s) to synchronize the pair(s) before the CCI command is executed. The **syncd** (synchronization delay) subcommand waits for the delayed IO for dismount after issued "**sync**".

Syntax

```
-x sync[d] A: B: C: ...  
-x sync[d] all  
-x sync[d] drive# (0-N)  
-x sync[d] Volume# ...  
-x sync[d] D:\Directory or \Directory pattern...
```

Arguments

Argument	Description
A: B: C: [\directory or \Directory pattern]	Specifies the logical drive that you want to synchronize. Data is flushed into the specified logical drive and the physical drive corresponding to the logical drive. If the specified logical drive has the directory mount volumes then SYNC is executed to all of the volumes on the logical drive as shown below: <pre>pairsplit -x sync D: [SYNC] D: HarddiskVolume2 [SYNC] D:\hd1 HarddiskVolume8 [SYNC] D:\hd2 HarddiskVolume9</pre> [\directory or \Directory pattern] is used to find the directory mount point on the logical drive. If the directory is specified, then SYNC does execute to a directory mounted volume only. <pre>pairsplit -x sync D:\hd1 [SYNC] D:\hd1 HarddiskVolume8</pre> If the directory pattern is specified, then SYNC does execute to any directory mounted volumes identified to "\directory pattern". <pre>pairsplit -x sync D:h [SYNC] D:\hd1 HarddiskVolume8 [SYNC] D:\hd2 HarddiskVolume9</pre>

Argument	Description
all	Synchronizes all logical drives and the physical drives corresponding to the logical drives assuming that they are on the hard disks. The logical drive on which the CCI software is installed and the logical drive containing the Windows directory are excluded. If the logical drive has the directory mount volumes then SYNC is executed to all volumes on the logical drive as shown below: <pre> pairsplit -x sync all [SYNC] C: HarddiskVolume1 [SYNC] D:\hd1 HarddiskVolume8 [SYNC] D:\hd2 HarddiskVolume9 [SYNC] G: HarddiskVolume10 </pre>
drive#(0-N)	Specifies the range of drives on the Windows system.
Volume#(0-N)	Specifies the LDM volumes to be flushed. Volume# must be specified '\Vol# or \Dms# or \Dmt# or \Dmr#' as LDM volume for Windows systems. To flush HarddiskVolumeX: <pre> -x sync \VolX </pre> For information on '\Vol# or \Dms# or \Dmt# or \Dmr#' for LDM volumes, see <i>Volume Discovery Function</i> in the <i>User and Reference Guide</i> .

Examples

The following examples show the **sync** subcommand used as an option of the **pairsplit** command.

sync subcommand with pairsplit

For the following example, the data remaining on logical drives C: and D: is written to disk, all pairs in the specified group are split (status = PSUS), and read/write access is enabled for all S-VOLs in the specified group.

```
pairsplit -x sync C: D: -g oradb -rw
```

sync subcommand with pairsplit -S

For the following example, the data remaining on physical devices harddisk2 and harddisk3 is written to disk, all pairs in the specified group are deleted (status = SMPL), which enables read/write access for all secondary volumes.

```
pairsplit -x sync hdisk2 hdisk3 -g oradb -S
```

Note: The sync subcommand has the following behavior on any conditions:

If the logical drives designated as the objects of the sync command are not opened to any applications, then sync flushes the system buffer to a drive and makes the dismount state for this drive.

If the logical drives designated as the objects of the sync command are already opened to any applications, then sync only flushes the system buffer to a drive.

This flushes the system buffer before pairsplit without unmounting the PVOL (opening state), and indicates as [WARNING] below:

```
pairsplit -x sync C:
WARNING: Only flushed to [\\.\C:] drive due to be opening
[SYNC] C: HarddiskVolume3
```

Note: Syncd has the following behavior as well:

- If the logical drives designated as the objects of the **sync** command are not opened to any applications, then **syncd** flushes the system buffer to a drive and waits (30 sec) the delayed (paging) IO for dismount after made the dismount state about the drive.

This avoids a problem that NTFS on PVOL is split on inconsistent state because Windows 2003 delays the IO for dismounting.

Note: If sync has failed, you need to confirm the following conditions:

- The logical and physical drives designated as the objects of the sync command are not opened to any applications. For example, confirm that Explore is not pointed on the target drive. If Explore is pointed on the target drive, the target drive is opening.
- The sync command does not ignore the detected error on the NT file system, so sync executes successfully in normal case (NO ERROR case) only on NT file system. For example, confirm the target drive has no failure on the system for Event Viewer. In this case, you must reboot the system or delete the partition and reconfigure the target drive.

mount

The **mount** subcommand mounts the specified drive to the specified partition on the specified hard disk drive using the drive letter. When the **mount** subcommand is executed without an argument, all currently mounted drives (including directory mounted volumes) are displayed, and logical drive has been mounting an LDM volume then displays Harddisk#[n] configured an LDM volume.

Syntax

```
-x mount drive: Volume# (for Windows 2008/2003/2000)
-x mount drive: [\\directory] Volume# (for Windows 2008/2003/2000)
```

Arguments

Argument	Description
drive: hdisk# [partition #]	Specifies the logical drive, hard disk drive (number), and partition to be mounted.

Argument	Description																														
drive: [\\directory] Volume#	Specifies the logical drive and LDM volume name and number to be mounted. Volume# must be specified '\\Vol# or \\Dms# or \\Dmt# or \\Dmr# ' as LDM volume for Windows 2008/2003/2000. To mount HarddiskVolumeX: -x mount C: hdX or -x mount C: \\VolX For information on '\\Vol# or \\Dms# or \\Dmt# or \\Dmr#' for LDM volumes, see <i>Volume Discovery Function</i> in the <i>User and Reference Guide</i>. [\\directory]: Specifies the directory mount point on the logical drive. pairsplit -x mount D:\\hd1 \\Vol8 D:\\hd1 <+> HarddiskVolume8 pairsplit -x mount D:\\hd2 \\Vol9 D:\\hd2 <+> HarddiskVolume9																														
Restriction	The partition on the specified disk drive (hard disk) must be recognized on the Windows system. [\\directory] for the mount must be specified a mount point without embedded space character. If [\\directory] is detected as mount point with embedded space (that is, <i>aaa bbb</i>), then the directory is shown by adding "..." to first strings as below. pairsplit -x mount <table><tr><td>Drive</td><td>FS_name</td><td>VOL_name</td><td>Device</td><td>Partition</td><td>...</td><td>Port</td><td>PathID</td><td>Targ</td><td>Lun</td></tr><tr><td>D:</td><td>NTFS</td><td>Null</td><td>Harddiskvolume3</td><td></td><td>...</td><td></td><td></td><td>Harddisk2</td><td></td></tr><tr><td>D:\\aaa...</td><td>NTFS</td><td>Null</td><td>Harddiskvolume4</td><td></td><td>...</td><td></td><td></td><td>Harddisk3</td><td></td></tr></table> The same method is used for "inqraid \$LETALL" and "raidscan -pi \$LETALL -find" command.	Drive	FS_name	VOL_name	Device	Partition	...	Port	PathID	Targ	Lun	D:	NTFS	Null	Harddiskvolume3		...			Harddisk2		D:\\aaa...	NTFS	Null	Harddiskvolume4		...			Harddisk3	
Drive	FS_name	VOL_name	Device	Partition	...	Port	PathID	Targ	Lun																						
D:	NTFS	Null	Harddiskvolume3		...			Harddisk2																							
D:\\aaa...	NTFS	Null	Harddiskvolume4		...			Harddisk3																							

Example

The following example shows the **mount** subcommand used as an option of the **pairsplit** command and its outputs.

```
pairsplit -x mount F: hdisk2
pairsplit -x mount
Drive FS_name VOL_name Device Partition ... Port PathID Targ Lun
C NTFS Null Harddiskvolume1 ... Harddisk0
F: NTFS Null Harddiskvolume2 ... Harddisk1
D: NTFS Null Harddiskvolume3 ... Harddisk2
D:\\hd1 NTFS Null Harddiskvolume4 ... Harddisk3
D:\\hd2 NTFS Null Harddiskvolume5 ... Harddisk4
G: NTFS Null HarddiskDmVolumes\\...\\Volume1...Harddisk5[3]
```

This example executes mount from command option of the **pairsplit** command and then displays the mounted devices:

- The F: drive is mounted to harddiskvolume2
- D: is mounted to
- harddiskvolume3D:\\hd1 directory ('hd1' directory on D: drive) is mounted to
- harddiskvolume4D:\\hd2 directory is mounted to harddiskvolume5
- G: drive is mounted to harddiskDmVolumes\\...\\Volume1 for spanned volume configured with three harddisks.

Output of the **mount** subcommand:

Drive: Shows the logical drive recognized by the Windows system

FS_name: Shows the name of the file system formatted on the specified drive

VOL_name: Shows the volume label name for the specified drive

Device, Partition: Shows the device name and partition for the specified drive

Port,Phid,Tid,Lun: Shows the port number, path group ID (bus), target ID, and LUN for the specified drive.

umount, umountd

The **umount** subcommand unmounts the specified logical drive and deletes the drive letter. Before deleting the drive letter, this subcommand executes sync internally for the specified logical drive and flushes unwritten data. The **umountd** subcommand unmounts the logical drive after waiting the delayed IO for dismount.

Syntax

```
-x umount[d] drive:[\directory] [time] (for Windows)
```

Argument

Argument	Description
drive	Specifies the mounted logical drive.
[\directory]	Specifies the directory mount point on the logical drive. This command option calls "mountvol /P" internally, if "USE_MOUNTVOL_P" environment variable will be specified. In case of Windows 2008, it is required to specify "USE_MOUNTVOL_P" variable to avoid a problem of mount. pairsplit -x umount D:\hd1 D:\hd1 <-> HarddiskVolume8 set USE_MOUNTVOL_P=1 pairsplit -x umount D:\hd2 D:\hd2 <-> HarddiskVolume9 Example for waiting 45 sec: pairsplit -x umount D: 45 D: <-> HarddiskVolume8
Restriction	The logical drive to be unmounted and the corresponding physical drive must be closed to all applications.

Example

The following example shows the **umount** subcommand used as an option of the **pairsplit** command.

```
pairsplit -x umount F: -x umount G: -g oradb -rw  
pairsplit -x mount
```

```
Drive FS_name VOL_name Device Partition... Port PathID Targ Lun  
C: FAT Null Harddisk0 Partition1... 1 0 0 0  
Z: Unknown Unknown CdRom0 ... Unknown
```

This example unmounts the F: and G: drives, splits all pairs in the specified group (status = PSUS), enables read/write access to all secondary volumes in the specified group, and then displays all mounted drives.

Output of the **umount** subcommand:

Drive: Shows the logical drive recognized by the Windows system

FS_name: Shows the name of the file system formatted on the specified drive

VOL_name: Shows the volume label name for the specified drive

Device, Partition: Shows the device name and partition for the specified drive

Port,Phid,Tid,Lun: Shows the port number, path group ID (bus), target ID, and LUN for the specified drive.

Note: The **umount** command flushes (sync) the system buffer of the associated drive before deleting the drive letter. If umount fails, confirm the following conditions:

The logical and physical drives designated as the objects of the **umount** command are not opened to any applications. For example, confirm that Explore is not pointed on the target drive. If it is, then the target drive is opening.

Umount command does not ignore the detected error on the NT file system, so that umount is successful in a normal case (NO ERROR case) only on NT file system. For example, confirm the target drive has no failure on the system for Event Viewer. If so, you must reboot the system or delete the partition and reconfigure the target drive.

Note: The **umountd** command has the following behavior as well.

Unmount the logical drive after waiting (30 sec) the delayed (paging) IO for dismount after flushed the system buffer to a drive.

This avoids a problem (Windows 2003 only) that NTFS on PVOL is split on inconsistent state because Windows 2003 (SP1) delays the IO for dismounting. This also avoids a problem that the delayed (paging) IO for dismounting is written on SVOL_PAIR(Writing Disable) state by rescan, and logged as Windows event (that is, ID51,57).

These problems do not occur on Windows 2008 systems.

Environment variable subcommands

If no environment variables are set in the execution environment, the following environment variable subcommands set or cancel an environment variable within the CCI command.

setenv: The **setenv** subcommand sets the specified environment variable(s).

usetenv: The **usetenv** subcommand deletes the specified environment variable(s).

env: The **env** subcommand command displays the environment variable(s).

sleep: The **sleep** subcommand causes CCI to wait for the specified time.

Syntax

```
-x setenv vaname value -x unsetenv vaname -x env -x sleep time
```

Arguments

Argument	Description
Vaname	Specifies the environment variable to be set or canceled.
Value	Specifies the value or character string of the environment variable to be set.
Time	Specifies the sleep time in seconds.
Restriction	The environment variables must be set before connecting to HORCM, and must be specified during interactive mode (-z option). Changing an environment variable after a CCI command execution error is invalid.

Example

The following examples show the **setenv** and **unsetenv** subcommands used as an option of the **raidscan** command. This example changes from "HORC" to "HOMRCF" an execution environment of the **raidscan** command that makes a dialog mode, because of establishing "HORCC_MRCF" as an environment variable.

```
raidscan[HORC]: -x setenv HORCC_MRCF 1
raidscan[MRCF]:

raidscan[MRCF]: -x unsetenv HORCC_MRCF
raidscan[HORC]:
```


Command tools

This chapter provides the specifications for the CCI command tools.

- [inqraid](#)
- [mkconf](#)

inqraid

The *inqraid* command is a CCI command tool used to confirm the drive connection between the storage system and host system. The *inqraid* command displays the relation between special file(s) on the host system and actual physical drive of the RAID storage system.

Syntax

```
/HORCM/usr/bin/inqraid [-h | quit | -inqdump  
| -fx[p][l][g][c][h][n] | -find[c] | <special file>  
| -CLI[W][P][N][B] | -sort [-CM ] | -pin | -export]  
  
/HORCM/etc/inqraid [-h | quit | -inqdump | -fx[p][l][g][c][h][n]  
| -find[c] | <special file> | -CLI[W][P][N][B] | -sort [-CM ]  
| -gvinf | -svinf | -gplba | -fv| -pin| -export]
```

Options and parameters

Option	Description
-h	Displays Help/Usage.
quit	Terminates from waiting STDIN and exits this command.
-inqdump	Displays information for standard inquiry with Dump Image of hexadecimal.
-fx	Displays the LDEV number (hexadecimal).
-fp or -fl or -pin	Shows a data protection volume with "-CLI" option by appending '*' to the device file name. If the <i>-fp</i> option is specified, the data protection volume is a Database Validator volume. If the <i>-fl</i> option is specified, the data protection volume is a Data Retention Utility volume. If the <i>-pin</i> option is specified, shows that the volume is PIN track volume because of double drive failure and/or especially external connection disk failure. <pre># ls /dev/rdisk/c57t4* ./inqraid -CLI -fp DEVICE_FILE PORT SERIAL LDEV CTG H/M/12 SSID R:Group PRODUCT_ID c57t4d0* CL1-D 62496 32 - s/P/ss 0004 5:01-03 OPEN- 3 c57t4d3* CL1-D 62496 35 - s/P/ss 0004 5:01-03 OPEN- 3 c57t4d4 CL1-D 62496 36 - s/P/ss 0004 5:01-01 OPEN- 3 c57t4d5 CL1-D 62496 37 - s/P/ss 0004 5:01-02 OPEN- 3</pre> This example shows that c57t4d0 and c57t4d3 (marked by *) are set to enable Database Validator checking (<i>-fp</i> option). The <i>raidvchkset</i> command is used to enable/disable volume protection.
-fg	Shows a LUN on the host view by finding a host group (9900V and later).

Option	Description
-find[c]	Finds the appropriate group within the configuration file using a special file provided by STDIN. -find: Searches a group on the configuration definition file (local instance) from <special file> of STDIN by using pairdisplay command, and uses the following options of the pairdisplay command to display its state. This option must be specified HORCMINST as command execution environment. For ShadowImage: pairdisplay -d <Seq#> <LDEV#> 0 1 2 -l [-fx] [-CLI] 2>/dev/null For TrueCopy: pairdisplay -d <Seq#> <LDEV#> -l [-fx] [-CLI] 2>/dev/null Note: <Seq#> and <LDEV#> are included using SCSI Inquiry command. <special file>: This option is used to specify the special file name as argument of command. If no argument, this command makes mode that wait for STDIN without argument. -findc: Uses the following options of the pairdisplay command, and displays with CLI format by editing an output of pairdisplay command. For ShadowImage: pairdisplay -d <Seq#> <LDEV#> <MU#> -fd -CLI 2>/dev/null For TrueCopy: pairdisplay -d <Seq#> <LDEV#> -fd -CLI 2>/dev/null Note: <Seq#> and <LDEV#> are included using SCSI Inquiry command. <special file>: Specifies a special file name as the argument of a command. No argument: Expects STDIN to provide the arguments.
-CLI	Displays structured column output for command line interface (CLI) parsing. Also used for "-find" option. The delimiters between columns can be spaces and/or dashes (-).
-CLIWP, -CLIWN	Displays the WWN (world wide name for host adapter) and LUN with CLI format, also used for "-find" option.
-sort[CM]	Sorts the target devices by Serial#,LDEV# order. [CM] Displays the command device only in horcm.conf image. This option is valid within "-sort" option.
-gvinf -gvinfex	Windows systems only. -gvinfex is for GPT disk. Gets the signature and volume layout information of a raw device file provided via STDIN or arguments, and saves this information to the system disk with the following format: \WindowsDirectory\VOLssss_IIII.ini where ssss = serial#, IIII = LDEV# Normally this option is used to save the signature and volume layout information once after setting the new partition for SVOL using the Windows Disk Management.

Option	Description
-svinf[=PTN] -svinfex[=PTN]	Windows systems only. -svinfex[=PTN] is for GPT disk. Sets the signature and volume layout information that was saved to the system disk to a raw device file provided via STDIN or arguments. Gets the serial# and LDEV# for the target device using SCSI Inquiry, and sets the signature and volume layout information into VOLssss_IIII.ini file to the target device. This option will set correctly because the signature and volume layout information is managed by the serial# and LDEV# without depend on Harddisk#, even if Harddisk# is changed by the configuration changes. [=PTN]: Specifies a strings pattern to interpret the strings provided via STDIN as a raw device. \Device\HarddiskVolume#(number) is made in a sequential order executed -svinf to Harddisk, and its number will remain the same as long as the system configuration is not changed. If you want to make \Device\HarddiskVolume#(number) more absolutely, then make \Device\HarddiskVolume# in serial# and LDEV# order by using the "-sort" option as shown below: <pre>D:\HORCM\etc>echo hd5 hd4 hd3 ingraid -svinf -sort [VOL61459_451_5296A763] -> Harddisk3 [OPEN-3] [VOL61459_452_5296A760] -> Harddisk4 [OPEN-3] [VOL61459_453_5296A761] -> Harddisk5 [OPEN-3]</pre>
-gplba -gplbaex	Windows systems only. -gplbaex is for GPT disk. Displays usable LBA on a physical drive in units of 512 bytes, and specifies [slba] [elba] options for raidvchkset command. <i>Example:</i> <pre>C:\HORCM\etc>ingraid \$Phys -CLI -gplba -sort Harddisk11 : SLBA = 0x00003f00 ELBA = 0x000620d9 PCNT = 7 [OPEN-3-CVS] Harddisk12 : SLBA = 0x00003f00 ELBA = 0x00042ad1 PCNT = 4 [OPEN-3-CVS] Harddisk13 : SLBA = 0x0000003f ELBA = 0x000620d9 PCNT = 1 [OPEN-3-CVS]</pre> SLBA: Displays usable starting LBA in units of 512 bytes. ELBA: Displays usable ending LBA (ELBA -1) in units of 512 bytes. PCNT: Displays the number of partitions. Example for setting of Harddisk11: C:\HORCM\etc>raidvchkset -d hd11 -vs 16 0x00003f00 0x000620d9
-fv	Windows systems only. Displays the Volume{GUID} via \$Volume with wide format. <i>Example:</i> <pre>C:\HORCM\etc>ingraid -CLI \$Vol -fv DEVICE_FILE PORT SERIAL LDEV CTG H/M/12 SSID R:Group PRODUCT_ID Volume{cec25efe-d3b8-11d4-aead- 00c00d003b1e}\Vol13\Dsk0 CL2-D 62496 256 - - - - OPEN-3-CVS-CM</pre>

Option	Description																																																																																	
-sort -CLIB	This option is used to know how much pair is possible to create the paired volume on the actual array, and calculates the total Bitmap page for HORC/HOMRCF and the unused Bitmap page by sorting the specified special file (the standard input or the argument) with Serial#,LDEV# order. The default is HOMRCF. This option is valid within "-sort" option. Note: An identical LDEV which was sorted in Serial#, LDEV# is accepted to calculate the Bitmap page (LDEVs shared by multiple ports are calculated as one LDEV). Also, a command device is excepted from the total. Example: <pre># ls /dev/rdsk/* inqraid -sort -CLIB</pre> <table><tr><th>DEVICE_FILE</th><th>PORT</th><th>SERIAL</th><th>LDEV</th><th>SL</th><th>CL</th><th>+SI/SI</th><th>UNUSED</th><th>PRODUCT_ID</th></tr><tr><td>c1t0d0</td><td>CL1-E</td><td>63516</td><td></td><td>0</td><td>0</td><td>0</td><td>-</td><td>- OPEN-9-CM</td></tr><tr><td>c1t0d1</td><td>CL1-E</td><td>63516</td><td>12288</td><td>0</td><td>0</td><td></td><td>1</td><td>30718 OPEN-3</td></tr><tr><td>c1t0d2</td><td>CL1-E</td><td>63516</td><td>12403</td><td>0</td><td>0</td><td></td><td>4</td><td>30718 OPEN-9</td></tr><tr><td>c1t0d3</td><td>CL1-E</td><td>63516</td><td>12405</td><td>0</td><td>0</td><td></td><td>9</td><td>30718 OPEN-E</td></tr><tr><td>c1t0d4</td><td>CL1-E</td><td>63516</td><td>12800</td><td>0</td><td>0</td><td></td><td>12</td><td>30718 OPEN-8</td></tr><tr><td>c1t0d5</td><td>CL1-E</td><td>63516</td><td>12801</td><td>0</td><td>0</td><td></td><td>18</td><td>30718 OPEN-8*2</td></tr><tr><td>c1t0d6</td><td>CL1-E</td><td>63516</td><td>13057</td><td>0</td><td>0</td><td></td><td>31</td><td>30718 OPEN-L</td></tr><tr><td>c2t0d6</td><td>CL2-E</td><td>63516</td><td>13057</td><td>0</td><td>0</td><td></td><td>31</td><td>30718 OPEN-L</td></tr></table>	DEVICE_FILE	PORT	SERIAL	LDEV	SL	CL	+SI/SI	UNUSED	PRODUCT_ID	c1t0d0	CL1-E	63516		0	0	0	-	- OPEN-9-CM	c1t0d1	CL1-E	63516	12288	0	0		1	30718 OPEN-3	c1t0d2	CL1-E	63516	12403	0	0		4	30718 OPEN-9	c1t0d3	CL1-E	63516	12405	0	0		9	30718 OPEN-E	c1t0d4	CL1-E	63516	12800	0	0		12	30718 OPEN-8	c1t0d5	CL1-E	63516	12801	0	0		18	30718 OPEN-8*2	c1t0d6	CL1-E	63516	13057	0	0		31	30718 OPEN-L	c2t0d6	CL2-E	63516	13057	0	0		31	30718 OPEN-L
DEVICE_FILE	PORT	SERIAL	LDEV	SL	CL	+SI/SI	UNUSED	PRODUCT_ID																																																																										
c1t0d0	CL1-E	63516		0	0	0	-	- OPEN-9-CM																																																																										
c1t0d1	CL1-E	63516	12288	0	0		1	30718 OPEN-3																																																																										
c1t0d2	CL1-E	63516	12403	0	0		4	30718 OPEN-9																																																																										
c1t0d3	CL1-E	63516	12405	0	0		9	30718 OPEN-E																																																																										
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c1t0d6	CL1-E	63516	13057	0	0		31	30718 OPEN-L																																																																										
c2t0d6	CL2-E	63516	13057	0	0		31	30718 OPEN-L																																																																										
-fh[c]	Specifies the bitmap page for TrueCopy/Universal Replicator. The "-fc" option is used to calculate the bitmap page of cylinder size for TrueCopy. Example: <pre># ls /dev/rdsk/* inqraid -sort -CLIB -fh</pre> <table><tr><th>DEVICE_FILE</th><th>PORT</th><th>SERIAL</th><th>LDEV</th><th>SL</th><th>CL</th><th>+TC/UR</th><th>UNUSED</th><th>PRODUCT_ID</th></tr><tr><td>c1t0d0</td><td>CL1-E</td><td>63516</td><td></td><td>0</td><td>0</td><td>0</td><td>-</td><td>- OPEN-9-CM</td></tr><tr><td>c1t0d1</td><td>CL1-E</td><td>63516</td><td>12288</td><td>0</td><td>0</td><td></td><td>1</td><td>11605 OPEN-3</td></tr><tr><td>c1t0d2</td><td>CL1-E</td><td>63516</td><td>12403</td><td>0</td><td>0</td><td></td><td>3</td><td>11605 OPEN-9</td></tr><tr><td>c1t0d3</td><td>CL1-E</td><td>63516</td><td>12405</td><td>0</td><td>0</td><td></td><td>10</td><td>11605 OPEN-E</td></tr><tr><td>c1t0d4</td><td>CL1-E</td><td>63516</td><td>12800</td><td>0</td><td>0</td><td></td><td>11</td><td>11605 OPEN-8</td></tr><tr><td>c1t0d5</td><td>CL1-E</td><td>63516</td><td>12801</td><td>0</td><td>0</td><td></td><td>13</td><td>11605 OPEN-8*2</td></tr><tr><td>c1t0d6</td><td>CL1-E</td><td>63516</td><td>13057</td><td>0</td><td>0</td><td></td><td>21</td><td>11605 OPEN-L</td></tr><tr><td>c2t0d6</td><td>CL2-E</td><td>63516</td><td>13057</td><td>0</td><td>0</td><td></td><td>21</td><td>11605 OPEN-L</td></tr></table> SL: Shows the SLPR number of LDEV. CL: Shows the CLPR number of LDEV. +SI/SI: Shows the total of Bitmap for the ShadowImage. The increase page shows necessary Bitmap page as <i>one paired volume</i> of HOMRCF. +TC/UR: Shows the total of Bitmap for the TrueCopy or Universal Replicator. The increase page shows necessary Bitmap page as <i>one volume</i> of TrueCopy or Universal Replicator. UNUSED: Shows the unused Bitmap page for each ShadowImage and TrueCopy/Universal Replicator. One Page is about 64 KB.	DEVICE_FILE	PORT	SERIAL	LDEV	SL	CL	+TC/UR	UNUSED	PRODUCT_ID	c1t0d0	CL1-E	63516		0	0	0	-	- OPEN-9-CM	c1t0d1	CL1-E	63516	12288	0	0		1	11605 OPEN-3	c1t0d2	CL1-E	63516	12403	0	0		3	11605 OPEN-9	c1t0d3	CL1-E	63516	12405	0	0		10	11605 OPEN-E	c1t0d4	CL1-E	63516	12800	0	0		11	11605 OPEN-8	c1t0d5	CL1-E	63516	12801	0	0		13	11605 OPEN-8*2	c1t0d6	CL1-E	63516	13057	0	0		21	11605 OPEN-L	c2t0d6	CL2-E	63516	13057	0	0		21	11605 OPEN-L
DEVICE_FILE	PORT	SERIAL	LDEV	SL	CL	+TC/UR	UNUSED	PRODUCT_ID																																																																										
c1t0d0	CL1-E	63516		0	0	0	-	- OPEN-9-CM																																																																										
c1t0d1	CL1-E	63516	12288	0	0		1	11605 OPEN-3																																																																										
c1t0d2	CL1-E	63516	12403	0	0		3	11605 OPEN-9																																																																										
c1t0d3	CL1-E	63516	12405	0	0		10	11605 OPEN-E																																																																										
c1t0d4	CL1-E	63516	12800	0	0		11	11605 OPEN-8																																																																										
c1t0d5	CL1-E	63516	12801	0	0		13	11605 OPEN-8*2																																																																										
c1t0d6	CL1-E	63516	13057	0	0		21	11605 OPEN-L																																																																										
c2t0d6	CL2-E	63516	13057	0	0		21	11605 OPEN-L																																																																										

Option	Description
-CLI -fn	Displays the LDEV nickname in the PRODUCT ID. If the storage system does not support LDEV nickname, "-" is displayed. Example: <pre># ls /dev/rdisk/c57t4* ./inqraid -CLI -fn</pre> DEVICE_FILE PORT SERIAL LDEV CTG C/B/12 SSID R:Group LDEV_NIC_NAME <pre>c57t4d0 CL1-D 62496 32 - s/P/ss 0004 5:01-03 my_volume_1 c57t4d3 CL1-D 62496 35 - s/P/ss 0004 5:01-03 my_volume_2 c57t4d4 CL1-D 62496 36 - s/P/ss 0004 5:01-01 - c57t4d5 CL1-D 62496 37 - s/P/ss 0004 5:01-02 -</pre>
-CLI -export	Exports the device information discovered on the production (remote) servers. The device information includes "Keyword, Serial#, Ldev#, Device file name, ...". The raidscan -find inst command on the CCI (local) server imports the device information, and registers it into the HORCM deamon. See <i>Remote Volume Discovery</i> in the <i>User and Reference Guide</i> for more details. Example: <pre># ls /dev/rdisk/c1t* inqraid -CLI -export</pre> <pre>INQRAID:@CL4-G@64015@0@124@OPEN-V-CM@/dev/rdisk/ c1t0d0s2 INQRAID:@CL4-G@64015@1@124@OPEN-V-CM@/dev/rdisk/ c1t0d1s2 INQRAID:@CL4-G@64015@2@95@OPEN-V@/dev/rdisk/c1t0d2s2 INQRAID:@CL4-G@64015@3@95@OPEN-V@/dev/rdisk/c1t0d3s2 INQRAID:@CL4-G@64015@4@95@OPEN-V@/dev/rdisk/c1t0d4s2 INQRAID:@CL4-G@64015@5@95@OPEN-V@/dev/rdisk/c1t0d5s2 INQRAID:@CL4-G@64015@7@95@OPEN-V@/dev/rdisk/c1t0d7s2</pre>
Restrictions on device naming	STDIN or special files are specified as follows: • HP-UX: /dev/rdisk/* or /dev/rdisk/disk* • Solaris: /dev/rdisk/*s2 or c*s2 • Linux : /dev/sd... or /dev/rd... ,/dev/raw/raw*. • zLinux: /dev/sd... or /dev/dasd... or /dev/rd... ,/dev/raw/raw*. • AIX®: /dev/rhdisk* or /dev/hdisk* or hdisk* • DIGITAL or Tru64: /dev/rrz*c or /dev/rdisk/dsk*c or /dev/cport/scp* • DYNIX: /dev/rdisk/sd* or sd* for only unpartitioned raw device • IRIX64: /dev/rdisk/*vol or /dev/rdisk/node_wwn/*vol/* or /dev/dsk/*vol or /dev/dsk/node_wwn/*vol/* • OpenVMS: \$1\$* or DK* or DG* or GK* • Windows: hdX-Y,\$LETALL,\$Volume,\$Phys, D:\Vol(Dms,Dmt,Dmr)X\DskY, \Vol(Dms,Dmt,Dmr)X\DskY. For information about LDM volumes for Windows systems, see <i>Remote Volume Discovery</i> in the <i>User and Reference Guide</i>. Lines starting with '#' via STDIN are interpreted as comments.

Examples

Example 1: using inqraid and system command to display the connection between STDIN special file and actual physical drive of storage system

HP-UX system:

```
# ioscan -fun | grep rdsk | ./inqraid
/dev/rdsk/c0t2d1 -> [HP] CL2-D Ser = 30053 LDEV = 9 [HP ]
[ OPEN-3 ] HORC = P-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL
MU#2 = SMPL] RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
/dev/rdsk/c0t4d0 -> [HP] CL2-D Ser = 30053 LDEV = 14 [HP ]
[OPEN-3-CM ] RAID5[Group 2- 1] SSID = 0x0008
```

Linux and zLinux system:

```
# ls /dev/sd* | ./inqraid
/dev/sdh -> CHNO = 0 TID = 1 LUN = 7
[HP] CL2-B Ser = 30053 LDEV = 23 [HP ]
[OPEN-3 ] HORC = P-VOL HOMRCF[MU#0 = SMPL
MU#1 = SMPL MU#2 = SMPL] RAID5[Group 1- 2]
SSID = 0x0004 CTGID = 2
/dev/sdi -> CHNO = 0 TID = 4 LUN = 0
[HP] CL2-B Ser = 30053 LDEV = 14 [HP ]
[OPEN-3-CM ] RAID5[Group 1- 2] SSID = 0x0004
```

Solaris system:

```
# ls /dev/rdsk/* | ./inqraid
/dev/rdsk/c0t2d1 -> [HP] CL2-D Ser = 30053 LDEV = 9 [HP ]
[OPEN-3 ] CA = P-VOL BC[MU#0 = SMPL MU#1 = SMPL
MU#2 = SMPL] RAID5[Group 2- 1] SSID = 0x0008
CTGID = 3
/dev/rdsk/c0t4d0 -> [HP] CL2-D Ser = 30053 LDEV = 14 [HP ]
[OPEN-3-CM ] RAID5[Group 2- 1] SSID = 0x0008
```

AIX® system:

```
# lsdev -C -c disk | grep hdisk | ./inqraid
hdisk1 -> [SQ] CL2-D Ser = 30053 LDEV = 9 [HITACHI ] [OPEN-3 ]
HORC = P-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL
MU#2 = SMPL] RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
hdisk2 -> [SQ] CL2-D Ser = 30053 LDEV = 14 [HITACHI ] [OPEN-3-CM ]
RAID5[Group 2- 1] SSID = 0x0008
```

Windows system:

```
C:\HORCM\etc> echo hd1-2 | inqraid ( or inqraid hd1-2 )
Harddisk 1 -> [SQ] CL2-D Ser = 30053 LDEV = 9 [HITACHI ] [OPEN-3 ]
HORC = P-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL
MU#2 = SMPL] RAID5[Group 2- 1] SSID = 0x0008
CTGID = 3 Harddisk 2 -> [SQ] CL2-D Ser = 30053
LDEV = 14 [HITACHI ] [OPEN-3-CM ] RAID5[Group 2- 1]
SSID = 0x0008
```

Tru64 UNIX system:

```
# ls /dev/rdisk/dsk* | ./inqraid
/dev/rdisk/dsk10c -> [SQ] CL2-D Ser = 30053 LDEV = 9 [HITACHI ]
[OPEN-3 ] HORC = P-VOL HOMRCF[MU#0 = SMPL
MU#1 = SMPL MU#2 = SMPL] RAID5[Group 2- 1]
SSID = 0x0008 CTGID = 3
/dev/rdisk/dsk11c -> [SQ] CL2-D Ser = 30053 LDEV = 14 [HITACHI ]
[OPEN-3-CM ] RAID5[Group 2- 1] SSID = 0x0008
```

DYNIX system:

```
# dumpconf -d | grep sd | ./inraid
sd1-> [SQ] CL2-D Ser = 30053 LDEV = 9 [HITACHI ] [OPEN-3 ]
HORC = P-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL MU#2 = SMPL]
RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
sd2-> [SQ] CL2-D Ser = 30053 LDEV = 14 [HITACHI] [OPEN-3-CM]
RAID5[Group 2- 1] SSID = 0x0008
```

IRIX system with FC_AL:

```
# ls /dev/rdisk/*vol | ./inraid
/dev/rdisk/dks1d6vol -> [SQ] CL2-D Ser = 30053 LDEV = 9 [HITACHI ]
[OPEN-3 ] HORC = P-VOL
HOMRCF[MU#0 = SMPL MU#1 = SMPL MU#2 = SMPL]
RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
/dev/rdisk/dks1d7vol -> [SQ] CL2-D Ser = 30053 LDEV = 14 [HITACHI ]
[OPEN-3-CM ]
RAID5[Group 2- 1] SSID = 0x0008
```

IRIX system with fabric:

```
# ls /dev/rdisk/*/*vol/* | ./inraid
/dev/rdisk/50060e8000100262/lun3vol/c8p0 -> [SQ] CL2-D Ser = 30053
LDEV = 9 [HITACHI] [OPEN-3 ] HORC = P-VOL
HOMRCF[MU#0 = SMPL MU#1 = SMPL MU#2 = SMPL]
RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
/dev/rdisk/50060e8000100262/lun4vol/c8p0 -> [SQ] CL2-D Ser = 30053
LDEV = 14 [HITACHI] [OPEN-3-CM]
RAID5[Group 2- 1] SSID = 0x0008
```

OpenVMS system:

```
$ inraid dka145-146
DKA145 -> [ST] CL2-D Ser = 30053 LDEV = 9 [HITACHI ] [OPEN-3 ]
HORC = P-VOL HOMRCF[MU#0 = SMPL MU#1 = SMPL
MU#2 = SMPL] RAID5[Group 2- 1] SSID = 0x0008 CTGID = 3
DKA146 -> [ST] CL2-D Ser = 30053 LDEV = 14 [HITACHI ] [OPEN-3-CM ]
RAID5[Group 2- 1] SSID = 0x0008
```

The following items are output for the *inraid* command tool:

CL X - Y: Displays the port number on the RAID storage system.

Ser: Displays the production (serial#) number on the RAID storage system.

LDEV: Displays the LDEV# in the RAID storage system.

HORC: Displays the attribute ("PVOL/SVOL/SMPL") of a volume as TrueCopy in the RAID storage system.

HOMRCF: Displays the attribute ("PVOL/SVOL/SMPL") of a volume as MU#0-2 of ShadowImage/Copy-on-Write Snapshot in the RAID storage system.

Group: Displays the physical position of an LDEV according to mapping of LDEV in the RAID storage system.

LDEV Mapping	Display Formats
RAID Group	RAID1[Group Group number - Sub number] RAID5[Group Group number - Sub number] RAID6[Group Group number - Sub number]

LDEV Mapping	Display Formats
Copy-on-Write Snapshot SVOL	SNAPS[PoolID poolID number]
Unmapped	UNMAP[Group 00000]
External LUN	E-LUN[Group External Group number]
Dynamic Provisioning volume	A-LUN[PoolID poolID number]

SSID: Displays the storage subsystem ID of the LDEV in the RAID storage system. The HUS VM does not support SSID but displays the specified value.

CTGID: Displays CT group ID of TrueCopy Async/Universal Replicator when the LDEV has been defined as the PVOL or SVOL of the TrueCopy Async/Universal Replicator.

CHNO: Displays the channel number on the device adapter that recognizes on the Linux host. Displayed only for Linux systems.

TID: Displays target ID of the hard disk that connects on the device adapter port. Displayed only for Linux systems.

LUN: Displays logical unit number of the hard disk that connects on the device adapter port. Displayed only for Linux systems.

Note: The display of group, SSID, and CTGID depends on the storage system microcode level. The *CHNO*, *TID*, and *LUN* items are displayed only for Linux systems.

Example 2: inqraid with -find option (Linux shown)

```
ls /dev/sd* | inqraid -find
/dev/sdb -> No such on the group
Group PairVol (L/R) (Port#,TID,LU),Seq#,LDEV#.P/S, Status,Fence,
Seq#,P-LDEV# M
oradb oradev2 (L) (CL2-N , 3, 2) 8071 22..SMPL -----,
----- -
->/dev/sdc
```

Example 3: inqraid with -find option (HP-UX shown)

```
# echo /dev/rdisk/c23t0d0 /dev/rdisk/c23t2d3 | ./inqraid -find
Group PairVol (L/R) (Port#,TID,LU-M),Seq#,LDEV#.P/S,Status,
Seq#,P-LDEV# M
horc1 dev00 (L) (CL2-J, 0, 0-0) 61456 192..S-VOL SSUS,
----- 193 -
->/dev/rdisk/c23t0d0
Group PairVol (L/R) (Port#,TID,LU-M),Seq#,LDEV#.P/S,Status,
Seq#,P-LDEV# M
horc1 dev10 (L) (CL2-J , 2, 3-0) 61456 209..S-VOL SSUS,
----- 206 -
->/dev/rdisk/c23t2d3
```

Example 4: inqraid with -findc option (HP-UX shown)

```
# echo /dev/rdisk/c23t0d0 /dev/rdisk/c23t2d3 | ./inqraid -findc
DEVICE_FILE M Group PairVol P/S Stat R_DEVICE M P/S Stat LK
c23t0d0 0 horc1 dev00 S-VOL SSUS c23t0d1 0 P-VOL PSUS OK
/dev/rdisk/c23t0d0[1] -> No such on the group
/dev/rdisk/c23t0d0[2] -> No such on the group
DEVICE_FILE M Group PairVol P/S Stat R_DEVICE M P/S Stat LK
c23t2d3 0 horc1 dev10 S-VOL SSUS c23t2d2 0 P-VOL PSUS OK
/dev/rdisk/c23t2d3[1] -> No such on the group
/dev/rdisk/c23t2d3[2] -> No such on the group

# echo /dev/rdisk/c23t0d0 /dev/rdisk/c23t2d3 | ./inqraid -findc -CLI
DEVICE_FILE M Group PairVol P/S Stat R_DEVICE M P/S Stat LK
c23t0d0 0 horc1 dev00 S-VOL SSUS c23t0d1 0 P-VOL PSUS OK
c23t2d3 0 horc1 dev10 S-VOL SSUS c23t2d2 0 P-VOL PSUS OK
```

DEVICE_FILE: Device file name.

M: MU# of local and remote.

Group: Group name (dev_group) defined in the configuration file.

PairVol: Paired vol. name (dev_name) within the group defined in the configuration file.

P/S: Volume attribute (PVOL or SVOL or simplex).

Stat: Status of the paired volume.

R_DEVICE: Device file name of remote site.

LK: Check result of the paired volume connection path.

Example 5: inqraid with -cli option (Linux shown)

```
# ls /dev/sd* | ./inqraid -CLI
DEVICE_FILE PORT SERIAL LDEV CTG H/M/12 SSID R:Group PRODUCT_ID
sdh CL2-B 30053 23 2 S/P/ss 0004 5:02-01 OPEN-3
sdi CL1-A 64015 14 - - 0004 E:00002 OPEN-3-CM
sdj - - - - - - - - -
```

DEVICE_FILE: Displays the device file name only.

PORT: Displays the RAID storage system port number.

SERIAL: Displays the production (serial#) number of the storage system.

LDEV: Displays the LDEV# within the storage system.

CTG: Displays the CT group ID of TrueCopy Async/Universal Replicator when the LDEV has been defined as a TrueCopy Async/Universal Replicator PVOL or SVOL.

H/M/12: Displays attribute (PVOL is "P", SVOL is "S", SMPL is "s") of a TrueCopy volume, ShadowImage/Copy-on-Write Snapshot volume, and ShadowImage/Copy-on-Write Snapshot MU#1,2 volumes.

SSID: Displays the storage subsystem ID of the LDEV in the storage system. The HUS VM does not support SSID but displays the specified value.

R:Group: Displays the physical position of an LDEV according to mapping of LDEV in the storage system.

LDEV Mapping	R:	Group
RAID Group	RAID Level 1 : RAID1 5 : RAID5 6 : RAID6	RAID Group number - Sub number
Copy-on-Write Snapshot SVOL	S	Pool ID number
Unmapped	U	00000
External LUN	E	External Group number
Dynamic Provisioning volume	A	Pool ID number

PRODUCT_ID: Displays product-id field in the STD inquiry page.

Note: For a command device, PORT/SERIAL/LDEV/PRODUCT_ID is the SCSI Inquiry information for the external command device, if the command device is mapped as ELUN(R: =E).

Example 6: inqraid with -cliwp and -cliwn options (HP-UX shown)

```
# echo /dev/rdisk/c23t0d0 /dev/rdisk/c23t0d1 | ./inqraid -CLIWP
DEVICE_FILE PWWN                AL PORT  LUN  SERIAL LDEV  PRODUCT_ID
c23t0d0      500060e802f01018  - CL2-J  -   61456 192   OPEN-3
c23t0d1      500060e802f01018  - CL2-J  -   61456 193   OPEN-3

# echo /dev/rdisk/c0t2d3 | ./inqraid -CLIWN
DEVICE_FILE NWWN                AL PORT  LUN  SERIAL LDEV  PRODUCT_ID
c0t2d3      5000E000E0005000  - CL1-A  -   30015 2054 OPEN3-CVS
```

DEVICE_FILE: Displays the device file name only.

WWN: CLIWP option displays External_WWN of the host adapter included in the STD inquiry page. CLIWN option displays Node_WWN of host adapter included in STD inquiry page.

AL: Always displays "-".

PORT: Displays the RAID storage system port number.

LUN: Always displays "-".

SERIAL: Displays the production (serial#) number of the storage system.

LDEV: Displays the LDEV# within the storage system.

PRODUCT_ID: Displays product-id field in the STD inquiry page.

Example 7: inqraid with -sort[cm] option (HP-UX shown)

```
#ioscan -fun | grep rdsk | ./inqraid -sort -CM -CLI
HORCM_CMD
#dev_name                dev_name                dev_name
#UnitID 0 (Serial# 30012)
/dev/rdsk/c0t3d0         /dev/rdsk/c1t2d1
```

```
#UnitID 1 (Serial# 30013)
/dev/rdisk/c2t3d0
```

Example 8: inqraid with -gvinf option

```
D:\HORCM\etc>inqraid $Phys -gvinf -CLI
\\.\PhysicalDrive0:
# Harddisk0      -> [VOL61459_448_DA7C0D91] [OPEN-3    ]
\\.\PhysicalDrive1:
# Harddisk1      -> [VOL61459_449_DA7C0D92] [OPEN-3    ]
\\.\PhysicalDrive2:
# Harddisk2      -> [VOL61459_450_DA7C0D93] [OPEN-3    ]
                        -> S7N LDEV Signature
```

Example 9: inqraid with -svinf[=PTN] option

```
D:\HORCM\etc>pairedisplay -l -fd -g URA
Group PairVol(L/R) Device_File M ,Seq#,LDEV#.P/S,Status, Seq#,
P-LDEV# M
URA   URA_000(L)   Harddisk3   0 61459   451..S-VOL SSUS,-----
      448         -
URA   URA_001(L)   Harddisk4   0 61459   452..S-VOL SSUS,-----
      449         -
URA   URA_002(L)   Harddisk5   0 61459   453..S-VOL SSUS,-----
      450         -

D:\HORCM\etc>pairedisplay -l -fd -g URA | inqraid -svinf=Harddisk
[VOL61459_451_5296A763] -> Harddisk3      [OPEN-3    ]
[VOL61459_452_5296A760] -> Harddisk4      [OPEN-3    ]
[VOL61459_453_5296A761] -> Harddisk5      [OPEN-3    ]
```

Caution: If the SVOL is created with "Noread" option (ShadowImage only) and the system is rebooted, the system cannot create a Device object (\Device\HarddiskVolume#) and Volume{guid} for SVOL, but a Device object (\Device\HarddiskVolume#) and Volume{guid} is created by using -svinf option after splits the SVOL.

mkconf

The *mkconf* command is a CCI command tool used to make a configuration file from a special file (raw device file) provided via STDIN.

Syntax

```
/HORCM/usr/bin/mkconf.sh      (UNIX systems)
\HORCM\Tool\mkconf.exe       (Windows and OpenVMS systems)
mkconf.sh [-g[g] <group> [-m <mu#>] [-i <inst#>] [-s <service>]
[-a] ]
mkconf.exe [-g[g] <group> [-m <mu#>] [-i <inst#>] [-s <service>]
[-a] [-c <drive#>] ]
```

Options and parameters

Option	Description
No argument	No option displays Help/Usage.

Option	Description
-g <group>	Specifies the "dev_group" name for a configuration file. If not specified, 'VG' is used as default.
-gg	Shows a LUN on the host view by finding a host group (9900V and later).
-m <mu#>	Specifies the mirror descriptor for ShadowImage volume. TrueCopy volume does not specify the mirror descriptor.
-i <inst#>	Specifies the instance number for HORCM.
-s <service>	Specifies the service name for a configuration file. If not specified, '52323' is used as default.
-a	Specifies an addition of the group to a configuration file.
-c <drive#>	Windows systems only. Specifies the range of drive numbers that should be examined in order to discover the command devices. If not specified, '\$PhysicalDrive' is used as default.
-c <DKA#-#>	OpenVMS systems only. Specifies the range of drive numbers that should be examined to discover the command devices. If not specified, '\$1\$DGA0-10000 DKA0-10000 DGA0-10000' is used as default.

Examples

Example 1: mkconf command tool (HP-UX shown)

In this example, the configuration file is created as "horcm*.conf" in the current directory. The log directory of HORCM is specified as "log*" in the current directory. You must modify the "ip_address & service" of an existing configuration file as needed.

```
# cd /tmp/test
# cat /etc/horcmperm.conf | /HORCM/usr/bin/mkconf.sh -g ORA -i 9
-m 0
starting HORCM inst 9
HORCM inst 9 starts successfully.
HORCM Shutdown inst 9 !!!
A CONFIG file was successfully completed.
starting HORCM inst 9
HORCM inst 9 starts successfully.
DEVICE_FILE      Group PairVol  PORT  TARG  LUN M  SERIAL  LDEV
/dev/rdsk/c23t0d0 ORA   ORA_000  CL2-J  0     0 0   61456   192
/dev/rdsk/c23t0d1 ORA   ORA_001  CL2-J  0     1 0   61456   193
/dev/rdsk/c23t0d2 ORA   ORA_002  CL2-J  0     2 0   61456   194
/dev/rdsk/c23t0d3 ORA   ORA_003  CL2-J  0     3 0   61456   195
/dev/rdsk/c23t0d4 ORA   ORA_004  CL2-J  0     4 0   61456   256
/dev/rdsk/c23t0d5 ORA   ORA_005  CL2-J  0     5 0   61456   257
/dev/rdsk/c23t0d6 ORA   ORA_006  CL2-J  0     6 0   61456   258
/dev/rdsk/c23t0d7 -     -        -      -     - 0   61456   259
HORCM Shutdown inst 9 !!!
Please check '/tmp/test/horcm9.conf', '/tmp/test/log9/curlog/
horcm_*.log', and modify 'ip_address & service'.

# ls                                     <=Verify configuration and log files.
horcm9.conf  log9
# vi *.conf    <=Verify config file, check ip address & service.

# Created by mkconf.sh on Mon Jan 22 17:59:11 JST 2001
```

```

HORCM_MON
#ip_address      service      poll(10ms)      timeout(10ms)
127.0.0.1        52323            1000            3000

```

```

HORCM_CMD
#dev_name      dev_name      dev_name
#UnitID 0 (Serial# 61456)
/dev/rdisk/c23t3d0

```

Example 2: mkconf command tool (HP-UX shown)

```

HORCM_DEV
#dev_group      dev_name      port#      TargetID      LU#      MU#
# /dev/rdsk/c23t0d0 SER = 61456 LDEV = 192 [FIBRE FCTBL = 4] ORA
ORA_000 CL2-J 0 0 0
# /dev/rdsk/c23t0d1 SER = 61456 LDEV = 193 [FIBRE FCTBL = 4] ORA
ORA_001 CL2-J 0 1 0
# /dev/rdsk/c23t0d2 SER = 61456 LDEV = 194 [FIBRE FCTBL = 4] ORA
ORA_002 CL2-J 0 2 0
# /dev/rdsk/c23t0d3 SER = 61456 LDEV = 195 [FIBRE FCTBL = 4] ORA
ORA_003 CL2-J 0 3 0
# /dev/rdsk/c23t0d4 SER = 61456 LDEV = 256 [FIBRE FCTBL = 4] ORA
ORA_004 CL2-J 0 4 0
# /dev/rdsk/c23t0d5 SER = 61456 LDEV = 257 [FIBRE FCTBL = 4] ORA
ORA_005 CL2-J 0 5 0
# /dev/rdsk/c23t0d6 SER = 61456 LDEV = 258 [FIBRE FCTBL = 4] ORA
ORA_006 CL2-J 0 6 0
# ERROR [CMDDEV] /dev/rdsk/c23t0d7 SER = 61456 LDEV = 259
[OPEN-3-CM]                                     <=See Notes.

HORCM_INST
#dev_group      ip_address      service
ORA_            127.0.0.1      52323      <=Check and update as needed.

```

Notes on mkconf:

- A unitID is added to the Serial# order. If two or more command devices exist in the storage system, then this option selects the multiple device files linked to a command device (an LDEV).
- If the target device is the command device, then the target device is suppressed as comment as shown below: # ERROR [CMDDEV] /dev/rdsk/c23t0d7 SER = 61456 LDEV = 259 [OPEN-3-CM]
- If the target device has shared an LDEV among multiple device files and an LDEV is displayed by another target device already, then its target device is suppressed as comment as shown below: # ERROR [LDEV LINK] /dev/rdsk/c24t0d3 SER = 61456 LDEV = 195 [FIBRE FCTBL = 4]
- If the target device does not have a valid MU#, then its target device is suppressed as a comment as shown below: # ERROR [INVALID MUN (2 < 1)] /dev/rdsk/c24t0d3 SER = 61456 LDEV = 195 [OPEN-3]
- If the target device is mixed with a different RAID TYPE, then its target device is suppressed as a comment as shown below: # ERROR [MIXING RAID TYPE] /dev/rdsk/c24t0d3 SER = 61456 LDEV = 195 [OPEN-3]

Configuration setting commands

This chapter provides the specifications for the CCI configuration setting (raidcom) commands.

- ☐ [raidcom](#)
- ☐ [Resource group operation](#)
- ☐ [Resource lock operation](#)
- ☐ [Resource locking and CCI commands](#)
- ☐ [raidcom add copy_grp](#)
- ☐ [raidcom delete copy_grp](#)
- ☐ [raidcom get copy_grp](#)
- ☐ [raidcom add device_grp](#)
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- ☐ [raidcom get device_grp](#)
- ☐ [raidcom add external_grp](#)
- ☐ [raidcom check_ext_storage external_grp](#)
- ☐ [raidcom delete external_grp](#)
- ☐ [raidcom disconnect external_grp](#)
- ☐ [raidcom get external_grp](#)

- ☐ [raidcom modify external_grp](#)
- ☐ [raidcom discover external_storage](#)
- ☐ [raidcom add host_grp](#)
- ☐ [raidcom delete host_grp](#)
- ☐ [raidcom get host_grp](#)
- ☐ [raidcom modify host_grp](#)
- ☐ [raidcom add hba_wwn](#)
- ☐ [raidcom delete hba_wwn](#)
- ☐ [raidcom get hba_wwn](#)
- ☐ [raidcom add journal](#)
- ☐ [raidcom delete journal](#)
- ☐ [raidcom get journal](#)
- ☐ [raidcom modify journal](#)
- ☐ [raidcom add ldev](#)
- ☐ [raidcom delete ldev](#)
- ☐ [raidcom extend ldev](#)
- ☐ [raidcom get ldev](#)
- ☐ [raidcom initialize ldev](#)
- ☐ [raidcom modify ldev](#)
- ☐ [raidcom add lun](#)
- ☐ [raidcom delete lun](#)
- ☐ [raidcom discover lun](#)
- ☐ [raidcom get lun](#)

- ☐ [raidcom add path](#)
- ☐ [raidcom check_ext_storage path](#)
- ☐ [raidcom delete path](#)
- ☐ [raidcom disconnect path](#)
- ☐ [raidcom get path](#)
- ☐ [raidcom delete pool](#)
- ☐ [raidcom get pool](#)
- ☐ [raidcom modify pool](#)
- ☐ [raidcom rename pool](#)
- ☐ [raidcom get port](#)
- ☐ [raidcom modify port](#)
- ☐ [raidcom get parity_grp](#)
- ☐ [raidcom add rcu](#)
- ☐ [raidcom delete rcu](#)
- ☐ [raidcom get rcu](#)
- ☐ [raidcom modify rcu](#)
- ☐ [raidcom add rcu_path](#)
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- ☐ [raidcom add ssid](#)
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- ☐ [raidcom add snap_pool](#)
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- ☐ [raidcom add snapshot](#)
- ☐ [raidcom delete snapshot](#)
- ☐ [raidcom modify snapshot](#)
- ☐ [raidcom get snapshot](#)
- ☐ [raidcom add dp_pool](#)
- ☐ [raidcom get dp_pool](#)
- ☐ [raidcom set hba_wwn](#)
- ☐ [raidcom reset hba_wwn](#)
- ☐ [raidcom monitor pool](#)
- ☐ [raidcom reallocate pool](#)
- ☐ [raidcom get command_status](#)
- ☐ [raidcom reset command_status](#)
- ☐ [raidcom add resource](#)
- ☐ [raidcom delete resource](#)
- ☐ [raidcom get error_message](#)
- ☐ [raidcom get clpr](#)
- ☐ [raidcom modify clpr](#)
- ☐ [raidcom add spm_wwn](#)
- ☐ [raidcom add spm_group](#)
- ☐ [raidcom delete spm_wwn](#)
- ☐ [raidcom delete spm_group](#)

- ☐ [raidcom modify spm_wwn](#)
- ☐ [raidcom modify spm_group](#)
- ☐ [raidcom get spm_wwn](#)
- ☐ [raidcom get spm_group](#)
- ☐ [raidcom monitor spm_wwn](#)
- ☐ [raidcom monitor spm_group](#)

raidcom

Specifies a configuration change.

Executes by specifying respective parameters and values that are expressed in [raidcom add copy_grp on page 5-15](#) and later.

Syntax

Displaying help

```
raidcom { [-h]
```

Log-in and log-out

```
raidcom {-login [<user_name> <password>] | -logout} [-s <seq# >  
| -u <unit#>]
```

Configuration change: line-by-line mode

```
raidcom <action> <object> [<param> <value>...] [-fx] [-checkmode  
<check mode>] [-store <filename>] [-nomsg] [-login [<user_name>  
<password>] [-resource <resource_grp_id>...] | -logout] [-s <seq# >  
| -u <unit#>]
```

Configuration change: transaction mode

```
raidcom -zt <filename> [-load <work_filename>]  
[-checkmode <check mode>]
```

Options and parameters

Option	Description
[-h]	Displays help of raidcom.
[-login [<user_name> <password>]]	Specifies user authentication for the storage system. Specifies user name and password. If no user authentication is done yet and the -login option is omitted, the input of the user name and the password is required. And, in case of omitting the user name and the password by specifying -login option, the input of the user name and the password is required. The maximum number of the user who can login at same time is 512.
[-logout]	Deletes the cache of the session control table in the storage system and logs out from the storage system (command device). Also deletes all the authentication files corresponding to the storage system. At the time of next login, the CCI command requires the user name and the password. If the same user is set for multiple hosts, the session control table of each host is managed so that the logout will be applied only to the relevant host.
[-s <Seq#>]	Specifies the serial number.
[-u <Unit#>]	Specifies the unit ID of command device as HORCM_CMD of configuration file.
<action> <object> [<param> <value>...]	Specifies each command name that is expressed in raidcom add copy_grp on page 5-15 and later section and the parameters and values that are required at each operation.
[-fx]	Displays the LDEV number in hexadecimal notation.

Option	Description
[-checkmode <check mode>]	Specifies when executing Precheck function (execute checking commands only). It specifies the following value. Precheck: When this option is specified, the actual process is not executed for the storage system even if the command is executed. This option is available to specify the setting of \$HORCC_NO_EXEC environment variable and \$HORCC_CTX_CHK environment variable.
[-store <file name>]	Specifies the file name of the configuration file to be created for implementation check.
[-nomsg]	Prevents displaying messages. This option is required to be defined on the beginning of the command parameter.
[-zt <file name>]	Specifies the script file.
[-load <file name>]	Specifies the file name of the file (Configuration file) that is created for implementation check.
[-resource <resource_grp_id>...]	Limits the operations coverage to the specified resource groups. When this option is specified in reference commands, objects that are in the specified resource groups are displayed.

Examples

Performing user authentication (login) by the user ID: USER01 and the password: PASS01.

```
# raidcom -login USER01 PASS01
```

Performing log-out.

```
# raidcom -logout
```

Performing syntax check and the context check of the script file (the actual processing is not executed).

```
# raidcom -zt <script file> -checkmode precheck
```

Performing syntax check, the context check, and the implementation check of the script file (the actual processing is not executed).

```
# raidcom -zt < script file> -load <work file> -checkmode precheck
```

Method for specifying LDEV number

The methods for specifying LDEV numbers are shown in the following table.

Specification method	Example
Decimal number	-ldev_id 300
Hexadecimal number	-ldev_id 0x12C -ldev_id 01:2C

Methods for specifying multiple LDEVs

Methods for specifying multiple LDEVs by LDEV IDs

The methods for specifying multiple LDEV IDs in a single command are shown below. Some methods do not apply to some commands.

```
-ldev_id 300-305
-ldev_id 0x12C-0x131
-ldev_id 01:2C-01:31
-ldev_id 300 -cnt 6
-ldev_id 300 301 302 303 304 305
```

Method for specifying LDEVs by device group

When you configure multiple LDEVs for pools or journals (for example, changing the resource group), you must issue the command to each LDEV. However, if you define LDEVs that configure pools or journals, you can issue the command to all LDEVs defined as a device group by specifying each device group at a time.

- Creating a pool by specifying a device group:

```
# raidcom add device_grp -device_grp_name dg_pool1 data1
-ldev_id 512 513 514 515

# raidcom add dp_pool -pool_id 2 -grp_opt ldev -device_grp_name
dg_pool1
```

- Creating a journal by specifying a device group:

```
# raidcom add device_grp -device_grp_name dg_jnl1 data1
-ldev_id 512 513 514 515

# raidcom add journal -journal_id 2 -grp_opt ldev
-device_grp_name dg_jnl1
```

Operations where multiple LDEVs can be specified

You can use "-ldev_id <ldev#>" to specify multiple LDEVs at the same time in the following operations only:

(a) Displaying LDEV information

```
# raidcom get ldev -ldev_id 100-103

# raidcom get ldev -ldev_id 100 -cnt 4
```

Note: Specifying multiple LDEV as follows cannot be performed: #raidcom get ldev -ldev_id 100 101 103

(b) Creating a journal

```
# raidcom add journal -journal_id 1 -ldev_id 265 266 267 268

# raidcom add journal -journal_id 1 -ldev_id 265-268

# raidcom add journal -journal_id 1 -ldev_id 265 -cnt 4
```

(c) Creating a pool

Creating a pool for Copy-on-Write Snapshot:

```
# raidcom add snap_pool -pool 1 -ldev_id 365 366 367
# raidcom add snap_pool -pool 1 -ldev_id 365-367
# raidcom add snap_pool -pool 1 -ldev_id 365 -cnt 3
```

Creating a pool for Dynamic Provisioning/Dynamic Provisioning for Mainframe:

```
# raidcom add dp_pool -pool 1 -ldev_id 465 466 467
# raidcom add dp_pool -pool 1 -ldev_id 465-470
# raidcom add dp_pool -pool 1 -ldev_id 465 -cnt 5
```

(d) Creating a device group

```
# raidcom add device_grp -device_grp_name DevG2 dev101 -ldev_id
101 105 201
# raidcom add device_grp -device_grp_name DevG2 dev101 -ldev_id
101-105
# raidcom add device_grp -device_grp_name DevG2 dev101 -ldev_id
101 -cnt 5
```

(e) Deleting a device group

```
# raidcom delete device_grp -device_grp_name DevG3 -ldev_id 200
201 204
# raidcom delete device_grp -device_grp_name DevG3 -ldev_id 200-
204
# raidcom delete device_grp -device_grp_name DevG3 -ldev_id 200 -
cnt 5
```

Resource group operation

When you have multiple resource group authorities, use the **-resource** option to see the resource group information.

Examples

```
# raidcom get resource
RS_GROUP      RGID  stat    Lock_owner  Lock_host  Serial#
meta_resource    0  Unlocked -           -          64568
RSG_CLI1        1  Unlocked -           -          64568
RSG_CLI2        2  Unlocked -           -          64568

# raidcom get port
PORT  TYPE  ATTR SPD  LPID FAB  CONN SSW  SL  Serial#  WWN          PHY_PORT
CL1-A FIBRE ELUN AUT   EF N   FCAL N   0  64568  50060e8006fc3800 -
CL1-B FIBRE TAR  AUT   EF N   FCAL N   0  64568  50060e8006fc3801 -
CL1-C FICON TAR   -   -   -   -   -   0  64568  50060e8006fc3802 -
CL1-D FICON TAR   -   -   -   -   -   0  64568  50060e8006fc3803 -

# raidcom get port -resource 1
PORT  TYPE  ATTR SPD  LPID FAB  CONN SSW  SL  Serial#  WWN          PHY_PORT
CL1-B FIBRE TAR  AUT   EF N   FCAL N   0  64568  50060e8006fc3801 -
```

```
CL1-C FICON TAR      - - - - - 0 64568 50060e8006fc3802 -
# raidcom get port -resource 2
PORT  TYPE  ATTR SPD LPID FAB CONN SSW SL Serial# WWN      PHY PORT
CL1-A FIBRE ELUN AUT  EF N  FCAL N  0 64568 50060e8006fc3800 -
CL1-D FICON TAR      - - - - - 0 64568 50060e8006fc3803 -
```

Resource lock operation

When you use the following commands, lock the resource that is allocated to resource groups before executing the command.

- add
- delete
- modify
- initialize
- check_ext_storage
- disconnect
- set
- reset
- reallocate
- monitor

The following examples show locking resource groups, executing commands, and then unlocking resource groups.

Examples

- Performing a user authentication by User ID: USER01, Password: PASS01.

```
# raidcom -login USER01 PASS01
```

- Locking a resource group: rsg001.

```
# raidcom lock resource -resource_name rsg001
```

- Creating LDEV#100 and #101.

```
# raidcom add ldev -parity_grp_id 33-16 -ldev_id 100 -capacity 10g
```

```
# raidcom add ldev -parity_grp_id 33-16 -ldev_id 101 -capacity 10g
```

- Unlocking resource group: rsg001

```
# raidcom unlock resource -resource_name rsg001
```

Resource locking and CCI commands

If you execute a CCI command when the specified resource is locked, the specified resource groups cannot be used by other users. Commands can be executed when the specified resources are not locked. However, if another user locks the resource, CCI commands will result in error. The following table shows the relations between CCI commands and resources that need to be locked, except for the required options for the commands. In the following table:

- Res. group: resource group
- Lock/auth: Resource locking and resource authority are required.
- Auth: Only resource authority check is specified.

Relation between commands and resources that need to be locked

Res. group	Port	Host group	Parity group	External volume /VDEV	LDEV	Command	Option
-	-	-	-	-	Lock/auth	raidcom add copy_grp	-
-	-	-	-	-	Lock/auth	raidcom delete copy_grp	-
-	-	-	-	-	Auth	raidcom get copy_grp	-
-	-	-	-	-	Lock/auth	raidcom add device_grp	-
-	-	-	-	-	Lock/auth	raidcom delete device_grp	-
-	-	-	-	-	Auth	raidcom get device_grp	-
-	Lock/auth	-	-	-	-	raidcom add external_grp	-
-	-	-	-	Lock/auth	-	raidcom check_ext_storage external_grp	-
-	-	-	-	Lock/auth	Auth	raidcom check_ext_storage external_grp	-ldev_id <ldev#>
-	-	-	-	Lock/auth	-	raidcom delete external_grp	-
-	-	-	-	Lock/auth	-	raidcom disconnect external_grp	-
-	-	-	-	Lock/auth	Auth	raidcom disconnect external_grp	-ldev_id <ldev#>
-	-	-	-	Auth	-	raidcom get external_grp	-

Res. group	Port	Host group	Parity group	External volume /VDEV	LDEV	Command	Option
-	-	-	-	Lock/auth	-	raidcom modify external_grp	-
-	Auth	-	-	-	-	raidcom discover external_storage	-
-	-	Lock/auth	-	-	-	raidcom add host_grp	-
-	-	Lock/auth	-	-	-	raidcom delete host_grp	-
-	Auth	Auth	-	-	-	raidcom get host_grp	-
-	-	Lock/auth	-	-	-	raidcom modify host_grp	-
-	-	Lock/auth	-	-	-	raidcom add hba_wwn	-
-	-	Lock/auth	-	-	-	raidcom delete hba_wwn	-
-	Auth	Auth	-	-	-	raidcom get hba_wwn	-
-	-	-	-	-	Lock/auth	raidcom add journal	-
-	-	-	-	-	Lock/auth	raidcom delete journal	-
-	-	-	-	-	Auth	raidcom get journal	-
-	-	-	-	-	Lock/auth	raidcom modify journal	-
-	-	-	Lock/auth	-	Lock/auth	raidcom add ldev	-parity_grp_id <gno-sgno>
-	-	-	-	Lock/auth	Lock/auth	raidcom add ldev	-external_grp_id <gno-sgno>
-	-	-	-	-	Lock/auth	raidcom add ldev	-
-	-	-	-	-	Lock/auth	raidcom delete ldev	-
-	-	-	-	-	Lock/auth	raidcom extend ldev	-
-	-	-	-	-	Auth	raidcom get ldev	-
-	-	-	-	-	Lock/auth	raidcom initialize ldev	-
-	-	-	-	-	Lock/auth	raidcom modify ldev	-
-	-	Lock/auth	-	-	Lock/auth	raidcom add lun	-

Res. group	Port	Host group	Parity group	External volume /VDEV	LDEV	Command	Option
-	-	Lock/ auth	-	-	Lock/ auth	raidcom delete lun	-
-	Auth	-	-	-	-	raidcom discover lun	-
-	-	Auth	-	-	-	raidcom get lun	-
-	Lock/ auth	-	-	-	-	raidcom add path	-
-	Lock/ auth	-	-	-	-	raidcom check_ext_storage path	-
-	Lock/ auth	-	-	-	-	raidcom delete path	-
-	Lock/ auth	-	-	-	-	raidcom disconnect path	-
-	-	-	-	-	Auth	raidcom get path	-
-	-	-	-	-	Lock/ auth	raidcom delete pool	-
-	-	-	-	-	Auth	raidcom get pool	-
-	-	-	-	-	Lock/ auth	raidcom modify pool	-
-	Auth	-	-	-	-	raidcom get port	-
-	Lock/ auth	-	-	-	-	raidcom modify port	-
-	-	-	Auth	-	-	raidcom get parity_grp	-
-	Lock/ auth	-	-	-	-	raidcom add rcu	-
-	Lock/ auth	-	-	-	-	raidcom delete rcu	-
-	Auth	-	-	-	-	raidcom get rcu	-
-	Lock/ auth	-	-	-	-	raidcom modify rcu	-
-	Lock/ auth	-	-	-	-	raidcom add rcu_path	-
-	Lock/ auth	-	-	-	-	raidcom delete rcu_path	-
Auth	-	-	-	-	-	raidcom get resource	-
Auth	-	-	-	-	-	raidcom lock resource	-
Auth	-	-	-	-	-	raidcom unlock resource	-
-	-	-	-	-	Lock/ auth	raidcom add snap_pool	-

Res. group	Port	Host group	Parity group	External volume /VDEV	LDEV	Command	Option
-	-	-	-	-	Auth	raidcom get snap_pool	-
-	-	-	-	-	Lock/auth	raidcom add dp_pool	-
-	-	-	-	-	Auth	raidcom get dp_pool	-
-	-	Lock/auth	-	-	-	raidcom set hba_wwn	-
-	-	Lock/auth	-	-	-	raidcom reset hba_wwn	-
-	-	-	-	-	Lock/auth	raidcom monitor pool	-
-	-	-	-	-	Lock/auth	raidcom reallocate pool	-
-	-	-	-	-	-	raidcom get command_status	-
-	-	-	-	-	-	raidcom reset command_status	-
-	-	-	-	-	-	raidcom add resource	-
Lock/auth	-	-	-	-	Lock/auth	raidcom add resource	-ldev_id <ldev#>
Lock/auth	Lock/auth	-	-	-	-	raidcom add resource	-port <port#>
Lock/auth	-	Lock/auth	-	-	-	raidcom add resource	-port <port#> <host group name>
Lock/auth	-	-	Lock/auth	-	-	raidcom add resource	-parity_grp_id <gno-sgno>
Lock/auth	-	-	-	Lock/auth	-	raidcom add resource	-external_grp_id <gno-sgno>
Auth	-	-	-	-	-	raidcom delete resource	-
Lock/auth	-	-	-	-	Lock/auth	raidcom delete resource	-ldev_id <ldev#>
Lock/auth	Lock/auth	-	-	-	-	raidcom delete resource	-port <port#>
Lock/auth	-	Lock/auth	-	-	-	raidcom delete resource	-port <port#> <host group name>
Lock/auth	-	-	Lock/auth	-	-	raidcom delete resource	-parity_grp_id <gnosgno>

Res. group	Port	Host group	Parity group	External volume /VDEV	LDEV	Command	Option
Lock/auth	-	-	-	Lock/auth	-	raidcom delete resource	-external_grp_id <gno-sgno>

raidcom add copy_grp

Creates a copy group.

Syntax

```
raidcom add copy_grp -copy_grp_name <copy group name>
                    <device group name> [<device group name>] [-mirror_id <mu#>
                    -journal_id <journal ID#>]
```

Options and parameters

Option	Description
-copy_grp_name <copy group name><device group name>[<device group name>]	Specifies the device group (maximum 32 characters) configuring a copy group (maximum 32 characters). You can specify up to two device group names. If you specify more than two, the option is ignored. For a copy group for an ShadowImage pair, specify two device groups. For a copy group for a TrueCopy pair, specify only one device group for the relevant storage system side (primary/main or secondary/remote).
[-mirror_id <mu#>]	Specifies the mirror ID. If this option is omitted (by raidcom get copy_grp), "-" is displayed.
[-journal_id <journal ID#>]	Specifies the journal number (0-255). If this option is omitted (by raidcom get copy_grp), "-" is displayed.

Example

Creating a copy group (ora) by device groups (grp1, grp2).

```
# raidcom add copy_grp -copy_grp_name ora grp1 grp2
```

raidcom delete copy_grp

Deletes the specified copy group.

Syntax

```
raidcom delete copy_grp -copy_grp_name <copy group name>
```

Options and parameters

Option	Description
-copy_grp_name <copy group name>	Specifies the name of the copy group (maximum 32 characters).

Example

Deleting the copy group: ora.

```
# raidcom delete copy_grp -copy_grp_name ora
```

raidcom get copy_grp

Displays the information of the specified copy group.

Syntax

```
raidcom get copy_grp
```

Options and parameters

None.

Examples

Displaying copy group information.

```
# raidcom get copy_grp
COPY_GROUP LDEV_GROUP MU# JID# Serial#
ora grp1      0 -      64034
ora grp2      0 -      64034
```

Description of each column in output example:

COPY_GROUP: Copy group name

LDEV_GROUP: Device group name that composes copy group

MU#: Mirror ID to which the device group belongs. If -mirror_id is not specified at the creation, "-" is displayed.

JID#: Journal number to which device group belongs

Serial#: Product serial number

raidcom add device_grp

Assigns a device name to the specified LDEV, and creates a device group. If the group already exists, the LDEV is added to the group. If the LDEV also already exists in the specified device group, the specified LDEV name is set.

Syntax

```
raidcom add device_grp -device_grp_name <ldev group name>
<device name> -ldev_id <ldev#>... [-cnt <count>]
```

Options and parameters

Option	Description
device_grp_name <device group name> <device name>	Specifies the device group name (maximum 32 characters) and the device group name in the device group (maximum 32 characters). If multiple LDEVs are specified, the same device group name is set for all of them.
-ldev_id <ldev#> ...	Specifies the LDEV number (0-65279). When you specify an LDEV that is part of a LUSE volume, all LDEVs in the LUSE volume will have the same name. For example: • -ldev_id 200 • -ldev_id 100-110 • -ldev_id 100 -cnt 10 Up to 64 of LDEVs can be specified. When you specify an LDEV in a LUSE volume, the number of LDEVs in the LUSE volume is included.
[-cnt <count>]	Specifies the count (2-64). If this option is omitted, the count is set to one.

Example

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

raidcom delete device_grp

Deletes the specified LDEV from the specified group. When the last LDEV is deleted, the device group is also deleted.

Syntax

```
raidcom delete device_grp -device_grp_name <device group name>  
-ldev_id <ldev#>... [-cnt <count>]
```

Options and parameters

Option	Description
-device_grp_name <device group name>	Specifies the device group name (maximum 32 characters)
-ldev_id <ldev#> ...	Specifies the LDEV number (0-65279). For example: • -ldev_id 200 • -ldev_id 100-110 • -ldev_id 100 -cnt 10 Up to 64 of LDEVs can be specified. When you specify an LDEV in a LUSE volume, the number of LDEVs in the LUSE volume is included.

Option	Description
<code>[-cnt <count>]</code>	Specifies the count (2-64). If this option is omitted, the count is set to one.

Example

Deleting the LDEV400 from the device group: grp1.

```
# raidcom delete device_grp -device_grp_name grp1 -ldev_id 400
```

raidcom get device_grp

Displays the LDEV information for the specified device group, or lists all device groups.

Syntax

```
raidcom get device_grp [-device_grp_name <device group name>]
```

Options and parameters

Option	Description
<code>[-device_grp_name <device group name>]</code>	Displays the device (LDEV) information for the specified device group (maximum 32 characters). If this option is omitted, the list of the registered device groups is displayed.

Examples

Displaying device group information.

```
# raidcom get device_grp
LDEV_GROUP Serial#
grp1_64034
grp2 64034
grp3 64034
```

Displaying device group information: grp1.

```
# raidcom get device_grp -device_grp_name grp1
LDEV_GROUP LDEV_NAME LDEV# Serial#
grp1_data1 400 64034
grp1_data2 401 64034
```

Description of each column in output example

LDEV_GROUP: Device group name

LDEV_NAME: Device name in the device group

LDEV#: LDEV number

Serial#: Product serial number

raidcom add external_grp

Adds an external volume to the specified external volume group, and connects to an external LUN on the specified external port /wwn. Only one external VOL is added in each operation. If the external volume group already exists, the external volume is added to the external volume group.

This command is executed asynchronously with the command input. Check the completion of this process using the **raidcom get command_status** command.

Syntax

```
raidcom add external_grp -path_grp <path group#>  
                        -external_grp_id <gno-sgno> -port <port#>  
                        -external_wwn <wwn strings> -lun_id <lun#>  
                        [-emulation <emulation type>][-clpr <clpr#>]]
```

Options and parameters

Option	Description
-path_grp <path group#>	Specifies the external VOL path group number (0-63231).
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: 52-11
-port <port#>	Specifies the port number. Specifies the port number whose attribute is External. For example: CL1-A Displays an external port.
-external_wwn <wwn strings>	Specifies the WWN value (hexadecimal value) of the external storage system in 8 bytes. The value can be split in units of 4 bytes by "," (commas). For example: 21000e08b0256f8 21000e0,8b0256f8
-lun_id <lun#>	Displays LUN (0-2047) of the external storage system port.
[-emulation <emulation type>]	Specifies the emulation type. If this option is omitted, OPEN-V is used. The valid values for <emulation type> are: - OPEN-V, OPEN-3, OPEN-8, OPEN-9, OPEN-E, OPEN-L 3390-1, 3390-2, 3390-3, 3390-A, 3390-3A, 3390-3B, 3390-3C, 3390-3R, 3390-9, 3390-9A, 3390-9B, 3390-9C, 3390-L, 3390-LA, 3390-LB, 3390-LC, 3390-M, 3390-MA, 3390-MB, 3390-MC, 3390-V 3380-3, 3380-3A, 3380-3B, 3380-3C 6586-G, 6586-J, 6586-K, 6586-KA, 6586-KB, 6586-KC6588-1, 6588-3, 6588-9, 6588-3A, 6588-3B, 6588-3C, 6588-9A, 6588-9B, 6588-9C, 6588-L, 6588-LA, 6588-LB, 6588-LC Some emulation types cannot be specified according to the type of device.
[-clpr <clpr#>]	Specifies the CLPR number.

Example

Mapping an LU: 0 defined to the external storage system port: 50060e80,05fa0f36 connected to the port: CL1-A (External port) by the External Volume Group#1-1 and the path group#1.

```
# raidcom add external_grp -path_grp 1 -external_grp_id 1-1
-port CL1-A -external_wnn 50060e80,05fa0f36 -lun_id 0
```

raidcom check_ext_storage external_grp

Specifies the external volume group, check the connection for the external VOL, and then restart using. Only one external VOL is operated in each operation.

An LDEV or device group can be specified instead of an external volume group.

- If an LDEV is specified, CCI finds the external volume groups to which the specified LDEV belongs and displays the result.
- If a device group is specified, CCI finds the external volume groups to which the specified device group belongs and displays the result.

If no LDEV exists in the external volume, the command is rejected with EX_ENOOBJ.

Syntax

```
raidcom check_ext_storage external_grp {-external_grp_id
<gno-sgno> | -ldev_id <ldev#>} | -grp_opt <group option>
-device_grp_name <device group name> [<device name>]}
```

Options and parameters

Option	Description
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: • 52-11
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: • -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information about LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all of the LDEVs in the device group are operated.

Examples

Executing the confirmation of existence and the LDEV recovery for the external volume #1-1.

```
# raidcom check_ext_storage external_grp -external_grp_id 1-1
```

Executing the confirmation of existence and the LDEV recovery for the external volume group including the external volume (LDEV:200).

```
# raidcom check_ext_storage external_grp -ldev_id 200
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Executing the confirmation of existence and the LDEV recovery for the external volume group including the LDEV belonging to the device group: grp1.

```
# raidcom check_ext_storage external_grp -grp_opt ldev -  
device_grp_name grp1
```

raidcom delete external_grp

Releases the mapping of the external volume to delete the registered external VOLs from the configuration. Only one external VOL is deleted in each operation. When the last external volume is deleted, the path group is also deleted.

This command is executed asynchronously with the command input. Check the completion of this process using the **raidcom get command_status** command.

Syntax

```
raidcom delete external_grp -external_grp_id <gno-sgno>
```

Options and parameters

Option	Description
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: 52-11

Example

Deleting the external volume group #1-1.

```
# raidcom delete ext_grp -ext_grp 01-01
```

raidcom disconnect external_grp

Disconnects the connection to the external volumes. Only one external VOL is operated in each operation.

You can specify an LDEV defined for the external volume or a device group to which the LDEV in the external volume group belongs instead of the external volume group.

- If an LDEV is specified, CCI finds the external volume groups to which the specified LDEV belongs and displays the result.
- If a device group is specified, CCI finds the external volume groups to which the LDEV in the specified device group belongs and displays the result.

If no LDEV exists in the external volume, the command is rejected with EX_ENOOBJ.

Syntax

```
raidcom disconnect external_grp {-external_grp_id <gno-sgno>
| -ldev_id <ldev#>} | -grp_opt <group option>
-device_grp_name <device group name> [<device name>]}
```

Options and parameters

Option	Description
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: • 52-11
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: • -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.

Examples

Disconnect the connection to the External Volume Group#1-1.

```
# raidcom disconnect external_grp -external_grp_id 1-1
```

Disconnect the connection to the external volume group including the external volume (LDEV:200) to "blocked".

```
# raidcom disconnect external_grp -ldev_id 200
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Disconnect the connection to the external volume group including the LDEV belonging to the device group: grp1.

```
# raidcom disconnect external_grp -grp_opt ldev -device_grp_name  
grp1
```

raidcom get external_grp

Displays the information of registered external volumes.

Syntax

```
raidcom get external_grp [-external_grp_id <gno-sgno>]
```

Options and parameters

Option	Description
[-external_grp_id <gno-sgno>]	Specifies the external volume group number (gno:1-16384, sgno:1-4096). If this option is omitted, the list of the registered external volumes is displayed. If this option is specified, the LDEV information defined for the specified external volumes is displayed. For example: 52-11

Examples

Displaying external volume information (The display might not be in ascending order.).

```
#raidcom get external_grp  
T GROUP Num_LDEV U(%) AV_CAP(GB) R_LVL E_TYPE SL CL DRIVE_TYPE  
E 1-1 0 0 100 - OPEN-V 0 0 OPEN-V  
E 1-2 0 0 30 - OPEN-V 0 0 OPEN-V
```

Description of each column in output example:

T: Type of the volume group

R: Parity Group, E: External Volume Group

GROUP: External Volume Group number

Num_LDEV: number of LDEV assigned to the external volume group

U(%): usage rate of the external volume group

AV_CAP(GB): available capacity (free space) for the external volume group

R_LVL: RAID level of the parity group. As the external volume group is not relevant, "-" (bar) is displayed.

E_TYPE: base emulation type of the external volume group

SL: SLPR to which the external volume group belongs (always displays 0)

CL: CLPR to which the external volume group belongs

DRIVE_TYPE: Product ID included in the SCSI Inquiry command of the external volume group

Displaying the external volume information by specifying the external volume group:

```
# raidcom get external_grp -external_grp_id 01-01
T GROUP P_NO LDEV# STS LOC_LBA SIZE_LBA Serial#
E 1-1 0 -NML 0x000000000000 0x000000003f00 64034
E 1-1 1 200 NML 0x000000003f00 0x000000010000 64034
E 1-1 2 201 REG 0x000000013f00 0x000000010000 64034
E 1-1 3 -DEL 0x000000023f00 0x0000f0000000 64034
```

Description of each column in output example:

T: type of the volume group

R: Parity Group, E: External Volume Group

GROUP: external volume group number.

P_NO: partition number in this external volume group.

LDEV#: LDEV number assigned to this external volume group.

STS: displays the following status.

- NML: an LDEV is installed.
- REG: an LDEV is being created.
- DEL: an LDEV is being deleted.

LOC_LBA: starting point of LBA for this partition on this External Volume Group, in units of 512 bytes.

SIZE_LBA: partition size of this External Volume Group, in units of 512 bytes.

Serial#: Product serial number.

raidcom modify external_grp

Changes the attribute of external volume options (cache mode, cache inflow control mode, and MP blade ID setting).

Syntax

```
raidcom modify external_grp -external_grp_id <gno-sgno>
    {-cache_mode {y | n} | -cache_inflow {y | n}
    | -mp_blade_id <mp#>} | -load_balance <mode>
```

Options and parameters

Option	Description
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: 52-11

Option	Description
-cache_mode {y n}	Specifies whether to use the cache mode for an external volume. If the relevant external volume group is split to the multiple LDEVs and these LDEVs are allocated to the pools, you cannot change the setting for the cache mode. - y: Cache mode enabled (E) - n: Cache mode disabled (D)
-cache_inflow {y n}	Specifies whether to use the Cache Inflow Control mode for an external volume. If the external volume group consists of multiple LDEVs and these LDEVs are allocated to the pool, you cannot change this parameter. - y : Cache Inflow Control mode enabled (E) - n : Cache Inflow Control mode disabled (D)
-mp_blade_id <mp#>	Specifies the MP blade ID (0-7). For example: -mp_blade_id 2
-load_balance <mode>	Specifies load distribution mode of the alternate paths. - normal: normal mode - extended: extended mode - disable: disables the alternate paths

Examples

Turning the cache mode of the External Volume Group#01-01 ON.

```
# raidcom modify external_grp -external_grp_id 01-01 -cache_mode y
```

Enabling the Cache Inflow Control mode of the External Volume Group#01-01 ON.

```
# raidcom modify external_grp -external_grp_id 01-01 -cache_inflow y
```

Changing the MP blade ID of the External Volume Group#01-01 to "3".

```
# raidcom modify external_grp -external_grp_id 01-01 -mp_blade_id 3
```

raidcom discover external_storage

Searches the port information on the external storage system connected to the external port.

Syntax

```
raidcom discover external_storage -port <port#>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number. Specifies the port number where the attribute is "ELUN(External)". For example: • CL1-A Displays an external port.

Example

Displaying the external storage system ports from the port: CL1-A.

```
# raidcom discover external_storage -port CL1-A
PORT WWN PM USED Serial# VENDOR_ID PRODUCT_ID
CL1-A 50060e8005fa0f36 M YES 60010 HITACHI VSP
CL1-A 50060e8005fa0f38 M YES 60010 HITACHI VSP
```

Description of each column in output example

PORT: Displays the Virtual Storage Platform external port number.

WWN: Displays the WWN which can be referred to from the port.

PM: Displays the path mode for external path.

- M: Multi
- S: Single
- A: APLB

USED: Displays whether this target WWN is used or not.

- YES: Used
- NO: Not used

Serial#: Product serial number of the external storage system.

VENDOR_ID: Displays the VENDOR_ID of the external storage system.
"OTHER" is displayed if an unsupported external storage system is connected.

PRODUCT_ID: Displays the PRODUCT_ID of the external storage system.
"OTHER" is displayed if an unsupported external storage system is connected.

raidcom add host_grp

Creates a host group on the specified port.

If the specified port does not exist, the command is rejected with EX_ENOOBJ.

If the specified port/host group already exists, the existing host group name is changed to the specified host group name.

The specified host group name must be unique in a port.

Syntax

```
raidcom add host_grp -port <port#> -host_grp_name <host group name>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number and the host group ID. For example: CL1-A-g (g is from 0 to 254)
-host_grp_name <host group name>	Specifies the HOST group name. Up to 64 characters can be set by CCI. If more than 64 characters are set, commands that specify host group name by Storage Navigator cannot be executed.

Examples

Creating a host group ID: 3, the host group name: a host group of Win_export, to the port: CL4-E.

```
# raidcom add host_grp -port CL4-E-3 -host_grp_name Win_export
```

Creating a host group ID: allocated automatically, the host group name: a host group of Win_export, to the port: CL4-E.

```
# raidcom add host_grp -port CL4-E -host_grp_name Win_export
```

raidcom delete host_grp

Deletes the specified host group and all WWN/LUNs setting on the specified port.

If the specified port does not exist, the command is rejected with EX_ENOOBJ.

Syntax

```
raidcom delete host_grp -port <port#> [<host group name>]
```

Options and parameters

Option	Description
-port <port#> [<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID. For example: - CL1-A-g (g is from 0 to 255) - CL1-A Linux_X86

Examples

Deleting the host group of port CL4-E, host group #7.

```
# raidcom delete host_grp -port CL4-E-7
```

Deleting the host group of port CL4-E, host group name: host group of Win_export.

```
# raidcom delete host_grp -port CL4-E Win_export
```

raidcom get host_grp

Displays the information about all host groups that are defined on the specified port.

Syntax

```
raidcom get host_grp -port <port#> [<host group name>] [-key  
<keyword>]
```

Options and parameters

Option	Description
-port <port#> [<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID. For example: • CLI-A • CL1-A-g (g is from 0 to 254) • CL1-A Linux_X86 If you specified the above settings, the information about all host groups that are defined on the specified port is displayed regardless of the examples.
[-key <keyword>]	Specifies when displaying unavailable host group IDs. Specify host_grp in <keyword>.

Examples

Displaying the host group information set for the port: CL4-E.

```
# raidcom get host_grp -port CL4-A
PORT   GID  GROUP_NAME      Serial#   HMD        HMO_BITS
CL4-E   0    Linux_x86       63528    LINUX/IRIX  2 13
CL4-E   1    Solaris        63528    SOLARIS    2 22
CL4-E   2    HP-UX          63528    HP-UX      40
CL4-E   3    Win_export     63528    WIN_EX     7
CL4-E   5    DEC            63528    TRU64      14
CL4-E   6    OpenVMS       63528    OVMS
CL4-E  254    RMTEST        63528    LINUX      7
```

Displaying only the host group IDs that are allocated to available resource groups for users.

```
# raidcom get host_grp -port CL4-A -key host_grp
PORT   GID  GROUP_NAME      Serial#   HMD        HMO_BITS
CL4-E   0    Linux_x86       63528    LINUX/IRIX  2 13
CL4-E   1    Solaris        63528    SOLARIS    2 22
CL4-E   2    HP-UX          63528    HP-UX      40
CL4-E   3    Win_export     63528    WIN_EX     7
CL4-E   5    DEC            63528    TRU64      14
CL4-E   6    OpenVMS       63528    OVMS
CL4-E  10    -              63528    -
CL4-E  11    -              63528    -
```

CL4-E	12	-	63528	-	
CL4-E	13	-	63528	-	
CL4-E	254	RMTEST	63528	LINUX	7

PORT: Displays the port number.

GID: Displays the host group ID of a port.

GROUP_NAME: Displays the host group name of a port.

Serial#: Product serial number.

HMD: Displays the following HOST MODE for the host adapter setting on host group.

- HP-UX, SOLARIS, AIX®, WIN, LINUX/IRIX, TRU64, DYNIX, OVMS, NETWARE, HI-UX
- VMWARE, HP-UX, VMWARE_EX, WIN_EX, UVM

HMO_BITS: Displays the host mode options of the host group. For details, see the section *Creating host groups and registering hosts in host groups (in a Fibre Channel environment)* in the *Provisioning Guide for Open Systems*.

raidcom modify host_grp

Sets a host mode to the host group on the specified port.

To set a host mode option, specify the "-host_mode_opt" option.

To reset a host mode option, specify the "-host_mode_opt 100" .

If the specified host group does not exist, the command is ignored.

Syntax

```
raidcom modify host_grp -port <port#> [<host group name>]
                        -host_mode < host mode> [-host_mode_opt <host mode option> ... ]
```

Options and parameters

Option	Description
-port <port#> [<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID. For example: • CL1-A-g (g is from 0 to 254) • CL1-A Linux_X86

Option	Description
-host_mode <host mode>	Specifies the host mode using the following strings. For details, see the Provisioning Guide for Open Systems. • LINUX/IRIX • VMWARE • HP-UX • OVMS • TRU64 • SOLARIS • NETWARE • WIN • AIX® • VMWARE_EX • WIN_EX • UVM
[-host_mode_opt <host mode option>...]	Host mode option This parameter is used when setting the option bits for the host mode option. For details, see the section <i>Creating host groups and registering hosts in host groups (in a Fibre Channel environment)</i> in the Provisioning Guide for Open Systems. Byte [n] MSB-----Bit-----LSB Byte [0] 00 01 02 03 04 05 06 07 Byte [1] 08 09 10 11 12 13 14 15 : : Byte [11] 88 89 90 91 92 93 94 95

Examples

Setting the host mode: HP-UX for the port: CL4-E, the host group: #2.

```
# raidcom modify host_grp -port CL4-E-2 -host_mode HP-UX
```

Setting the host mode: HP-UX and the host mode option: 2, 13 for the port: CL4-E, the host group: #2.

```
# raidcom modify host_grp -port CL4-E-2 -host_mode HP-UX
    -host_mode_opt 2 13
```

Clearing the host mode options of the host mode: HP-UX of the port: CL4-E, the host group: #2.

```
# raidcom modify host_grp -port CL4-E-2 -host_mode HP-UX
    -host_mode_opt 100
```

raidcom add hba_wwn

Registers the WWN of the host adapter to the host group on the specified port.

If the specified WWN already exists, this command is ignored.

Syntax

```
raidcom add hba_wnn -port <port#> [<host group name>]
-hba_wnn <WWN strings>
```

Options and parameters

Option	Description
-port <port#> [<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID. For example: - CL1-A-g (g is from 0 to 254) - CL1-A Linux_X86
-hba_wnn <WWN strings>	Specifies the WWN value (hexadecimal value) of the host adapter. For example: 21000e08b0256f8 21000e0,8b0256f8 (The value can be split in units of 4 bytes by ",", (commas).)

Example

Setting the WWN of host adapter: 210000e0, 8b0256f8 to the port: CL4-E, the host group #0.

```
# raidcom add hba_wnn -port CL4-E-0 -hba_wnn 210000e0,8b0256f8
```

raidcom delete hba_wnn

Deletes the specified host (WWN) from the host group.

If the specified WWN does not exist, this command is ignored.

Syntax

```
raidcom delete hba_wnn -port <port#> [<host group name>]
-hba_wnn <WWN strings>
```

Options and parameters

Option	Description
-port <port#> [<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID. For example: - CL1-A-g (g is from 0 to 254) - CL1-A Linux_X86
-hba_wnn <WWN strings>	Specifies the WWN value (hexadecimal value) of the host adapter. For example: 21000e08b0256f8 21000e0,8b0256f8 (The value can be split in units of 4 bytes by ",", (commas).)

Example

Deleting the WWN of host adapter: 210000e0,8b039800 set for the port: CL4-E, the host group #0.

```
# raidcom delete hba_wnn -port CL4-E-0 -hba_wnn 210000e0,8b039800
```

raidcom get hba_wnn

Displays the WWN of the HBA registered to the host group.

Syntax

```
raidcom get hba_wnn -port <port#> [<host group name>]
```

Options and parameters

Option	Description
-port <port#>[<host group name>]	Specifies s a port number, a host group ID, and a host group name. It cannot be specified when more than 64 characters is set for the host group name. Use the host group ID. If setting the host group ID or the host group name is omitted, the information about host group ID 0 is displayed. For example, • CLI-A • CL1-A-g (g is from 0 to 254) • CL1-A Linux_X86

Example

Displaying the WWN of host adapter set for the port: CL4-E, the host group 0.

```
# raidcom get hba_wnn -port CL4-E-0
PORT  GID  GROUP_NAME          HWWN  Serial#      NICK_NAME
CL4-E   0   Linux_x86 210000e08b0256f8  63528  ORA_NODE0_CTL_0
CL4-E   0   Linux_x86 210000e08b039c15  63528  ORA_NODE1_CTL_0
```

Description of each column in output example

PORT: Displays the port number.

GID: Displays the host group ID of a port.

GROUP_NAME: Displays the host group name of a port.

HWWN: Displays the WWN of registered host adapter.

Serial#: Product serial number.

NICK_NAME: Displays the Nick Name of the WWN of host adapter.

raidcom add journal

Registers (adds) a volume to a journal.

This makes a Journal for "Open System" or "M/F System" to the specified LDEVs.

If the journal already exists, the specified LDEV is added to the journal.

If the journal does not exist, you must create it first, and then add an LDEV.

If the **-timer_type** option is specified, this command makes a journal as "M/F System". If not, this command makes a journal as "Open System".

A device group can also be specified instead of an LDEV.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom add journal -journal_id <journal ID#> {-ldev_id <ldev#> ...  
[-cnt <count>] | -grp_opt <group option>  
-device_grp_name <device group name> [<device name>]}  
[-mp_blade_id <mp#> | -timer_type <timer type> ]
```

Options and parameters

Option	Description
-journal_id <journal ID#>	Specifies the journal number (0-255).
-ldev_id <ldev#> ...	Specifies the LDEV number (0-65279). Up to 64 LDEVs can be specified at a time. For example: • -ldev_id 200 • -ldev_id 100-110 • -ldev_id 100 -cnt 10
[-cnt <count>]	Specifies the count (2-64). If this option is omitted, "1" is used as the count.
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.
[-mp_blade_id <mp#>]	Specifies the MP blade ID number (0-7). If this option is omitted, the device automatically allocates an MP blade ID number. For example: • -mp_blade_id 2

Option	Description
<code>[-timer_type <timer type>]</code>	Specifies the timer type: system, local, or None. For example: • <code>-timer_type system</code> • <code>-timer_type local</code> For details, see the Universal Replicator manual for the storage system.

Examples

Examples for Open:

Creating a journal #1 of LDEVs: 265, 266, 267, and 278.

```
# raidcom add journal -journal_id 1 -ldev_id 265 266 267 268
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Creating a journal #1 with an LDEV belonging to the device group: grp1.

```
# raidcom add journal -journal_id 1 -grp_opt ldev -device_grp_name grp1
```

Example for mainframe:

Creating a journal #1 with LDEVs: 265, 266, 267, and 278. As a timer type, the system clock of the mainframe host is used. (When LDEV is added to the journal of M/F, it is required to specify the system clock of the mainframe host to the timer type.)

```
# raidcom add journal -journal_id 1 -ldev_id 265 266 267 268
-timer_type system
```

raidcom delete journal

Deletes a journal from the specified journal.

A device group can also be specified instead of an LDEV. If the LDEV and device group are not specified, journal is deleted.

This command is executed asynchronously with the command input. Check the completion of this process on the `raidcom get command_status` command.

Syntax

```
raidcom delete journal -journal_id <journal ID#> [-ldev_id <ldev#>
| -grp_opt <group option>
-device_grp_name <device group name> [<device name>]]
```

Options and parameters

Option	Description
-journal <journal ID#>	Specifies the journal number (0-255).
[-ldev_id <ldev#>]	Specifies the LDEV number (0-65279). For example: • -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.

Examples

Deleting the specified Journal.

```
# raidcom delete journal -journal_id 6
```

Deleting the specified LDEV from the Journal.

```
# raidcom delete journal -journal_id 6 -ldev_id 265
```

Deleting the LDEV belonging to the device group: grp1 from the Journal.

```
# raidcom delete journal -journal_id 6 -grp_opt ldev  
-device_grp_name grp1
```

raidcom get journal

Displays the information of registered journal.

Syntax

Displaying journal information

```
raidcom get journal [-key <keyword>]
```

Displaying timer related information

```
raidcom get journalt
```

Options and parameters

Option	Description
[-key <keyword>]	Specifies the display keyword. Specify opt as <keyword>.

Examples

Displaying journal information.

```
# raidcom get journal
JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ(BLK) Seq# Num LDEV#
001 0 1 PJNN 4 21 43216fde 30 512345 62500 4 265
002 1 2 PJNF 4 95 3459fd43 52000 512345 62500 3 270
002 2 2 SJNS 4 95 3459fd43 52000 512345 62500 3 270
003 0 3 PJSN 4 0 - - 512345 62500 1 275
004 0 4 PJSF 4 45 1234f432 78 512345 62500 1 276
005 0 5 PJSE 0 0 - - 512345 62500 1 277
```

Displaying Timer related information of the journal.

```
# raidcom get journalt
JID MU CTG JNLS AP U(%) Q-Marker Q-CNT D-SZ(BLK) Seq# DOW PBW APW
001 0 1 PJNN 4 21 43216fde 30 512345 63528 20 300 40
002 1 2 PJNF 4 95 3459fd43 52000 512345 63528 20 300 40
003 0 3 PJSN 4 0 - - 512345 63528 20 300 40
```

Displaying option information of the journal.

```
# raidcom get journal -key opt
JID MU CTG JNLS TYPE TTYPE MODE IF DOW(S) PBW(M) CR CS(bps) DM MP#
Seq#
001 0 1 PJNN OPEN - HDD E 30 5 M 256 Y 2 64034
002 1 2 PJNF M/F system CACHE D 30 5 H 256 Y 2 64034
```

Description of each column in output example:

JID: Journal number.

MU: Mirror ID on Universal Replicator.

CTG: Consistency group number.

JNLS: Status in the journal:

- SMPL: a journal volume that does not have a pair, or is being deleted.
- P(S)JNN: "P(S)vol Journal Normal Normal".
- P(S)JNS: "P(S)vol Journal Normal Suspend" created with **-nocsus** option.
- P(S)JSN: "P(S)vol Journal Suspend Normal".
- PJNF: "P(S)vol Journal Normal Full".
- P(S)JSF: "P(S)vol Journal Suspend Full".
- P(S)JSE: "P(S)vol Journal Suspend Error" including link failure.
- P(S)JES: "P(S)vol Journal Error Suspend" created with **-nocsus** option.

AP: Number of active link paths of Universal Replicator.

U(%): Usage rate of journal volumes assuming the entire relevant volume is 100%.

Q-Marker: The PVOL journal volume Shows the newest sequential number (Q-marker) at the time of receiving WRITE data. The SVOL journal volume shows the newest sequential number (Q-marker) written to the cache.

Q-CNT: Number of Q-markers remaining in the PVOL journal volume.

D-SZ(BLK): Capacity of the data block size of the journal volume in units of 512 bytes.

Seq#: Sequential number.

Num: Number of LDEVs configuring the journal volume.

LDEV#: LDEV number.

DOW: Data Overflow Watch timer setting (in seconds) per the Journal.

PBW: Path Blockade Watch timer setting (in seconds) per the Journal. If the setting is more than 3600 seconds, it displays 6000 seconds.

APW: Active Path Watch timer setting (in seconds) to detect any link failures.

TYPE: Open or M/F system.

TTYPE: Timer type for mainframe: System or Local.

MODE: Status of the journal:

- HDD: Store the journal data to the journal volume (cache mode disabled).
- CACHE: Store the journal data to the cache (cache mode enabled).

IF: Inflow control for journal:

- E: Enable
- D: Disable

DOW(S): Data Overflow Watch timer setting (in seconds) per the Journal.

PBW(M): Path Blockade Watch timer setting (in minutes) per the Journal. If the setting is more than 60 minutes, it displays 100 minutes.

CR: Copy rate: Low, Medium, or High.

CS(bps): Copy speed in bps: 10 bps, 100 bps, or 256 bps.

DM: Copy mode "Y" or "N" under failure of the delta resync:

- Y: copying ALL data.
- N: No copying.

MP#: MP blade ID.

raidcom modify journal

Changes the option of Universal Replicator to be used at journal, and sets the specified control parameter to the journal.

If you specify the **-mp_blade_id** option, you cannot specify the other options (-data_overflow_watch, -path_blocked_watch, -cache_mode, or -timer_type).

The **-timer_type** option must be specified to the journal on mainframe systems. This means that this option cannot be used for changing from "Open System" to "M/F System".

Syntax

When changing the data overflow watching time of journal data area, path blocked watch or the timer type, specify more than one option.

```
# raidcom modify journal -journal_id <journal ID#>
    {[-data_overflow_watch <time>][-cache_mode {y | n}]}
    [-timer_type <type>]}
```

When changing the path blocked watch.

```
# raidcom modify journal -journal_id <journal ID#>
    -path_blocked_watch <time> [-mirror_id <mu#>]
```

When changing the MP blade ID.

```
# raidcom modify journal -journal_id <journal ID#>
    -mp_blade_id <mp#>
```

Options and parameters

Option	Description
-journal_id <journal ID#>	Specifies the journal number (0-255).
-data_overflow_watch <time(sec)>	The data overflow watch timer (0-600) (second). Specifies the watch time for the journal data area being full. If 0 is specified, the setting of the data overflow watch timer is changed and the inflow control for journals is set to disabled.
-path_blocked_watch <time(min)>	The watch for the path blockage (1-60) (minute). Use Storage Navigator to set the value with more than 60 minutes. If 0 is specified, the time of the watch for the path blockage does not change, and the watch for the path blockage is invalid.
-cache_mode {y n}	Specifies whether to use the cache mode. - y: Cache mode enabled (E) - n: Cache mode disabled (D)
[-timer_type <type>]	Specifies the timer type: system, local, or None. For example: -timer_type system -timer_type local For details, see the Universal Replicator manual for the storage system.

Option	Description
-mp_blade_id <mp#>	Specifies the MP blade ID (0-7). Changing MP blade ID should be executed during off-peak hours of I/O loading. Do not change the MP blade ID during initial copying of Universal Replicator (on-peak hours of I/O loading). To change the MP blade ID again for the same journal, wait for more than 30 minutes after changing the MP blade ID. For example: -mp 2
[-mirror_id <mu#>]	Specifies the Mirror ID. If the setting is omitted, "0" is used.

Examples

Changing the data overflow watch time for journal "6" to 15 seconds.

```
# raidcom modify journal -journal_id 6 -data_overflow_watch 15
```

Changing the settings for journal 6: data overflow watch time to 15 seconds, and timer type to the system clock of the mainframe host .

```
# raidcom modify journal -journal_id 6 -data_overflow_watch 15
-timer_type system
```

Changing the the MP blade ID for journal "6" to 2.

```
# raidcom modify journal -journal_id 6 -mp_blade_id 2
```

Changing the setting for journal "6" to store journal data in the secondary journal to the cache.

```
# raidcom modify journal -journal_id 6 -cache_mode y
```

Changing the path block monitoring time of mirror ID 1 for journal "6" to 59 minutes.

```
# raidcom modify journal -journal_id 6 -path_blocked_watch 59
-mirror_id 1
```

raidcom add ldev

Adds an LDEV to the specified parity group or the external volume group. Or adds a V-VOL to the specified pool for Dynamic Provisioning, Dynamic Provisioning for Mainframe, Dynamic Tiering, Dynamic Tiering for Mainframe, Thin Image, or Copy-on-Write Snapshot.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom add ldev {-parity_grp_id <gno-sgno>
| -external_grp_id <gno-sgno> | -pool {<pool ID#>
| <pool naming>| snap}} -ldev_id <ldev#> {-capacity <size>
```

```
| -offset_capacity <size> | -cylinder <size>}
[-emulation <emulation type>][-location <lba>]
[-mp_blade_id <mp#>] [-clpr <clpr#>
```

Options and parameters

Option	Description
-parity_grp_id <gno-sgno>	Specifies the parity group number (gno:1-32, sgno:1-16). For example: 3-1 Specifies one of the following options: -raid_grp, -external_grp_id, or -pool_id.
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: 52-11 ("E" is not required) Specifies one of the following options: -raid_grp, -external_grp_id, or -pool_id.
-pool {<pool ID#> <pool naming> snap}	For Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering: specifies the Pool ID or Pool name when a V-VOL is created to pool. When only a number is specified, it is recognized as a pool ID. Therefore, when you specify a pool that the pool name is only a number, specify the pool ID instead of the pool name. When creating V-VOL for a Thin Image or Copy-on-Write Snapshot pool, specify "snap".
-ldev_id <ldev#> -tse_ldev_id <ldev#>	Specifies the LDEV number (0-65279). If you specify -tse_ldev_id option, the volume is the same as the volume used by FlashCopy® SE. When using -tse_ldev_id option, you must create the virtual volumes in Dynamic Provisioning for Mainframe. Examples: -ldev_id 200 -tse_ldev_id 400

Option	Description
-capacity <size>	Specifies the capacity. The size can be specified in bytes or LBAs. When specifying bytes, the unit is t/T (terabyte), g/G (gigabyte), m/M (megabyte), or k/K (kilobyte). If this option is omitted, block (512KB) is used. When specifying byte, note the following: • There is no size correction. • If the capacity of LDEVs that are created by GUI and CLI are the same, a copy pair might not be created. To create a pair with an LDEV that was created by GUI, create the LDEV by specifying LBA. Example of specification: 1GB (gigabyte) is: -capacity 1G, -capacity 1g, -capacity 1024M, -capacity 1024m, -capacity 1048576K, -capacity 1048576k, -capacity 2097152 In case of volumes other than OPEN-V, more free space than the capacity that was actually specified is required. For details, see the Provisioning Guide for Open Systems. When you specify "all" instead of digits to create an OPEN-V LDEV and no LDEV has been created in the specified parity group* or the external volume group, the system allocates all empty space for the LDEV. If the empty space is larger than the maximum capacity of an LDEV, the system creates the LDEV with the maximum capacity and leaves the rest of the space as an empty space. *: "all" cannot be specified depending on the combination of the drive type and drive level because of the LDEV control area allocation, and so on. In this case specify byte or LBA.
-offset_capacity <size>	Specifies capacity. Corrects the size as well as GUI for the specified capacity. The capacity can be specified in bytes or blocks. When specifying byte, the unit is t/T (terabyte), g/G (gigabyte), m/M (megabyte), or k/K (kilobyte).
-cylinder <size>	Specifies the size in cylinder unit. When specifying, the unit is t/T (teracylinder), g/G (gigacylinder), m/M (megacylinder), or k/K (kilocylinder). Cylinder is applied if you do not specify the unit. When an open-systems emulation type is specified, this option cannot be specified.
[-location <lba>]	Specifies the Location (the starting point of the LDEV to be created in the parity group/external volume group). If this specification is omitted, create a LDEV and close up in the free space.

Option	Description
<code>[-emulation <emulation type>]</code>	Specifies the emulation type. For example: • OPEN-V If this specification is omitted, OPEN-V is specified. The values that can be specified for <emulation type> are: • OPEN-3, OPEN-8, OPEN-9, OPEN-E, OPEN-L, OPEN-V • 3380-3, 3380-3A, 3380-3B, 3380-3C • 3390-1, 3390-2, 3390-3, 3390-A, 3390-3A, 3390-3B, 3390-3C, 3390-3R, 3390-9, 3390-9A, 3390-9B, 3390-9C, 3390-L, 3390-LA, 3390-LB, 3390-LC, 3390-M, 3390-MA, 3390-MB, 3390-MC, 3390-V • 6586-G, 6586-J, 6586-K, 6586-KA, 6586-KB, 6586-KC • 6588-1, 6588-3, 6588-9, 6588-3A, 6588-3B, 6588-3C, 6588-9A, 6588-9B, 6588-9C, 6588-L, 6588-LA, 6588-LB, 6588-LC Some emulation types cannot be specified depending on the emulation type.
<code>[-mp_blade_id <mp#>]</code>	Specifies the MP blade ID (0-7). If this specification is omitted, it is allocated automatically.
<code>[-clpr <clpr#>]</code>	When you create virtual volumes by specifying the -pool_id <pool#> option, specify the CLPR number. If you omit this option, the CLPR number to which the pool is allocated is used.

Examples

Creating an LDEV: 100 of size 10GB in a parity group: 33-16.

Location in the parity group: automatic allocation, LDEV Emulation type: OPEN-V

```
# raidcom add ldev -parity_grp_id 33-16 -ldev_id 100 -capacity 10G
```

Creating an LDEV of command device with the following conditions: parity group: 33-16; location of the parity group: automatic allocation; emulation type: OPEN-V; size: 10GB (Corrected); LDEV: 110.

```
# raidcom add ldev -parity_grp_id 33-16 -ldev_id 110
  -offset_capacity 10G -command_device y
```

Creating an LDEV with the following conditions: Parity group: 33-17, location of the parity group: automatic allocation, Emulation type: 3390-3, Size: 10M cylinder (Cylinder specification), LDEV: 120.

```
# raidcom add ldev -parity_grp_id 33-17 -ldev_id 120
  -cylinder 10m -emulation 3390-3
```

Creating an LDEV of position in the external volume: allocated automatically, emulation type: OPEN-V, External volume: 01-02, Capacity: 200MB, and LDEV number: 200.

```
# raidcom add ldev -external_grp_id 01-02 -ldev_id 200 -capacity
  200m
```

Creating an LDEV of external volume group:01-03, position in the external volume: allocated automatically, emulation type: OPEN-V, External volume size: takeover, and LDEV number: 220.

```
# raidcom add ldev -external_grp_id 01-03 -ldev_id 220 -capacity
all
```

Creating a V-VOL of Capacity: 300MB and number: 300, to a pool for Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, or Dynamic Tiering for Mainframe.

```
# raidcom add ldev -pool 4 -ldev_id 300 -capacity 300m
```

Creating a V-VOL of Capacity: 300MB and LDEV number: 400, to a pool for Thin Image or Copy-on-Write Snapshot.

```
# raidcom add ldev -pool snap -ldev_id 400 -capacity 300m
```

raidcom delete ldev

Deletes the specified LDEVs or the V-VOLs. A device group can also be specified instead of an LDEV.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom delete ldev {-ldev_id <ldev#> | -grp_opt <group option>
-device_grp_name <device group name> [<device name>]}
```

Options and parameters

Option	Description
-ldev_id <ldev#> (0-65279)	Specifies the LDEV number (0-65279). For example: -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.

Examples

Deleting an LDEV: 200.

```
raidcom delete ldev -ldev_id 200
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Deleting an LDEV belonging to the device group: grp1.

```
raidcom delete ldev -grp_opt ldev -device_grp_name grp1
```

raidcom extend ldev

Extends the capacity of V-VOL for Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, or Dynamic Tiering for Mainframe volume.

If the specified LDEV is not a V-VOL of Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, or Dynamic Tiering for Mainframe, the command is rejected with EX_ENOOBJ.

A device group can also be specified instead of an LDEV.

Syntax

```
raidcom extend ldev {-ldev_id <ldev#> | -grp_opt <group option>
                    -device_grp_name <device group name> [<device name>]}
                    -capacity <size> | -offset_capacity <size> | -cylinder <size>
```

Options and parameters

Option	Description
-ldev_id <ldev#> (0-65279)	Specifies the LDEV number (0-65279). For example: -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.
-capacity <size>	Specifies the capacity to be extended. The unit is g/G, m/M, or k/K. If this option is omitted, block (512k) is used. Example of specification: 1GB (gigabyte) is: -capacity 1G, -capacity 1g, -capacity 1024M, -capacity 1024m, -capacity 1048576K, -capacity 1048576k, -capacity 2097152
-offset_capacity <size>	Specifies capacity. Corrects the size as well as GUI for the specified capacity. The capacity can be specified in bytes or blocks.
-cylinder <size>	Specifies the size in cylinder unit. When specifying, the unit is g/G (gigabyte), m/M (megabyte), or k/K (kilobyte). Cylinder is applied if you do not specify the unit. When the emulation type for the Open System is specified, this option cannot be specified.

Examples

Extending the capacity of a Dynamic Provisioning V-VOL: 200 by 10 GB.

```
# raidcom extend ldev -ldev_id 200 -capacity 10G
```

Extending the capacity of a Dynamic Provisioning V-VOL: 201 by 200 MB.

```
# raidcom extend ldev -ldev_id 201 -capacity 200M
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Extending the capacity of Dynamic Provisioning V-VOL belonging to the device group: grp1 by 200 MB.

```
# raidcom extend ldev -grp_opt ldev -device_grp_name grp1 -  
capacity 200M
```

raidcom get ldev

Displays the information of the specified LDEV or the device file. A device group can also be specified instead of an LDEV.

Syntax

```
raidcom get ldev {-ldev_id <ldev#> ... [-cnt <count>]  
| -grp_opt <group option> -device_grp_name <device group  
name> [<device name>] | -ldev_list <ldev list option>}  
[-key <keyword>] [{-check_status| -check_status_not} <string>  
[-time <time>]]
```

Options and parameters

Option	Description
-ldev_id <ldev#> ...	Specifies the LDEV number (0-65279). For example: -ldev_id 200 -ldev_id 100-110 -ldev_id 100 -cnt 10
[-cnt <count>]	Specifies the count (2-65280). If this option is omitted, the count is set to one.
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.

Option	Description
-ldev_list <ldev list option>	Specifies the type of LDEVs to display. Specify one of the following LDEV list options. - defined: Displays all implemented LDEVs. - dp_volume: Displays LDEVs that have Dynamic Provisioning attributes. Combining this with -pool_id <pool id> specification displays LDEVs that have Dynamic Provisioning attributes related to the specified POOL. - external_volume: Displays external volumes. - undefined: Displays all LDEV numbers that are not implemented. - mapped: Displays all LDEVs to which LU paths are defined. Combining this with -pool_id <pool id> specification displays LDEVs (defined the LU path) relate to the specified POOL. - unmapped: Displays all LDEVs to which LU paths are defined. However, LDEVs that are not implemented or mainframe volumes are not displayed because they cannot specify the LU path. Combining this with -pool_id <pool id> specification displays LDEVs (not defined the LU path) relate to the specified POOL. - journal -journal_id <journal id>: Displays LDEVs that belong to the specified journal. - pool -pool_id <pool id>: Displays LDEVs that belong to the specified pool. If a -pool_id option is non-numeric, the specified value is recognized as a pool name to identify the pool ID. - parity_grp -parity_grp_id <parity group id>: Displays LDEVs that belong to the specified parity group. - mp_blade -mp_blade_id <mp#>: Displays LDEVs that are set to the specified MP blades.
[-key <keyword>]	Specifies a display keyword. If this option is omitted, basic LDEV information is displayed. If this option is specified, the following information is displayed. The following display keywords can be specified: front_end: Front-end information parity_grp: Parity group information external: External volume information tier: Tier information for the Dynamic Tiering V-VOL.

Option	Description
[-check_status <string> [-time <time>]]	Check if the LDEV is in the state as shown in <string>. The following strings are specified in the <string>. • STS ◦ NML: Normal ◦ BLK: Blocked ◦ BSY: Status is changing • OPE_TYPE ◦ FMT: Formatting ◦ QFMT: Quick formatting ◦ CCOPY: Copying the collections ◦ CACCS: Accessing to collections ◦ NONE: Not in operation ◦ SHRD: Shredding ◦ ZPD: Page discarding ◦ SHRPL: Deleting from the pool ◦ RLC: Pool relocating ◦ RBL: Pool rebalancing • VOL_TYPE ◦ NOT_DEFINED: An LDEV is not installed ◦ DEFINING: An LDEV is being created ◦ REMOVING: An LDEV is being deleted If the relevant LDEV is in the specified status, the operation ends normally. If "-time" is specified, the operation is placed in wait status for the time (seconds) set by the <time>.

Option	Description
[-check_status_not <string> [-time <time>]]	Check that the LDEV is not in the state as shown in <string>. The following strings are specified in the <string>. - STS - NML: Normal - BLK: Blocked - BSY: Status is changing - OPE_TYPE - FMT: Formatting - QFMT: Quick formatting - CCOPY: Copying the collections - CACCS: Accessing to collections - NONE: Not in operation - SHRD: Shredding - ZPD: Page discarding - SHRPL: Deleting from the pool - RLC: Pool relocating - RBL: Pool rebalancing - VOL_TYPE - NOT_DEFINED: An LDEV is not installed - DEFINING: An LDEV is being created - REMOVING: An LDEV is being deleted If the relevant LDEV is not in the specified status, the operation ends normally. If "-time" is specified, the operation is placed in wait status for the time (seconds) set by the <time>.

Some keywords might not be displayed depending on the LDEV attribute as shown below.

LDEV attribute		Front end	Parity group	External	Tier
Normal volume	Internal volume	Y	Y	N	Y
	External volume	Y	N	Y	Y
POOL Volume for HTI, SS, HDP, HDPz, HDT, or HDTz	Internal volume	N	Y	N	N
	External volume	N	N	Y	N
Journal volume	Internal volume	N	Y	N	N
	External volume	N	N	Y	N

Legend Y: Displayed, N: Not displayed

Example (LDEV number 577 (internal VOL))

Displaying the information of the LDEV number 577 (internal VOL).

```
# raidcom get ldev -ldev_id 577
Serial# : 63502
LDEV : 577
SL : 0
CL : 0
VOL_TYPE : OPEN-V-CVS
VOL_Capacity(BLK) : 2181120
NUM_LDEV : 1
LDEVs : 577
NUM_PORT : 2
PORTs : CL2-E-0 1 Linux_X86 : CL2-E-1 1 Solaris
F_POOLID : NONE
VOL_ATTR : CVS
RAID_LEVEL : RAID1
RAID_TYPE : 2D+2D
NUM_GROUP : 1
RAID_GROUPS : 02-01
DRIVE_TYPE : DKS2C-K072FC
DRIVE_Capa : 141822798
LDEV_NAMING : Oracle_data_1
STS : NML
OPE_TYPE : QFMT
OPE_RATE : 100
MP# : 2
SSID:001F
```

Description of each column in output example

Serial#: Product serial number.

LDEV: LDEV number.

SL: SLPR information ("0" is displayed for storage systems other than USP V/VM).

CL: CLPR information.

VOL_TYPE: Emulation type of the relevant LDEV. Displays the same name as the product ID of the Inquiry command. If the LDEV is not installed or is in the process of being created or deleted, the status is one of the following:

- NOT DEFINED: An LDEV is not installed.
- DEFINING: An LDEV is being created.
- REMOVING: An LDEV is being deleted.

VOL_Capacity (BLK): capacity of LDEV in block size.

VOL_Capacity(cyl) : 22720 (displayed only when attribute: MF-VOL)

NUM_LDEV: number of LDEVs that configures the LU where the specified LDEV is belongs to.

LDEVs: number of LDEV in the LU.

NUM_PORT: number of ports defined to the paths for relevant LDEV.

PORTs: ports defined to the paths for the relevant LDEV.

F_POOLID: pool ID if the LDEV is a component of the pool. In other cases, "NONE" is displayed.

VOL_ATTR: attributes of the LDEV.

- CMD: Command device (open-systems only)
- CLUN: Cache LUN (DCR)
- CVS: CVS volume
- LUSE: LUSE volume
- ALUN: Volume Migration volume
- ELUN: External volume
- OLG: OpenLDEV Guard volume
- VVOL: V-VOL
- HORC: The remote copy pair volumes:
 - TrueCopy/Universal Replicator/Universal Replicator for Mainframe: P-VOL or S-VOL
 - TrueCopy for Mainframe: M-VOL or R-VOL
 - MRCF: ShadowImage Volume (PVOL or SVOL)
 - QS: Thin Image or Copy-on-Write Snapshot Volume (PVOL or SVOL)
 - JNL: JNL Volume
 - HDP: Dynamic Provisioning or Dynamic Provisioning for Mainframe Volume
 - HDT: Dynamic Tiering (HDT) or Dynamic Tiering for Mainframe Volume
 - POOL: POOL Volume
 - QRD: Quorum disk
 - ENCD: Encryption disk
 - SYSD: System disk
 - TSE: Dynamic Provisioning for Mainframe volumes that are used in FlashCopy[®] SE.
- RAID_LEVEL: RAID level (RAID1, RAID5, or RAID6).
- RAID_TYPE: configuration of the drives: 2D+2D, 2D+2D×2, 3D+1P, 7D+1P, 7D+1P×2, 7D+1P×4, or 6D+2P.
- NUM_GROUP: number of parity groups where the relevant LDEV is belongs to.
- RAID_GROUPS: parity groups where the relevant LDEVs are belong to.
- DRIVE_TYPE: type of HDD drive where the relevant LDEV is configured.
- DRIVE_Capa: capacity of relevant HDD in the number of block (512 byte) (decimal number).
- LDEV_NAMING: nickname of the LDEV.
- STS: status of the LDEV:
 - NML: Normal
 - BLK: Blocked
 - BSY: Status is changing
 - NONE: unknown state (not supported)

- OPE_TYPE: current operation.
 - FMT: Formatting
 - QFMT: Quick formatting
 - CCOPY: Copying the collections
 - CACCS: Accessing to collections
 - NONE: Not in operation
 - SHRD: Shredding
 - ZPD: Page Discarding
 - SHRPL: Deleting from the pool
 - RLC: Pool relocating
 - RBL: Pool rebalancing
- OPE_RATE: progress of the format or shred operation. When the status is other than formatting or shredding, 100 is displayed. If the process ended abnormally, "BSY" is displayed on the "STS".
- MP#: MP blade ID.
- SSID: storage subsystem ID number (hexadecimal). The HUS VM does not support SSID but displays the specified value.

Example (front-end information of LDEV number 577)

Displaying front-end information of the LDEV number 577.

```
# raidcom get ldev -ldev_id 577 -key front_end
Serial# LDEV# SL CL VOL_TYPE VOL_Cap(BLK) PID ATTRIBUTE Ports
PORT_No:LU#:GRPNAME ...
63502 577 0 0 OPEN-V-CVS 2181120 - CVS 2
CL2-E-0:1:Linux_X86 CL2-E-1:1:Solaris
```

Displaying back-end (parity group) information of the LDEV number 577.

```
# raidcom get ldev -ldev_id 577 -key parity_grp
Serial# LDEV# SL CL PID ATTRIBUTE R_LVL RAID_TYPE DRV_TYPE
DRV_Cap
GRPs RAID GRP ...
63502 577 0 0 - CVS RAID1 2D+2D DKS2C-K072FC 141822798 1 02-01
```

Check if LDEV number 577 is in normal status.

```
# raidcom get ldev -ldev_id 577 -check_status NML
```

Check if LDEV number 577 is in blocked status.

```
# raidcom get ldev -ldev_id 577 -check_status BLK
```

Set in wait status for 30 seconds until the formatting process of LDEV number 577 is complete.

```
# raidcom get ldev -ldev_id 577 -check_status not FMT -time
30raidcom:[EX_EWSTOT]Timeout waiting for specified statusRefer to
the command log(/HORCM/log0/horcc_rmhost.log) for details.
```

(The command fails if the FMT does not change (is not complete) in 30 seconds.)

Description of each column in output example

PID: pool ID for a virtual volume. If the volume is not a virtual volume, hyphen (-) is displayed.

ATTRIBUTE: LDEV attribute. Same as VOL_ATTR.

Displaying the information of the LDEV number 160 (external VOL).

```
# raidcom get ldev -ldev_id 160
Serial#   : 63502
LDEV     : 160
SL       : 0
CL       : 0
VOL_TYPE : OPEN-V
VOL_Capacity(BLK) : 4385280
VOL_Capacity(cyl) : 22720
NUM_PORT : 0
PORTs    :
F_POOLID : NONE
VOL_ATTR : ELUN
E_VendorID : HITACHI
E_ProductID : OPEN-V
E_VOLID   :
4849544143484920523530304638304530303641000000000000000000000000
000000
E_VOLID_C : HITACHI R500F80E006A.....
NUM_E_PORT : 1
E_PORTS   : CL2-G-0 0 50060e8004f80e34
LDEV_NAMING : Oracle_data_1
STS       : NML
OPE_TYPE  : QFMT
OPE_RATE  : 70
MP#       : 2
SSID:001F
```

Description of columns in output example

E_VendorID: VENDOR information in the SCSI information of the external volume.

E_ProductID: PRODUCT information in the SCSI information of the external volume.

E_VOLID: Device identification information in the SCSI information of the external volume (hexadecimal).

E_VOLID_C: PRODUCT information in the SCSI information of the external volume (ASCII display).

NUM_E_PROTs: Number of alternate paths.

E_PORTS: List of defined alternate paths.

Example (LDEV number 160 is an external volume)

If the LDEV number 160 is an external volume, its back-end (RAID Group) information is displayed.

```
# raidcom get ldev -ldev_id 160 -key external
Serial# LDEV# SL CL PID ATTRIBUTE E_VendorID E_ProductID E_VOLID E_VOLID_C E_PORTS PORT NO:LUH:WWN ...
63502 160 0 0 - ELUN HITACHI OPEN-V 48495441(48)000 HITACHI R500374C0100... 1 CL2-G-0:40:50060e8004374c71
```

Displaying the information of the LDEV number 640 (V-VOL of Dynamic Tiering).

```
# raidcom get ldev -ldev_id 640
Serial#   : 63502
LDEV      : 640
SL        : 0
CL        : 0
VOL_TYPE  : OPEN-V-CVS
VOL_Capacity(BLK) : 2181120
NUM_LDEV  : 1
LDEVs     : 640
NUM_PORT  : 1
PORTs     : CL2-E-0 14 Linux_X86
F_POOLID  : NONE
VOL_ATTR  : CVS : HDP : HDT
B_POOLID  : 5
LDEV_NAMING : Oracle_data_1
STS       : NML
OPE_TYPE  : NONE
OPE_RATE  : 100
MP#       : 2
SSID:001F
Used_Block(BLK) : 218112
TIER_Relocation : Enable
TIER_LEVEL : all
TIER#1(MB) : 1120
TIER#2(MB) : 3000
TIER_Alloc_level : H
TIER#1_Alloc_rate : MAX : 50 : MIN : 30
TIER#3_Alloc_rate : MAX : 50 : MIN : 30
```

Description of columns in output example:

B_POOL ID: Pool ID to which the LDEV is associated.

Used_Block(BLK): Number of blocks used in the pool.

TIER_Relocation: Status of the relocation setting:

- Enable: The status where the relocation is enabled
- Disable: The status where the relocation is disabled

TIER_LEVEL: Shows the level of tiering policy that is used for reallocation.

- all: Shows that all tiers of the pool to which the relevant LDEV is allocated are being used.
- 1-5: Shows the Tiering Policy level that is configured to the relevant LDEV.
- 6-31: Shows the Tiering Policy (customized policy (1-26)) that is configured to the relevant LDEV. For details, see the Provisioning Guide for Open Systems or the Hitachi Unified Storage Block Module Provisioning Guide.

TIER#n(MB): Capacity (in MB) assigned to each tier.

TIER_Alloc_level: Shows the new page assignment tier level:

- H: High
- M: Middle
- L: Low

TIER#1_Alloc_rate: Shows the Tier1 Max or Min value that is set in the Tiering Policy.

TIER#3_Alloc_rate: Shows the Tier3 Max or Min value that is set in the Tiering Policy.

Examples (Tier information of LDEV 640 (V-VOL of Dynamic Tiering V-VOL))

Displays the tier information for LDEV number 640 (V-VOL of Dynamic Tiering).

```
# raidcom get ldev -ldev_id 640 -key tier
Serial# LDEV# SL CL VOL_TYPE VOL_Cap(BLK) PID ATTRIBUTE
VOL_Used(BLK) TR TL T#1(MB) T#2(MB) T#3(MB) T#4(MB) T#5(MB)
63502 640 0 0 OPEN-V-CVS 204800 13 CVS|HDP|HDT 4720 E 0 3000 1120
600 0 0
```

Description of each column in output example:

TR: Displays the operational status of tier relocation:

- E: Enabled
- D: Disabled

TL: Displays the tier level:

- 0: ALL
- 1-5: Level (1-5)
- 6-31: Customized policy (1-26)

T#x(MB): Displays the allocated volume of the relevant LDEV for Tier x. Displays up to 5 tiers. If there is no tier, "0" is displayed.

raidcom initialize ldev

Formats LDEVs. You can specify Quick Format, Normal Format, or Shredding.

A device group can also be specified instead of an LDEV.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom initialize ldev {-ldev_id <ldev#>
| -grp_opt <group option>-device_grp_name <device group
name> [<device name>]} -operation <type>
```

Options and parameters

Option	Description
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: • -ldev_id 200

Option	Description
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.
-operation <type>	Instructs the operation. The following operations can be specified. fmt: Normal Format qfmt: Quick Format shrd: Shredding stop: Stops shredding. However, cannot stop the format processing.

Examples

Performing Quick Format for an LDEV: 200.

```
# raidcom initialize ldev -operation qfmt -ldev_id 200
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Performing Quick Format for an LDEV belonging to the device group: grp1.

```
# raidcom initialize ldev -operation qfmt -grp_opt ldev  
-device_grp_name grp1
```

Performing Normal Format for an LDEV: 200.

```
# raidcom initialize ldev -operation fmt -ldev_id 200
```

Performing Shredding (Pattern: 0x55aa55aa) for an LDEV: 200.

```
# raidcom initialize ldev -operation shrd 0x55aa55aa -ldev_id 200
```

Stopping Shredding for an LDEV: 200.

```
# raidcom initialize ldev -operation stop -ldev_id 200
```

raidcom modify ldev

Changes the following LDEV attributes:

- Switching LDEV normal and LDEV blockade
- Setting LDEV nickname
- Setting MP blade ID of LDEV
- Setting the Tiering policy, the new page assignment tier, or enabling or disabling of the tier relocation for the Dynamic Tiering or Dynamic Tiering for Mainframe V-VOL.

- Setting the start/stop of relocation of V-VOL for Dynamic Tiering, or / Dynamic Tiering for Mainframe
- Instructing the page discarding of V-VOL for Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, or /Dynamic Tiering for Mainframe
- Setting the command device attribute

When executing LDEV blocking or recovery operation, this command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom modify ldev -ldev_id <ldev#> {-status <status>
    [<level>] | -ldev_name <ldev naming> | -mp_blade_id <mp#>
    | -ssid <value> | -command_device {y | n} [Security value]}
```

Options and parameters

Option	Description
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: • -ldev_id 200

Option	Description
-status <status> [<level>]	Specifies the LDEV status. The following LDEV statuses can be specified. nml: Changes the LDEV status to Normal blk: Changes the LDEV status to Blockade enable_relocation [<level>]: Relocation of LDEV (V-VOL) enabled. Defines the tier that is used for reallocation depending on the value of the level. - all: Uses all tiers in the pool. 1-5: Specifies the level of the tier for use. For details, see <i>Provisioning Guide for Open Systems</i> or <i>Hitachi Unified Storage Block Module Provisioning Guide</i>. disable_reallocation disable_relocation : Relocation of LDEV (V-VOL) disabled discard_zero_page: Discarding 0 page of LDEV(V-VOL) for Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, and /Dynamic Tiering for Mainframe. enable_relocation_policy <policy_id>: Enables the LDEV relocation for Dynamic Tiering and sets the level or customized policy of the Tier to be used for the relocation by Policy ID. <policy_id>: - all: Uses all tiers in the pool. 1-5: Specifies the level of the tier for use. 6-31: Specifies the customized policy of the tier for use. new_page_allocation: Sets the Tier when new page is allocated to the LDEV for Dynamic Tiering (V-VOL). The value is one of high/middle/low. For example: -status nml
-ldev_name <ldev naming>	Specifies the LDEV nickname (maximum 32 characters).
-mp_blade_id <mp#>	Specifies the MP blade ID (0-7). Changing MP blade ID should be executed during off-peak hours of I/O loading. Do not change the MP blade ID during initial copying of TrueCopy, ShadowImage, or Universal Replicator (on-peak hours of I/O loading). To change the MP blade ID again for the same LDEV, wait for more than 30 minutes after changing the MP blade ID. For example: -mp_blade_id 2
-ssid <value>	Specifies SSID (hexadecimal number). When specifying SSID, specify not only unallocated SSID but also LDEV ID. In this case, LDEV ID must be ID for the undefined LDEV in the area where SSID is not allocated. For example: To change the MP blade ID again for the same LDEV, wait for more than 30 minutes after changing the MP blade ID. For example: -ssid 0x1234 -ldev_id 200 Note: This option is for enterprise storage systems. You need not specify the -ssid option when you use Unified Storage VM, but this option is enabled.

Option	Description
-command_device {y n} [Security value]	Configures command device attribute. y: Command device attribute enabled. n: Command device attribute disabled. Specifies the value of command device security (0-7). You can specify 0-7 to Security value as the command device security setting: • 0: Security: OFF, User authentication: OFF, Group information acquisition: OFF • 1: Security: OFF, User authentication: OFF, Group information acquisition: ON • 2: Security: OFF, User authentication: ON, Group information acquisition: OFF • 3: Security: OFF, User authentication: ON, Group information acquisition: ON • 4: Security: ON, User authentication: OFF, Group information acquisition: OFF • 5: Security: ON, User authentication: OFF, Group information acquisition: ON • 6: Security: ON, User authentication: ON, Group information acquisition: OFF • 7: Security: ON, User authentication: ON, Group information acquisition: ON

Examples

Restoring the LDEV: 200.

```
# raidcom modify ldev -status nml -ldev_id 200
```

Blocking the LDEV: 200.

```
# raidcom modify ldev -status blk -ldev_id 200
```

Assigning an LDEV nickname: my_volume to LDEV:200

```
# raidcom modify ldev -ldev_id 200 -ldev_name my_volume
```

Setting the LDEV owner MP blade ID of LDEV: 200 to 2

```
# raidcom modify ldev -ldev_id 200 -mp_blade_id 2
```

Enabling relocation of LDEV (Dynamic Tiering/Dynamic Tiering for Mainframe V-VOL) :200

```
# raidcom modify ldev -ldev_id 200 -status enable_reallocation
```

Disabling relocation of LDEV (Dynamic Tiering/Dynamic Tiering for Mainframe V-VOL) :200

```
# raidcom modify ldev -ldev_id 200 -status disable_reallocation
```

Discarding of the 0 page of LDEV (Dynamic Provisioning, Dynamic Provisioning for Mainframe, Dynamic Tiering, /Dynamic Tiering for Mainframe V-VOL):200

```
# raidcom modify ldev -ldev_id 200 -status discard_zero_page
```

Specifies 0x1234 to LDEV SSID of LDEV: 200.

Note: Specify undefined LDEV number: 200 in the area that is not allocated SSID, and assign new SSID: 0x1234. If you specify LDEV number that is already defined or SSID that is already registered, an error occurs.

```
# raidcom modify ldev -ssid 0x1234 -ldev_id 200
```

Enables LDEV command device attribute of LDEV: 200. Specifies 2 to the value of command device security.

```
# raidcom modify ldev -command_device y 2 -ldev_id 200
```

Disables LDEV command device attribute of LDEV: 200.

```
# raidcom modify ldev -command_device n -ldev_id 200
```

Set the relocation of LDEV for LDEV:200 by the customized policy 6.

```
# raidcom modify ldev -ldev_id 200 -status  
enable_relocation_policy 6
```

Set the new page assignment tier of LDEV: 200 to High.

```
# raidcom modify ldev -ldev_id 200 -status new_page_allocation  
high
```

raidcom add lun

To set the LU path, this maps the specified LDEV to a LUN on a host group on the specified port and creates a LUN path or alternate path. A device group can also be specified instead of an LDEV.

If the specified port or host group does not exist, this command is rejected with EX_ENOOBJ(EX_CMDRJE).

If the specified LUN or LDEV already exists, this command is ignored.

If a LUN is not specified, an empty LUN is assigned automatically.

Not allowed:

- Mapping the same LDEV to another LUN in the same host group.
- Overwriting the same LUN to another LDEV.
- Executing this command on an LDEV in a LUSE volume



WARNING: Do not execute this command on an LDEV whose command device attribute is set. If this command is executed on a command device, the command device attribute is released.

Syntax

```
raidcom add lun -port <port#> [<host group name>]  
{-ldev_id <ldev#> [-lun_id<lun#>] | -grp_opt <group option>  
-device_grp_name <device group name> [<device name>]}
```

Options and parameters

Option	Description
-port <port#>[<host group name>]	Specifies the Port number. For example: - CL1-A-g (g: 0-254) - CL1-A Linux_X86
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.
[-lun_id <lun#>]	Specifies the LU number (0-2047). This is unavailable to specify when the device group is specified to operate. If this option is omitted, a free LU number is assigned automatically.

Examples

Map the LDEV: 200 to the LU numbers: 1 for the port: CL1-A, the host group #0.

```
# raidcom add lun -port CL1-A-0 -lun_id 1 -ldev_id 200
```

Map the LDEV: 200 for the port: CL1-A, the host group #0. The LU numbers are automatically assigned.

```
# raidcom add lun -port CL1-A-0 -ldev_id 200
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Map the LDEV for the port: CL1-A, the host group #0, and the one belonging to the device group: grp1. The LU numbers are automatically assigned.

```
# raidcom add lun -port CL1-A-0 -grp_opt ldev -device_grp_name  
grp1
```

raidcom delete lun

Deletes the LU path on the host group on the specified port.

An LDEV or a device group can also be specified instead of a LUN.

If an LDEV does not exist on the specified port /host group/LUN, this command is rejected with EX_ENLDEV or EX_ENOOBJ.

When deleting the LU path, stop the I/O for the LU path to be deleted.

In the last one path, LDEV must be specified as SMPL volume.

Note: LDEVs in LUSE volumes cannot be configured with this command.



WARNING: Do not execute this command on an LDEV whose command device attribute is set. If this command is executed on a command device, the command device attribute is released.

Syntax

```
raidcom delete lun -port <port#> [<host group name>]
                        {-lun_id <lun#> | -ldev_id <ldev#> | -grp_opt <group option>
                        -device_grp_name <device group name> [<device name>]}
```

Options and parameters

Option	Description
-port <port#> [<host group name>]	Specifies the Port number. For example: - CL1-A-g (g: 0-254) - CL1-A Linux_X86
-lun_id <lun#>	Specifies the LUN number (0-2047).
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: -ldev_id 200
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated.

Examples

Deleting LUN: 1(LDEV number 200) on the port: CL1-A-0

```
# raidcom delete lun -port CL1-A-0 -lun 1
# raidcom delete lun -port CL1-A-0 -ldev_id 200
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Deleting LDEV belonging to the device group: grp1 on the port: CL1-A-0

```
# raidcom delete lun -port CL1-A-0 -grp_opt ldev -device_grp_name
grp1
```

raidcom discover lun

Searches external volumes. Displays a list of LUs which can be referred to from the External port of a specific external storage system.

Syntax

```
raidcom discover lun -port <port#> -external_wnn <wnn strings>
```

Options and parameters

Option	Description
-port <port#>	Specifies the Port number. It specifies a port of whose attribute is External. For example: CL1-A
-external_wnn <wnn strings>	Specifies the WWN (hexadecimal value) of the external storage system in 8 bytes. The value can be split in units of 4 bytes by "," (commas). For example: 21000e08b0256f8 21000e0,8b0256f8

Examples

Displaying LUs defined to the external storage system port: 50060e80, 06fc3850 connected to the port: CL5-A (External port).

```
# raidcom discover lun -port CL5-A -external_wnn 50060e8006fc3850
PORT  WWN                LUN VOL_Cap(BLK) PRODUCT_ID E_VOL_ID_C
CL5-A 50060e8006fc3850  0 102400 OPEN-V HITACHI R500FC381000
CL5-A 50060e8006fc3850  1 102400 OPEN-V HITACHI R500FC381001
CL5-A 50060e8006fc3850  2 102400 OPEN-V HITACHI R500FC381002
CL5-A 50060e8006fc3850  3 102400 OPEN-V HITACHI R500FC381003
CL5-A 50060e8006fc3850  4 102400 OPEN-V HITACHI R500FC381004
CL5-A 50060e8006fc3850  5 102400 OPEN-V HITACHI R500FC381005
CL5-A 50060e8006fc3850  6 102400 OPEN-V HITACHI R500FC381006
CL5-A 50060e8006fc3850  7 102400 OPEN-V HITACHI R500FC381007
CL5-A 50060e8006fc3850  8 102400 OPEN-V HITACHI R500FC381008
CL5-A 50060e8006fc3850  9 102400 OPEN-V HITACHI R500FC381009
CL5-A 50060e8006fc3850 10 102400 OPEN-V HITACHI R500FC38100A
```

PORT: External initiator port number.

WWN: WWN on the external storage system.

LUN: LUN of the port on external storage system.

VOL_Cap (BLK): Capacity of the external volume in units of block (1 block = 512 bytes).

PRODUCT_ID: Product_ID included in the SCSI Inquiry command respond of the external volume.

E_VOL_ID_C: Volume identifier including in the SCSI inquiry command of the external volume.

raidcom get lun

Displays the LU path information defined in the specified port and host group.

If the specified port does not exist, this command is rejected with EX_ENOOBJ. If an external port is specified, the command is rejected with EX_INVARG.

Syntax

```
raidcom get lun -port <port#> <host group name> [-key <keyword>]
```

Options and parameters

Option	Description
-port <port#>[<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID. If the host group ID and host group name are omitted, the LU path information for host group ID 0 is displayed. For example, • CLI-A • CL1-A-g (g: 0-254) • CL1-A Linux_X86
-key <keyword>]	Specifies <i>opt</i> as <keyword> to display the status of the host-reserved LUN.

Examples

Displaying the LU information defined to the port CL4-E, the host group #0.

```
# raidcom get lun -port CL4-E-0
PORT GID      HMD LUN  NUM  LDEV CM  Serial#  HMO_BITS
CL4-E 0 LINUX/IRIX 0    1    0 CM   63528    2 13
CL4-E 0 LINUX/IRIX 2    1    2  -   63528    2 13
CL4-E 0 LINUX/IRIX 3    1    3  -   63528    2 13
CL4-E 0 LINUX/IRIX 4    1    4  -   63528    2 13
CL4-E 0 LINUX/IRIX 5    1  992  -   63528    2 13
CL4-E 0 LINUX/IRIX 6    1  993  -   63528    2 13

#raidcom get lun -port CL4-E-0 -key opt
PORT GID HMD      LUN  NUM  LDEV CM  Serial#  OPKMA  HMO_BITS
CL4-E 0 LINUX/IRIX 0    1    0 CM   63528  -Y---    2 13
CL4-E 0 LINUX/IRIX 2    1    2  -   63528  -Y---    2 13
CL4-E 0 LINUX/IRIX 3    1    3  -   63528  -Y---    2 13
CL4-E 0 LINUX/IRIX 6    1  993  -   63528  -Y---    2 13
```

Description of each column in output example

PORT: Displays the port number.

GID: Displays the host group ID on the port.

HMD: Displays the following HOST MODE for the host adapter setting on host group.

- HP-UX, SOLARIS, AIX®, WIN, LINUX/IRIX, TRU64, DYNIX, OVMS, NETWARE, HI-UX
- VMWARE, HP-UX, VMWARE_EX, WIN_EX, UVM

LUN: Displays LUN number on host group mapping LDEV.

NUM: Displays the number of LDEV configured an LUSE.

LDEV: Displays the LDEV number.

CM: Displays the command device.

Serial#: Product serial number.

OPKMA: Displays the host-reserved LU.

- O: The LU is reserved by an open system.
- P: The LU is reserved by a persistent group.
- K: The LU is reserved by an RGR key.
- M: The LU is reserved by a mainframe.
- A: The LU is reserved by ACA.

If Y is displayed under each character, the LU is reserved. If a hyphen (-) is displayed, the LU is not reserved.

HMO_BITS: Displays the host mode options of the host groups.

For details, see the section describing *Creating host groups and registering hosts in host groups (in a Fibre Channel environment)* in *Provisioning Guide for Open Systems*.

raidcom add path

Adds and changes an external path to an external volume. Only one path is operated in one operation.

The order of priority for the oath is allocated in accordance with the order of adding paths.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom add path -path_grp <path group#> -port <port#>  
                -external_wnn <wnn strings>
```

Options and parameters

Option	Description
-path_grp <path group#>	Specifies the external VOL path group number (0-63231).
-port <port#>	Specifies the Port number. Specifies the number of the port whose attribute is External. For example: • CL1-A

Option	Description
-external_wnn <wnn strings>	Specifies the WWN (hexadecimal value) of the external storage system in 8 bytes. The value can be split in units of 4 bytes by "," (commas). For example: 21000e08b0256f8 21000e0,8b0256f8

Examples

Adding a path of External port CL1-A, external storage system port 50060e80,05fa0f36 to an external volume path group number: 1.

```
# raidcom add path -path_grp 1 -port CL1-A -external_wnn
50060e80,05fa0f36
```

raidcom check_ext_storage path

Restores an external path to external VOLs. Only one path is operated in one operation.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom check_ext_storage path -path_grp <path group#>
      -port <port#> -external_wnn <wnn strings>
```

Options and parameters

Option	Description
-path_grp <path group#>	Specifies the external VOL (0-63231) path group number.
-port <port#>	Specifies the port number. Specifies the number of the port whose attribute is ELUN (External). For example: CL1-A
-external_wnn <wnn strings>	Specifies the WWN (hexadecimal value) of the external storage system in 8 bytes. The value can be split in units of 4 bytes by "," (commas). For example: 21000e08b0256f8 21000e0,8b0256f8

Examples

Restoring a path of external volume path group number: 1, External port CL1-A, and external storage system port 50060e80,05fa0f36.

```
# raidcom check_ext_storage path -path_grp 1 -port CL1-A
      -external_wnn 50060e80,05fa0f36
```

raidcom delete path

Deletes the external path or alternative path to an external volume. Only one path is operated in one operation.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom delete path -path_grp <path group#> -port <port#>  
-external_wnn <wnn strings>
```

Options and parameters

Option	Description
-path_grp <path group#>	Specifies the external VOL path group number (0-63231).
-port <port#>	Specifies the Port number. Specifies the number of the port whose attribute is ELUN (External). For example: CL1-A
-external_wnn <wnn strings>	Specifies the WWN (hexadecimal value) of the external storage system in 8 bytes. The value can be split in units of 4 bytes by "," (commas). For example: 21000e08b0256f8 21000e0,8b0256f8

Examples

Deleting a path of External port CL1-A, and external storage system port 50060e80,05fa0f36 from the external volume path group number: 1.

```
# raidcom delete path -path_grp 1 -port CL1-A -external_wnn  
50060e80,05fa0f36
```

raidcom disconnect path

Blocks the usage of external paths to external VOLs. Only one path is operated in one operation.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom disconnect path -path_grp <path group#> -port <port#>  
-external_wnn <wnn strings>
```

Options and parameters

Option	Description
-path_grp <path group#>	Specifies the external VOL path group number (0-63231).
-port <port#>	Specifies the port number. Specifies the number of the port whose attribute is ELUN (External). For example: CL1-A
-external_wwn <wwn strings>	Specifies the WWN (hexadecimal value) of the external storage system in 8 bytes. The value can be split in units of 4 bytes by "," (commas). For example: 21000e08b0256f8 21000e0,8b0256f8

Examples

Blocks the usage of a path of the external volume path group number: 1, the External port CL1-A, and the external storage port 50060e80,05fa0f36.

```
# raidcom disconnect path -path_grp 1 -port CL1-A -external_wwn
50060e80,05fa0f36
```

raidcom get path

Displays the external path information to an external volume.

Syntax

```
raidcom get path [-path_grp <path group#>]
```

Options and parameters

Option	Description
[-path_grp <path group#>]	Specifies the external VOL path group number (0-63231). If it is omitted, all groups are displayed.

Examples

Displaying the external path (group) information to the external volume.

```
# raidcom get path
PHG GROUP STS CM IF MP# PORT WWN PR LUN PHS Serial# PRODUCT_ID
1 1-1 NML E D 2 CL1-A 50060e8005fa0f36 1 3 NML 60010 VSP
1 1-1 NML E D 2 CL2-A 50060e8005fa0f38 2 3 NML 60010 VSP
```

Displaying the information of the external volume path group number: 1.

```
# raidcom get path -path_grp 1
PHG GROUP STS CM IF MP# PORT WWN PR LUN PHS Serial# PRODUCT_ID
1 1-1 NML E D 2 CL1-A 50060e8005fa0f36 1 3 NML 60010 VSP
1 1-1 NML E D 2 CL2-A 50060e8005fa0f38 2 3 NML 60010 VSP
```

Description of each column in output example:

PHG: Displays the path group number for the external volume.

GROUP: Displays the external volume group number.

STS: Displays the following status of the external volume.

- NML: "Normal"
- CHK: "Checking"
- SYN: "Cache Destage"
- DSC: "Disconnect" in the external path for the external volume.
- BLK: "Blockading" in the external path for the external volume.
- UNK: "Unknown"
- WAR: "Warning"

CM: Displays the cache mode for external volume.

- E: Enable
- D: Disable

IF: Displays the cache inflow control for external volume.

- E: Enable
- D: Disable

MP#: Displays the MP blade ID for the external volume owner.

PORT: Displays the port number.

WWN: Displays the target wwn on the external storage system.

PR: Displays the priority number in the external volume path group.

LUN: Displays the LUN in the port on the external storage system side.

PHS: Displays the following status of the external path.

- - NML: "Normal" status in external path.
- - CHK: "temporary blockading " status in external path.
- - BLK: "blockading" status in external path.
- - DSC: "disconnected" status in external path.
- - UNK: "Unknown" status in external path.

Serial#: Displays the serial number of external storage system.

PRODUCT_ID: Displays the PRODUCT_ID of the external storage system.

raidcom delete pool

Deletes the specified Pool for Thin Image, Copy-on-Write Snapshot, Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe.

When LDEVs are specified, only the relevant LDEVs are deleted.

This command is executed asynchronously with the command input. Check the completion of this process on the `raidcom get command_status` command.

Syntax

```
raidcom delete pool -pool {<pool ID#> | <pool naming>}  
[-ldev_id <ldev#>]
```

Options and parameters

Option	Description
-pool {<pool ID#> <pool naming>}	Specifies the Pool ID (0-127) or pool name. When you specify only a number, it is recognized as a pool ID. Therefore, to specify a pool whose name is a number, use the pool ID instead of the pool name.
-ldev_id <ldev#>	Specifies the LDEV number (0-65279), for example: -ldev_id 200

Examples

Deleting a pool of pool ID 5:

```
# raidcom delete pool -pool_id 5
```

Deleting a pool of pool name "my_aou_pool":

```
# raidcom delete pool -pool my_aou_pool
```

Note: "Aou" (allocation on use) refers to dynamic provisioning.

raidcom get pool

Displays pool information for Thin Image, Copy-on-Write Snapshot, Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe.

Syntax

```
raidcom get pool [-key <keyword>]
```

Options and parameters

Option	Description
[-key <keyword>]	Specifies when displaying a pool name. Specify "opt" as the <keyword>.

Examples

Displaying pool information.

```
# raidcom get pool  
PID POLS U(%) SSCNT Available(MB) Capacity(MB) Seq# Num LDEV# H(%)  
001 POLN 10 330 10000000 1000000000 62500 2 365 80  
002 POLF 95 9900 100000 1000000000 62500 3 370 70
```

```
003 POLS 100 10000 100 10000000000 62500 1 375 70
004 POLE 0 0 0 0 62500 0 0 80
```

Displaying pool name.

```
# raidcom get pool -key opt
PID  POLS  U(%)  POOL_NAME  Seq#  Num  LDEV#  H(%)  VCAP(%)  TYPE  PM
001  POLN   10   my_aou_pool 62500   2    265   80   65500   OPEN  S
002  POLF   95   New_Pool_2  62500   3    270   70   65534   OPEN  S
003  POLS  100   my_ss_pool  62500   1    275   70    -      OPEN  N
004  POLN    0   New_Pool_4  62500   2    280   80    - 0     M/F   N
005  POLE    0   New_Pool_5  62500   4     0    80   100     M/F   S
```

Description of each column in output example:

PID: Displays the Thin Image or Copy-on-Write Snapshot pool ID.

POLS: Displays the following status in the Thin Image or Copy-on-Write Snapshot pool:

- POLN: "Pool Normal" (The pool is in the normal status.)
- POLF: "Pool Full" (Pool utilization exceeds the depletion threshold.)
- POLS: "Pool Suspend" (The pool is in the overflow status exceeding the threshold and is suspended.)
- POLE: "Pool failure" (The pool is suspended in the failure status.) In this status, the pool information cannot be displayed.

U(%): Displays the usage rate of the pool.

SSCNT: Displays the number of volumes in the pool.

POOL_NAME: Displays the pool name.

Available (MB): Displays the capacity available to the volume data in the pool.

Capacity (MB): Displays the total capacity of the pool.

Seq#: Displays the product serial number.

Num: Displays the number of LDEV configured the pool.

LDEV#: displays the first number of LDEV configured the pool.

H(%): Displays threshold for the pool.

VCAP (%): Displays the subscription threshold %. "-" indicates unlimited.

TYPE: Displays the types of pools.

- Open: Shows that it is a Dynamic Provisioning pool.
- M/F: Shows that it is a Dynamic Provisioning for Mainframe pool.

PM: Displays the pool status.

- N: Normal status.
- S: Shrinking.
- NT: The pool for Thin Image is in the normal status.

raidcom modify pool

Sets the options of a pool for Thin Image, Copy-on-Write Snapshot, Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe.

When the **-status** option is specified, the operation is executed asynchronously with the command input. Check the completion of this process on the **raidcom get command_status** command.

Syntax

```
raidcom modify pool -pool {<pool ID#> | <pool naming>} { -status  
    <status> | -user_threshold <threshold_1> [<threshold_2>]  
    | -tier <Tier number> [<ratio>] [-tier_buffer_rate <%>]  
    | -subscription <%> | -pool_attribute <pool_attribute>  
    | -monitor_mode <Monitor mode>}
```

Options and parameters

Option	Description
-pool {<pool ID#> <pool naming>}	Specifies the Pool ID (0-127) or pool name. When only a number is specified, it is recognized as a pool ID. Therefore, to specify a pool whose name is a number, use the pool ID instead of the pool name.
-status <status>	Specifies the status of the pool. "nml" must be specified as the status.
-user_threshold <threshold_1> [<threshold_2>]	Sets a user-defined threshold. - For Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe, you may specify two user-defined thresholds, and their valid ranges are 1-100%, respectively. If you specify <threshold_1> and <threshold_2>: the value of <threshold_1> is set as the threshold for <i>WARNING</i> specified to a pool. the value of <threshold_2> is set as the threshold for <i>High water mark</i> specified to a pool. If you specify only <threshold_1>, your specified value and the system default value (80%) are applied. The setting in which you specify only <threshold_1> is supported to maintain backward compatibility with microcode 70-02-0x-xx/xx. Once you specify two user-defined thresholds, you must continue to specify two user-defined thresholds thereafter. - The valid range for Thin Image or Copy-on-Write Snapshot is 20-95%. You may specify only <threshold_1>. Even if you specify the value for <threshold_2>, the value is ignored.
-tier <Tier number> <ratio>	Specifies the pool information for Dynamic Tiering/Dynamic Tiering for Mainframe. This is specified when changing the free space percentage for a new allocation by each tier. When this option is specified, pool attribute changes into manual relocation. <Tier number>: Tier number (1-3) <ratio>: Free space percentage for new allocation(0-50) [%]

Option	Description
-tier_buffer_rate <%>	Specifies the pool information for Dynamic Tiering and Dynamic Tiering for Mainframe. Specifies the amount of reallocation buffer (2-40) for each tier in percent (%).
-subscription <%>	Sets the maximum reserved V-VOL capacity rate (0-65535%) to the pool capacity. 0-65534: Specified percentage 65535: Unlimited
-pool_attribute <pool_attribute>	Specifies when changing the pool from Dynamic Provisioning/Dynamic Provisioning for Mainframe to Dynamic Tiering/Dynamic Tiering for Mainframe, or from Dynamic Tiering/Dynamic Tiering for Mainframe to Dynamic Provisioning/Dynamic Provisioning for Mainframe. Specifies the following value depend on the type of pool desired to be changed. - dt_manual: Changes the pool from Dynamic Provisioning/Dynamic Provisioning for Mainframe to Dynamic Tiering/Dynamic Tiering for Mainframe. It is changed to manual relocation. - dp: Changes the pool from Dynamic Tiering/Dynamic Tiering for Mainframe to Dynamic Provisioning/Dynamic Provisioning for Mainframe.
-monitor_mode <monitor mode>	Specifies the monitoring mode for a Dynamic Tiering/Dynamic Tiering for Mainframe pool. - period: Performs monitoring periodically. - continuous: Performs monitoring continuously.

Examples

Restoring the status of a pool ID: 6.

```
# raidcom modify pool -pool 6 -status nml
```

Restoring the status of a pool name: my_ss_pool.

```
# raidcom modify pool -pool my_ss_pool -status nml
```

Changing the user-defined thresholds of the pool ID:6 of the pool for Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe, *WARNING* to 70% and *High water mark* to 80%.

```
# raidcom modify pool -pool 6 -user_threshold 70 80
```

Changing the user-defined threshold of the pool ID: 6 of the pool for Thin Image or Copy-on-Write Snapshot to 80%.

```
# raidcom modify pool -pool 6 -user_threshold 80
```

Changing the free space percentage for a new allocation to the tier number 1 of the pool ID:6 for Dynamic Tiering/Dynamic Tiering for Mainframe to 30%.

```
# raidcom modify pool -pool 6 -tier 1 30
```

Changing the amount of reallocation buffer to the tier number 1 of the pool ID:6 for Dynamic Tiering/Dynamic Tiering for Mainframe to 20%.

```
# raidcom modify pool -pool 6 -tier 1 -tier_buffer_rate 20
```

Changing a Dynamic Provisioning/Dynamic Provisioning for Mainframe pool to a Dynamic Tiering/Dynamic Tiering for Mainframe pool.

```
# raidcom modify pool -pool 6 -pool_attribute dt_manual
```

Changing a Dynamic Tiering/Dynamic Tiering for Mainframe pool to a Dynamic Provisioning/Dynamic Provisioning for Mainframe pool.

```
# raidcom modify pool -pool 6 -pool_attribute dp
```

Changing the automatic relocation of the pool (Pool name: my_pool) for Dynamic Provisioning to manual relocation.

```
# raidcom modify pool -pool my_pool -pool_attribute dt_manual
```

Changing the monitoring mode of Dynamic Tiering/Dynamic Tiering for Mainframe pool ID: 6 to continuous.

```
# raidcom modify pool -pool 6 -monitor_mode continuous
```

raidcom rename pool

Changes the pool name for a pool of Thin Image, Copy-on-Write Snapshot, Dynamic Provisioning, Dynamic Provisioning for Mainframe, Dynamic Tiering, or Dynamic Tiering for Mainframe.

Syntax

```
raidcom rename pool -pool_id <pool ID#> -pool_name <pool naming>
```

Options and parameters

Option	Description
-pool_id <pool ID#>	Specifies a pool ID (0-127). If a -pool_id option is non-numeric, the specified value is recognized as a pool name to identify the pool ID.
-pool_name <pool naming>	Specifies a new pool name. You can specify up to 32 characters. The -pool_name option cannot be specified by configuring only in numeric because numeric values are preferentially identified as a pool ID. Specifies a pool ID with the '-pool_id<pool ID#>' option.

Examples

Changing the pool name of the pool (ID: 1) to my_pool.

```
# raidcom rename pool -pool_id 1 -pool_name my_pool
```

raidcom get port

Displays Port information.

This queries the setting informations on all port.

Syntax

```
raidcom get port [-port <port#>]
```

Options and parameters

Option	Description
[-port <port#>]	Specifies the Port number. If the port number is specified for the port which is enabled LUN security, it displays LOGIN WWN. For example: CL1-A

Examples

Displaying port information.

In case of mainframe port (FICON®, ESCON®), "-" is displayed to the rows from SPD to SSW.

```
# raidcom get port
PORT  TYPE ATTR SPD  LPID FAB  CONN SSW SL Serial# WWN      PHY_PORT
CL1-A FIBRE TAR AUT   EF   N   FCAL  N   0 64568 50060e8006fc3800 -
CL1-B FIBRE TAR AUT   EF   N   FCAL  N   0 64568 50060e8006fc3801 -
CL1-C FIBRE TAR -     -     -     -     -   0 64568 50060e8006fc3802 -
CL1-D FICON TAR -     -     -     -     -   0 64568 50060e8006fc3803 -
CL2-A FIBRE TAR AUT   D9   N   FCAL  N   0 64568 50060e8006fc3810 -
CL2-B FIBRE TAR AUT   D3   N   FCAL  Y   0 64568 50060e8006fc3811 -
CL2-C FICON TAR -     -     -     -     -   0 64568 50060e8006fc3812 -
CL2-D FICON TAR -     -     -     -     -   0 64568 50060e8006fc3813 -
CL3-A FIBRE MCU AUT   E8   N   FCAL  N   0 64568 50060e8006fc3820 -
CL3-B FIBRE TAR AUT   E0   N   FCAL  Y   0 64568 50060e8006fc3821 -
```

Description of each column in output example

PORT: Displays the port numbers.

TYPE: Displays the following package type on a port: FIBRE, SCSI, ISCSI, ENAS, ESCON®, FICON®, FCoE

ATTR: Displays the following attribute setting on a port. One of the following items is displayed.

- TAR: Fibre target port (target port)
- MCU: MCU initiator port (initiator port)
- RCU: RCU target port (RCU target port)
- ELUN: External initiator port (External port)

SPD: Displays the transfer rate setting on a port. One of the following values is displayed: AUT(AUTO), 1G, 2G, 4G, 8G, 10G...

LPID: Displays the Loop ID(AL_PA) setting on a port.

FAB: Displays the fabric mode setting on a port as Y(YES) or N(NO).

CONN: Displays the following topology setting on a port: FCAL/PtoP

SSW: Displays the LUN security setting on a port as Y (enabled) or N (disabled).

SL: Displays the SLPR number to which the port belongs.

Serial#: Product serial number.

WWN: Displays the external WWN.

PHY_PORT: Displays the port number of the physical port in a resource ID takeover configuration. (For microcode is 70-02-0x, "-" is displayed.

Displaying the information of the port CL4-E.

```
# raidcom get port -port CL4-E
PORT LOGIN_WWN Serial# -
CL4-E 210000e08b0256f8 63528 OLA_NODE0_CTL_0
CL4-E 210000e08b039c15 63528 OLA_NODE1_CTL_0
```

Description of each column in output example

PORT: Displays the port numbers.

LOGIN_WWN: Displays WWN of the host adapter login to this port.

Note: Only the currently connected WWN is displayed unlike the display on Storage Navigator.

Serial#: Product serial number.

For example, for getting information on FCoE option:

```
# raidcom get port -port CL4-E -key opt
PORT ENMA VLAN_ID FPMA
VPS VP_I FCF_ICL4-E e3:00:00:e0:8b:02 0x03fe
e2:00:00:e0:8b:02 DWN 0x00 0x0000
```

Description of each column in output example.

PORT: Displays the port number.

ENMA: Displays Enode MAC address setting to this port.

VLAN_ID: Displays the VLAN identifier.

FPMA: Displays FP MAC address setting to this port.

VPS: Displays the virtual port status.

- DWN: the Link status is in Link Down.
- LOT: the Link status is in Link Up and Log-Out.
- LIN: the Link status is in Link Up and Log-In.

VP_I: Displays the virtual port index (zero is currently displayed).

FCF_I: Displays the FCoE index (zero is currently displayed).

raidcom modify port

This sets the attribute value of the specified port.

When the value other than the port attribute value is specified, the specified port must be "TYPE=FIBRE or FCoE package and ATTR=TAR". If not, this command is rejected with EX_ENOOBJ.

When using a package of Fiber Channel over Ethernet, specify Port speed: 10G, Port topology: f_port. In this case, port attribute cannot be changed.

Syntax

```
raidcom modify port -port <port#>{[-port_speed <value>]
[-loop_id <value>][-topology <topology>]
[-security_switch {y | n}]
| -port_attribute <port attribute>}
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number. For example: CL1-A
[-port_speed <value>]	Specifies the HOST speed (0, 1, 2, 4, 8) as follows. 0: AUTO 1: 1G 2: 2G 4: 4G 8: 8G 10: 10G If this specification is omitted, 0 is used.
[-loop_id <alpha value>]	Specifies the Loop ID (0x01-0xEF) of the Port. If this specification is omitted, 0xEF is used.
[-topology < topology>]	Specifies the topology of the Port as follows: fl-port : fabric on and fcsl f-port : fabric on and PtoP nl-port : fabric off and fcsl n-port : fabric off and PtoP If this specification is omitted, n-port is used.
[-security _switch {y n}]	Specifies whether to use the security switch or not. If this specification is omitted, n is used.
-port_attribute <port attribute>	Specifies the Port attribute as follows: TAR: Fiber target port (target port) MCU: MCU initiator port (initiator port) RCU: RCU target port (RCU target port) ELUN: External initiator port (External port)

Examples

Changing the port attributes (the Loop ID and the topology of the Port) of a port CL3-E.

```
# raidcom modify port -port CL3-E -loop_id 0xAB -topology fl_port
```

Changing the port attributes of the port CL3-E to the External initiator port (ELUN).

```
# raidcom modify port -port CL3-E -port_attribute ELUN
```

raidcom get parity_grp

Displays parity group information.

Syntax

```
raidcom get parity_grp [-parity_grp_id <gno-sgno>]
```

Options and parameters

Option	Description
<code>[-parity_grp_id <gno-sgno>]</code>	Specifies the parity group number (gno: 1-32, sgno: 1-16) or external volume number (gno:1-16384, sgno:1-4096). If this option is omitted, the list of parity groups defined in the storage system is displayed. If this option is specified, the LDEV information defined in the specified parity group is displayed. For example: 3-1

Examples

Displaying parity group information.

```
# raidcom get parity_grp
T GROUP  Num_LDEV  U(%)  AV_CAP(GB)  R_LVL  R_TYPE  SL  CL  DRIVE_TYPE
R 33-16      4    45    140000  RAID1  2D+2D  0  0  DKS2C-K072FC
R 33-17      4    45    140000  RAID1  2D+2D  0  0  DKS2C-K072FC
```

Description of each column in output example

T: Displays the type of the volume group.

- R: Parity
- GroupE: External volume group

GROUP: Displays the parity group number or the external volume group number.

Num_LDEV: Displays the number of LDEVs assigned to this Parity Group or to the external volume group.

U(%): Displays the usage rate of this Parity Group or of the external volume group.

AV_CAP(GB): Displays the available capacity (Free space) for this Parity Group or the external volume group. The value is displayed by rounding less than 1GB down.

R_LVL: Displays the RAID level of the parity group or of the external volume group.

R_TYPE: Displays the RAID type of the parity group or of the external volume group.

SL: Displays the SLPR number to which the parity group or external volume group belongs.

CL: Displays the CLPR number to which the parity group or external volume group belongs.

DRIVE_TYPE: Displays the PRODUCT_ID of the drives in the parity group.

```
# raidcom get parity_grp -parity_grp_id 33-16
T GROUP P_NO LDEV# STS LOC_LBA SIZE_LBA Serial#
R 33-16 0 - NML 0x000000000000 0x000000003f00 64034
R 33-16 1 100 NML 0x0000000003f00 0x000000010000 64034
R 33-16 2 101 REG 0x000000013f00 0x000000010000 64034
R 33-16 3 - DEL 0x000000023f00 0x0000f0000000 64034
```

Description of each column in output example

T: Displays the type of the volume group.

R: Parity Group, E: External volume group

GROUP: Displays the Parity Group number or the external volume group number.

P_NO: Displays the partition number partitioning this Parity Group.

LDEV#: Displays LDEV number.

STS: Displays the following status.

- NML: LDEV is installed.
- REG: LDEV is being created.
- DEL: LDEV is being deleted.

LOC_LBA: Displays the Start of LBA for this partition on this Parity Group or the external volume group, in units of 512 bytes.

SIZE_LBA: Displays the size for this partition on this Parity Group or the external volume group, in units of 512 bytes.

Serial#: Product serial number.

raidcom add rcu

Registers RCUs.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom add rcu {-rcu <serial#> <mcu#> <rcu#> <id> -ssid <ssid>
| -cu_free <serial#> <id> <pid> -mcu_port <port#>
-rcu_port <port#>}
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#> <id>	Specifies the CU by serial number, <mcu#>, <rcu#>, and <id>. You can use hexadecimal numbers (add "0x" prefix) or decimal numbers for <mcu#> and <rcu#>. < id > specifies the storage system type as follows: • For VSP use R700. • For HUS VM use M700. • For USP V/VM use R600. • For TagmaStore USP/TagmaStore NSC use R500.
-ssid <ssid>	Specifies storage subsystem IDs. Up to 4 SSIDs can be specified. You can use hexadecimal numbers (add "0x" prefix) or decimal numbers for <ssid>.
-cu_free <serial#> <id> <pid>	Specifies the CU free by serial#, id#, pid#. < id > specifies the storage system type as follows: • For VSP use R700. • For HUS VM use M700. • For USP V/VM use R600. • For TagmaStore USP/TagmaStore NSC use R500. < pid> specifies the path group ID (0-255). Note: The RCU registered by specifying "0" for <pid> is displayed by default or "0" on the GUI of TrueCopy, Universal Replicator, or Universal Replicator for Mainframe.
-mcu_port <port#>	Specifies the port number of the MCU.
-rcu_port <port#>	Specifies the port number on the RCU (storage system port on the remote side). Specify the port that the attribute is MCU Initiator port (MCU) or RCU Target port (RCU).

Example

Serial Number: Register VSP of Serial number 64034 with CU free. Sets the path group ID: 0 for the port on MCU: CL1-A and the port on RCU: CL1-B.

```
# raidcom add rcu -cu_free 64034 R700 0 -mcu_port CL1-A -rcu_port CL1-B
```

raidcom delete rcu

Deletes the RCU.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom delete rcu {-rcu <serial#> <mcu#> <rcu#> -ssid <ssid>  
| -cu_free <serial#> <id> <pid>
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#> <id>	Specifies the CU by serial number, <mcu#>, <rcu#>, and <id>. You can use hexadecimal numbers (add "0x" prefix) or decimal numbers for <mcu#> and <rcu#>.
-ssid <ssid>	Specifies the storage subsystem ID. Up to four SSIDs can be specified. You can use hexadecimal numbers (add "0x" prefix) or decimal numbers for <ssid>.
-cu_free <serial#><id><pid>	Specifies the CU free by serial#, id#, pid#. < id > specifies the storage system type as follows: • For VSP use R700. • For HUS VM use M700. • For USP V/VM use R600. • For TagmaStore USP/TagmaStore NSC use R500. < pid> specifies the path group ID (0-255). Note: Deleting the RCU registered by specifying "0" for <pid> causes removal of the display as shown by default on the GUI of TrueCopy, Universal Replicator, or Universal Replicator for Mainframe.

Examples

Deleting the VSP for which the product number; 64034, the RAID type: VSP and the path group ID: 1 are set.

```
# raidcom delete rcu -cu_free 64034 R700 1
```

raidcom get rcu

Displays MCU/RCU information.

Syntax

```
raidcom get rcu [-rcu <serial#> <mcu#> <rcu#> -ssid <ssid> | -  
cu_free <serial#> <id> <pid>
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#> <id>	Specifies the CU by serial number, <mcu#>, <rcu#>, and <id>. You can use hexadecimal numbers (add "0x" prefix) or decimal numbers for <mcu#> and <rcu#>.
-ssid <ssid>	Specifies the storage subsystem ID. Up to four SSIDs can be specified. You can use hexadecimal numbers (add "0x" prefix) or decimal numbers for <ssid>.

Option	Description
[-cu_free <serial#><id><pid>]	Specifies the CU free by serial#, id#, pid#. < id > specifies the storage system type as follows: • For VSP use R700. • For HUS VM use M700. • For USP V/VM use R600. • For TagmaStore USP/TagmaStore NSC use R500. < pid> specifies the path group ID (0-255). Note: The information for the RCU registered by specifying "0" for <pid> is displayed by default on the GUI of TrueCopy, Universal Replicator, or Universal Replicator for Mainframe.

Examples

Displaying RCU information.

```
# raidcom get rcu
Serial# ID PID MCU RCU M/R T STS MP NP IM FZ RTO(s) RTT(ms)
64034 R7 - 1C 23 RCU F NML 4 8 MR D 15 20
64034 R7 - 1C 23 RCU F NML 4 8 RO E 15 20
64034 R7 1 - - MCU E NML 4 8 - - 15 20
```

Description of each column in output example

Serial#: Product serial number.

ID: Displays the ID for identifying RAID type: R7 = VSP, M7 = HUS VM, R6 = USP V/VM, R5 = TagmaStore USP/TagmaStore NSC

PID: Displays a path group ID. If CU is specified for RCU, "-" is displayed.

MCU: Displays the CU number (hexadecimal) as MCU. If CU free is specified for RCU, "-" is displayed.

RCU: Displays the CU number (hexadecimal) as RCU. If CU free is specified for RCU, "-" is displayed.

M/R: Displays the CU type as MCU/RCU.

T: Displays the type of physical path, F:FIBRE, E:ESCON

STS: Displays the following status of the CU.

- NML: Normal
- WAR: Warning
- ERR: Failing
- UNK: Unknown, displayed when the target of the pair is MCU.

MP: Displays the number of path as minimum.

NP: Displays the number of path setting between MCU and RCU.

IM: Displays the incident mode setting to RCU.

- MR: it sends incident to MCU host and RCU host

- RO: it sends incident only to RCU host
- If CU free is specified for RCU, "-" is displayed.

FZ: Displays the freeze option.

- D: the freeze option is disabled.
- E: the freeze option is enabled.
- -: "-" is displayed when CU free is specified for RCU.

RTO (s): Displays the timeout value for RIO (Remote IO) setting between MCU and RCU.

RTT (ms): Displays the round trip time value between MCU and RCU.

```
# raidcom get rcu -cu free 64034 R700 1
Serial# ID PID MCU RCU M/R T PNO MPORT RPORT STS_CD SSIDs ...
64034
R7 1 - - RCU F 1 CL1-A CL1-B NML_01 -
64034 R7 1 - - RCU F 2 CL1-A CL1-B NML_01 -
64034 R7 1 - - RCU F 3 CL1-A CL1-B NML_01 -
```

Description of each column in output example

-Serial#: Product serial number.

-ID: Displays the ID for identifying RAID type: R7 = VSP, M7 = HUS VM, R6 = USP V/VM, R5 = TagmaStore USP/TagmaStore NSC

PID: Displays the path group ID. If CU is specified for RCU, "-" is displayed.

-MCU: Displays the CU number (hexadecimal) as MCU. If CU free is specified for RCU, "-" is displayed.

-RCU: Displays the CU number (hexadecimal) as RCU. If CU free is specified for RCU, "-" is displayed.

-M/R: Displays the CU type as MCU/RCU.

-T: Displays the type of physical path: F: FIBRE, E:ESCON.

-PNO: Displays the path number.

-MPORT: Displays the MCU port number.

-RPORT: Displays the RCU port number.

-STS_CD: Displays the following path status:

- - NML_01: Normal
- - ERR_02: Initialization failed
- - ERR_03: Communication timeout
- - ERR_04: Logical blockade
- - ERR_05: Resource Shortage
- - ERR_06: Serial Number Mismatch
- - ERR_10: Invalid Port
- - ERR_80: RCU Port Number Mismatch

- - ERR_81: RCU Port Type Mismatch
- - ERR_82: Communication Failed.

-SSIDs: Displays the SSIDs (hexadecimal) setting to RCU. If CU free is specified for RCU, "-" is displayed. The HUS VM does not support SSID but displays the specified value.

raidcom modify rcu

This sets the control parameters to specified CU that is specified using two way.

Syntax

```
raidcom modify rcu {-rcu <serial#> <mcu#> <rcu#> -ssid <ssid>
| -cu_free <serial#> <id> <pid>} -rcu_option <mpth> <rto>
<rtt> [fzd | fze]
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#>	Specifies the CU by serial number, <mcu#>, and <rcu#>. You can use hexadecimal numbers (add 0x prefix) or decimal numbers for the <mcu#> and <rcu#>.
-ssid <ssid>	Specifies the storage subsystem ID. You can use hexadecimal numbers (add 0x prefix) or decimal numbers for the <ssid>.
-cu_free <serial#> <id> <pid> >	Specifies CU free by serial#, id#, pid#. < id > specifies the storage system type as follows: • For VSP use R700. • For HUS VM use M700. • For USP V/VM use R600. • For TagmaStore USP/TagmaStore NSC use R500. < pid> specifies the path group ID (1-255). Note: When "0" is specified for <pid>, the RCU is displayed by default on the GUI of TrueCopy, Universal Replicator, or Universal Replicator for Mainframe.
-rcu_option <mpth> <rto> <rtt> [fzd fze]	Specifies CU control parameters: • <mpth>: minimum number of paths (1-8) • <rto>: RIO timeout value (10-100) (second) for RIO (Remote IO) setting between MCU and RCU. • <rtt> is used to set the round trip time value (1-500) (millisecond) between MCU and RCU. • [fzd fze]: Specify fze to enable the freeze option, or fzd to disable it. If the freeze option is not specified to the RCU with CU units, the freeze option is disabled.

Examples

For the RCU for which the product number; 64034, the RAID type: VSP and the path ID: 1 are set, setting the options: the minimum number of paths <mpth>-4, RIO MIH time<rto>15 seconds, and round trip time 20 milisecond are set.

```
# raidcom modify rcu -cu_free 64034 R700 1 -rcu_option 4 15 20
```

raidcom add rcu_path

Adds logical paths to RCUs.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom add rcu_path {-rcu <serial#> <mcu#> <rcu#> -ssid <ssid>  
| -cu_free <serial#> <id> <pid>} -mcu_port <port#>  
-rcu_port <port#>
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#>	Specifies the CU by serial number, <mcu#>, and <rcu#>. You can use hexadecimal numbers (add 0x prefix) or decimal numbers for the <mcu#> and <rcu#>.
-ssid <ssid>	Specifies the storage subsystem ID. You can use hexadecimal numbers (add 0x prefix) or decimal numbers for the <ssid>.
-cu_free <serial#><id><pid>	Specifies CU free by serial#, id#, pid#. < id > specifies the storage system type as follows: • For VSP use R700. • For HUS VM use M700. • For USP V/VM use R600. • For TagmaStore USP/TagmaStore NSC use R500. < pid> specifies the path group ID (1-255). Note: When "0" is specified for <pid>, the RCU is displayed by default on the GUI of TrueCopy, Universal Replicator, or Universal Replicator for Mainframe.
-mcu_port <port#>	Specifies the port number on the MCU.
-rcu_port <port#>	Specifies the port number on the RCU (storage system port on the remote side). Specify the port that the attribute is MCU initiator port (MCU) or RCU target port (RCU).

Examples

To the RCU for which the product number; 64034, the RAID type: VSP and the path ID: 1 are set, adding RCU path: mcu port: CL1-A, rcu port CL1-B.

```
# raidcom add rcu_path -cu_free 64034 R700 1 -mcu_port CL1-A
-rcu_port CL1-B
```

raidcom delete rcu_path

Deletes logical paths from a specified RCU.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

Syntax

```
raidcom delete rcu_path {-rcu <serial#> <mcu#> <rcu#>
                        -ssid <ssid> | -cu_free <serial#> <id> <pid>} -mcu_port
                        <port#> -rcu_port <port#>
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#>	Specifies the CU by serial number, <mcu#>, and <rcu#>. You can use hexadecimal numbers (add 0x prefix) or decimal numbers for the <mcu#> and <rcu#>.
-ssid <ssid>	Specifies the storage subsystem ID. You can use hexadecimal numbers (add 0x prefix) or decimal numbers for the <ssid>.
-cu_free <serial#> <id> <pid>	Specifies CU free by serial#, id#, pid#. < id > specifies the storage system type as follows: - For VSP use R700. - For HUS VM use M700. - For USP V/VM use R600. - For TagmaStore USP/TagmaStore NSC use R500. < pid> specifies the path group ID (1-255). Note: When "0" is specified for <pid>, the RCU is displayed by default on the GUI of TrueCopy, Universal Replicator, or Universal Replicator for Mainframe.
-mcu_port <port#>	Specifies the port number on the MCU.
-rcu_port <port#>	Specifies the port number on the RCU (storage system port on the remote side). Specifies the port that the attribute is MCU initiator port (MCU) or RCU target port (RCU).

Examples

From the RCU for which the product number; 64034, the RAID type: VSP and the path ID: 1 are set, deleting RCU path: mcu port: CL1-A and rcu port CL1-B.

```
# raidcom delete rcu_path -cu_free 64034 R700 1 -mcu_port CL1-A
-rcu_port CL1-B
```

raidcom add ssid

Adds the specified SSID to the RCU that is specified by serial number, <mcu#>, and <rcu#>.

Syntax

```
raidcom add ssid -rcu <serial#> <mcu#> <rcu#> <id> -ssid <ssid>
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#> <id>	Specifies the CU by serial number, <mcu#>, <rcu#>, and <id>. You can use hexadecimal (add the prefix 0x) or decimal for the <mcu#> and <rcu#> numbers . Use the following strings for <id> to specify the RAID storage system type: - For VSP, use "R700". - For USP V/VM, use "R600". - For TagmaStore USP/TagmaStore NSC, use "R500".
-ssid <ssid>	Specifies the storage subsystem ID (SSID) to add to the RCU. You can use hexadecimal (add the 0x prefix) or decimal for the <ssid> number.

Examples

Adding SSID:345 to the RCU with serial number: 64034, RAID type: R700, MCU#:0, and RCU#:1 are set.

```
raidcom add ssid -rcu 64034 0 1 R700 -ssid 345
```

raidcom delete ssid

Deletes the specified SSID from the RCU that is specified by a serial number, <mcu#>, and <rcu#>.

Syntax

```
raidcom delete ssid -rcu <serial#> <mcu#> <rcu#> -ssid <ssid>
```

Options and parameters

Option	Description
-rcu <serial#> <mcu#> <rcu#>	This parameter is used to specify a CU that is specified by a serial number, <mcu#>, and <rcu#>. This option specifies <mcu#> and <rcu#> with hexadecimal numbers (adding 0x) or decimal numbers.
-ssid <ssid>	Specifies the storage subsystem ID to be deleted from the RCU. You can specify the ssid as a hexadecimal number (add the 0x prefix) or a decimal number.

Examples

Deleting SSID:345 from the RCU where the serial number: 64034, MCU#:0, and RCU#:1 are set.

```
raidcom delete ssid -rcu 64034 0 1 -ssid 345
```

raidcom get resource

Displays resource group information.

Syntax

```
raidcom get resource
```

Options and parameters

None.

Examples

Displaying a resource group and resource group lock information.

```
# raidcom get resource
RS_GROUP      RGID      stat Lock_owner  Lock_host  Serial#
meta_resource  0      Unlocked      -          -          64556
```

Description of each column in output example

RS_GROUP: Resource group name

RGID: resource ID. RGID=0 is used for meta resource group.

stat: locking status of the resource group name on HUS VM or VSP

Lock_owner: owner (authorized user) who locks the resource group name

Lock_host: host name of a user who locks the resource group name

Serial#: Product serial number

raidcom lock resource

This locks the specified resource group name.

When you perform these commands, lock the resource group to which resource is allocated before executing the command.

- add
- delete
- modify
- initialize
- check_ext_storage
- disconnect
- set

- reset
- reallocate
- monitor

If the specified resource group name does not exist, this command is rejected with EX_ENOOBJ.

In authentication mode, the user executing this command must have a permission for the resource group name.

Syntax

```
raidcom lock resource [-resource_name <resource group name>]
                        [-time <time(sec)>]
```

Options and parameters

Option	Description
[-resource_name <resource group name>]	Specifies the name of resource group (maximum 32 characters). Specify defined resource group names. If this parameter is not specified, all resource groups that are assigned to the user are locked.
[-time <time(sec)>]	This parameter is used for specifying the latency until the specified resource is locked. The TOV time of the lock instruction is specified. When <time> is specified as "0", it is executed as "nowait (no waiting time)" mode. If this parameter is not specified, the default waiting time (7200 seconds) is used.

Examples

Resource group: Locking the resource of the meta_resource.

```
# raidcom lock resource -resource_name meta_resource
```

raidcom unlock resource

This unlocks the specified resource group name.

If the specified resource group name does not exist, this command is rejected with EX_ENOOBJ.

In authentication mode, A user executing this command must have a permission for the resource group name.

Syntax

```
raidcom unlock resource [-resource_name <resource group name>]
```

Options and parameters

Option	Description
<code>[-resource_name <resource group name>]</code>	Specifies the name of resource group (maximum 32 characters). Specify defined resource group names. If this parameter is not specified, all resource groups that are assigned to the user are unlocked.

Examples

Resource group: Unlocking the resource of the meta_resource.

```
# raidcom unlock resource -resource_name meta_resource
```

raidcom add snap_pool

Creates Pools/Adds pool VOLs for Thin Image or Copy-on-Write Snapshot by the specified LDEVs. A device group can also be specified instead of an LDEV.

When specifying a pool that is already created for Thin Image or Copy-on-Write Snapshot, the specified LDEV is added as a pool volume.

Specify either one of Pool ID or Pool Name certainly. If both the Pool ID and Pool Name options are omitted, this command is rejected with EX_REQARG.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

If you create multiple pools with specifying only the pool names, execute the raidcom get command_status command to each pool and confirm each completion.

Syntax

```
raidcom add snap_pool {{-pool_id <pool ID#> [-pool_name <pool naming>] | -pool_name <pool naming>[-pool_id <pool ID#>]}}  
| -pool_id <pool ID#> -pool_name <pool naming>}}  
{-ldev_id <ldev#> ...[-cnt<count>] | -grp_opt <group option>  
-device_grp_name <device group name> [<device name>]}  
[-user_threshold <%> ] [-thinsnap]
```

Options and parameters

Option	Description
<code>-pool_id <pool ID#></code>	Specifies the Pool ID (0-127) of a Thin Image or Copy-on-Write Snapshot pool. If a -pool_id option is non-numeric, the specified value is recognized as a pool name to identify the pool ID. When you omit specifying -pool_id option, you need to specify -pool_name option. When specifying -pool_name option without specifying -pool_id option, a pool ID is allocated automatically.

Option	Description
-pool_name <pool naming>	Specifies the pool name of a pool for Thin Image or Copy-on-Write Snapshot. Up to 32 characters can be specified. When specifying a pool ID or a pool name, if a pool name exists in the specified pool ID, the pool name is overwritten. If the pool volume is added by specifying only a pool ID, the pool name will not be changed. When the specification of Pool Name is omitted, a Pool ID must be specified. When the Pool ID is specified and the Pool Name is omitted, a pool name is allocated automatically in the form of "New Pool<number>". The -pool_name option cannot be specified by configuring only in numeric because numeric values are preferentially identified as a pool ID. Specifies a pool ID with the '-pool_id<pool ID#>' option.
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). Up to 64 of LDEVs can be specified at a time. For example: • -ldev_id 100 • -ldev_id 100-110 • -ldev_id 100 -cnt 10
[-cnt <count>]	Specifies the count (2-64). The count becomes singular if not specified. Up to 64 of LDEVs can be specified at a time.
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated. When the -pool_name option is omitted, the device group name will change into the pool name.
[-user_threshold <%>]	Specifies the user defined threshold value (20-95) %. If this option is omitted, "80" is used. When you add a pool volume, this option is ignored even if it is specified. If you want to change the user defined threshold value of the additional pool volume, execute the raidcom modify pool command.
[-thinsnap]	When this option is specified, a pool for Thin Image is created.

Examples

Using LDEVs:400, 401, and 402, creating a pool of Pool ID:1, Pool Name: my_ss_pool for Copy-on-Write Snapshot.

```
# raidcom add snap_pool -pool_id 1 -pool_name my_ss_pool -ldev_id 400 401 402
```

Using LDEVs:410, 411, and 412, creating a pool of Pool ID:3, Pool Name: my_ss_pool for Thin Image.

```
# raidcom add snap_pool -pool_id 3 -pool_name my_ss_pool -ldev_id
410 411 412 -thinsnap
```

Using LDEVs:500, 501, and 502, creating a pool of Pool ID: Allocated automatically, Pool Name: my_ss_pool for Copy-on-Write Snapshot.

```
# raidcom add snap_pool -pool_name my_ss_pool -ldev_id 500 501 502
```

Using LDEVs:600, 601, and 602, creating a pool of Pool ID: 2, Pool Name: Allocated automatically for Copy-on-Write Snapshot.

```
# raidcom add snap_pool -pool_id 2 -ldev_id 600 601 602
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

Using LDEV belonging to the device group: grp1, creating a pool of Pool ID: 1, Pool Name: Allocated automatically for Copy-on-Write Snapshot.

```
# raidcom add snap_pool -pool_id 1 -grp_opt ldev -device_grp_name
grp1
```

raidcom get snap_pool

Displays pool information for Thin Image or Copy-on-Write Snapshot.

Syntax

```
raidcom get snap_pool
```

Options and parameters

None.

Examples

Displaying pool information for Thin Image or Copy-on-Write Snapshot.

```
# raidcom get snap_pool
ID POLS U(%) SSCNT Available(MB) Capacity(MB) Seq# Num LDEV# H(%)
003 POLS 100 10000          100 10000000000 62500 1 375 70
```

Description of each column in output example

PID: pool ID

POLS: Displays the pool status:

- - POLN: "Pool Normal" (The pool is in the normal status.)
- - POLF: "Pool Full" (Pool utilization exceeds the depletion threshold.)
- - POLS: "Pool Suspend" (The pool is in the overflow status exceeding the threshold and is suspended.)
- - POLE: "Pool failure" (The pool is suspended in the failure status.) In this status, the pool information cannot be displayed.

U(%): usage rate of the pool

SSCNT: number of volumes in the pool

Available (MB): available capacity for the data volumes in the pool

Capacity (MB): total capacity of the pool

Seq#: Sequential number

Num: number of LDEVs in the pool

LDEV#: number of the first LDEV in the pool (lowest LDEV ID)

H(%): threshold value for the pool

raidcom add snapshot

Adds a combination of the specified LDEV number and Pool ID to a snapshot group. When the specified snapshot group does not exist, creates a new snapshot group.

Syntax

```
raidcom add snapshot -ldev_id <ldev#(P)> <ldev#(S)> -pool  
{<pool ID#> | <pool naming>}  
-snapshotgroup <name> [-snap_mode <mode>]
```

Options and parameters

Option	Description
-ldev_id <ldev#(P)> <ldev#(S)>	Specifies the LDEV number to create the snapshot data. LDEV numbers for P-VOL and S-VOL must be included.
-pool {<pool ID#> <pool naming>}	Specifies the pool ID or the pool name created for Snapshot.
-snapshotgroup <name>	Specifies the name of the snapshot group. When the specified snapshot group does not exist, creates a new snapshot group.
[-snap_mode <mode>]	Specifies the mode for the snapshot group: <mode>= CTG: For creating in CTG mode. The CTG number is allocated internally by itself. This option is effective only when a new snapshot group is created. If this option is omitted, the snapshot group is created in normal mode. This option is ignored if it is specified for an existing snapshot group.

Examples

Adding a combination of the P-VOL (LDEV number 10:10), the S-VOL (LDEV number 20:20), and the Pool (SnapPool00) to the snapshot group (db1).

```
# raidcom add snapshot -ldev_id 0x1010 0x2020 -pool SnapPool00 -  
snapshotgroup db1
```

raidcom delete snapshot

Deletes snapshot data and snapshot groups. The relevant snapshot data of the LDEV is deleted from the snapshot group by specifying LDEV number. When no snapshot data is left in the snapshot group, the snapshot group is deleted.

Syntax

```
raidcom delete snapshot {-snapshotgroup <name> | -ldev_id <ldev#>
{-mirror_id <mu#> |-snapshotgroup <name>}}
```

Options and parameters

Option	Description
-snapshotgroup <name>	Specifies the snapshot group that contains the target data to be deleted. If a snapshot group is specified as the target, all snapshot data and the snapshot group are deleted.
-ldev_id <ldev#>	Specifies the LDEV number of the P-VOL or S-VOL for the snapshot data to be deleted. When a P-VOL is specified, specify the snapshot data by specifying the MU number or the snapshot group (Specifying the MU number or the snapshot group is mandatory.). When an S-VOL is specified, do not specify an MU number or a snapshot group. If you specify the MU number or Snapshot group, the P-VOL for the specified LDEV number becomes the subject of deletion.
-mirror_id <mu#>	Specifies the Mirror ID of the snapshot data to be deleted.
-snapshotgroup <name>	Specifies the snapshot group to be deleted. The smallest number of MU in the snapshot group becomes the subject to be deleted.

Examples

Deleting the snapshot data of the snapshot group (db1).

```
# raidcom delete snapshot -snapshotgroup db1
```

Deleting the snapshot data of the P-VOL (LDEV number 10:10) and the Mirror ID (10).

```
# raidcom delete snapshot -ldev_id 0x1010 -mirror_id 10
```

Deleting the snapshot data of the LDEV number 10:10 that is included in the snapshot group (db1).

```
# raidcom delete snapshot -ldev_id 0x1010 -snapshotgroup db1
```

```
# raidcom delete snapshot -snapshotgroup db1 -ldev_id 0x1010
```

Deleting the snapshot data of the S-VOL (LDEV number 20:10).

```
# raidcom delete snapshot -ldev_id 0x2010
```

raidcom modify snapshot

Modifies the specified snapshot group.

Syntax

```
raidcom modify snapshot -ldev_id <ldev#> {-snapshotgroup <name>
| -mirror_id <mu#>} -snapshot_data <op>
raidcom modify snapshot -snapshotgroup <name> -snapshot_data <op>
raidcom modify snapshot -ldev_id <ldev#> -snapshot_data <op>
raidcom modify snapshot -ldev_id <ldev#> -mirror_id <mu#>
-snapshotgroup <name> -snapshot_data <op>
```

Options and parameters

Option	Description
-ldev_id <ldev#>	Specifies the LDEV number of P-VOL (or S-VOL) to be performed.
-snapshotgroup <name>	Specifies the snapshot group name in which the snapshot data is included.
-mirror_id <mu#>	Specifies the mirror ID of a snapshot data.
-snapshot_data <op>	Specifies the operation to be performed for the specified snapshot group. The parameter of the operation to be specified is the following: • create: Creates a snapshot data. • split: Creates a snapshot data. • resync: Discards the created snapshot data. • restore: Restores the snapshot data.

The following shows snapshot operations with the combination of options and parameters:

When creating snapshot data (specifying create/split)

#	The ways to specify the parameter	CTG mode	normal mode
1	LDEV number and snapshot group.	P-VOL in the snapshot group.	P-VOL in the snapshot group and the smallest number of MU.
2	LDEV number and MU number.	Specified P-VOL and MU number.	Specified P-VOL and MU number.
3	LDEV number only (Specifying S-VOL).	P-VOL and MU number that are mapped by the specified S-VOL.	P-VOL and MU number that are mapped by the specified S-VOL.
4	Snapshot group.	All the P-VOLs related to the snapshot group. The consistency is endured.	All the P-VOLs related to the snapshot group. The consistency is not endured.

When discarding or restoring snapshot data (specifying resync/restore)

#	The ways to specify the parameter	CTG mode	normal mode
1	LDEV number and snapshot group.	P-VOL in the snapshot group.	P-VOL in the snapshot group and the smallest number of MU.
2	LDEV number and MU number.	Specified P-VOL and MU number.	Specified P-VOL and MU number.
3	LDEV number only (Specifying S-VOL).	P-VOL and MU number that are mapped by the specified S-VOL.	P-VOL and MU number that are mapped by the specified S-VOL.
4	Snapshot group.	All the P-VOLs related to the snapshot group.	All the P-VOLs related to the snapshot group.

Examples

Creating snapshot data for the P-VOL (LDEV number 10:10) that is included in the snapshot group (db1).

```
# raidcom modify snapshot -ldev_id 0x1010 -snapshotgroup db1 -  
snapshot_data create
```

Creating snapshot data for the P-VOL (LDEV number 10:10) and the mirror ID 10.

```
# raidcom modify snapshot -ldev_id 0x1010 -mirror_id 10 -  
snapshot_data create
```

Creating snapshot data for the S-VOL (LDEV number 20:10).

```
# raidcom modify snapshot -ldev_id 0x2010 -snapshot_data create
```

Creating snapshot data for all the P-VOLs that are included in the snapshot group (db1).

```
# raidcom modify snapshot -snapshotgroup db1 -snapshot_data create
```

Discarding the snapshot data for the P-VOL (LDEV number 10:10) and the mirror ID 10.

```
# raidcom modify snapshot -ldev_id 0x1010 -mirror_id 10 -  
snapshot_data resync
```

Restoring the snapshot data for the S-VOL (LDEV number 20:10).

```
# raidcom modify snapshot -ldev_id 0x2010 -snapshot_data restore
```

raidcom get snapshot

Displays the snapshot group and snapshot data information for the specified device. If this option is omitted, the list of snapshot groups is displayed.

Syntax

```
raidcom get snapshot [-ldev_id <ldev#> | -snapshotgroup <name>]  
[{-check_status | -check_status_not} <string> [-time <time>]]
```

Options and parameters

Option	Description
[-ldev_id <ldev#>]	Specifies the LDEV number to display the snapshot data information. Specifies either the P-VOL or S-VOL for the LDEV number.
[-snapshotgroup <name>]	Specifies the snapshot group for which you want to display the snapshot data information.
[-check_status <string> [-time <time>]]	Check if the snapshot group or the snapshot data is in the state shown in <string>. The following are specified in <string>: • COPY: Copy status. • PAIR: Pair status. • PSUS: Suspend status. • PSUE: Suspend failure status. • PFUL: Indicates that the Thin Image or Copy-on-Write Snapshot pool exceeds the threshold in the PAIR status. • PFUS: Indicates that the Thin Image or Copy-on-Write Snapshot pool exceeds the threshold in the PSUS status. • RCPY: Shows that the copying is in progress by resynchronization. If the snapshot group or the snapshot data is in the specified state, the operation ends normally. When it is not in the specified status, the operation is placed in wait status for the time (seconds) set by the <time> if "-time" is specified. If "-time" is not specified, the operation soon ends abnormally.
[-check_status_not <string> [-time <time>]]	Check if the snapshot group or the snapshot data is not in the state shown in <string>. The following are specified in <string>: • COPY: Copy status. • PAIR: Pair status. • PSUS: Suspend status. • PSUE: Suspend failure status. • PFUL: Indicates that the Thin Image or Copy-on-Write Snapshot pool exceeds the threshold in the PAIR status. • PFUS: Indicates that the Thin Image or Copy-on-Write Snapshot pool exceeds the threshold in the PSUS status. • RCPY: Shows that the copying is in progress by resynchronization. If the snapshot group or the snapshot data is not in the specified state, the operation ends normally. When it is in the specified status, the operation is placed in wait status for the time (seconds) set by the <time> if "-time" is specified. If "-time" is not specified, the operation soon ends abnormally.

Examples

Displaying the list of snapshot groups.

```
# raidcom get snapshot
SnapShot_name P/S STAT Serial# LDEV# MU# P-LDEV# PID % MODE SPLT-
TIME
snap1          - -      85000098 - - - - - - - - - - -
snap2          - -      85000098 - - - - - - - - - - -
snap3          - -      85000098 - - - - - - - - - - -
```

Displaying the snapshot data related to the specific P-VOL (LDEV number: 14536).

```
# raidcom get snapshot -ldev_id 14536
SnapShot_name P/S STAT Serial# LDEV# MU# P-LDEV# PID % MODE SPLT-
TIME
snap1          P-VOL PAIR 85000098 14536 1010 - 2 100 ---- -
snap2          P-VOL PAIR 85000098 14536 1011 13000 2 100 G--- -
snap3          P-VOL PAIR 85000098 14536 1012 - 2 100 ---- -
```

Displaying the snapshot data related to the specific S-VOL (LDEV number: 13000).

```
# raidcom get snapshot -ldev_id 13000
SnapShot_name P/S STAT Serial# LDEV# MU# P-LDEV# PID % MODE SPLT-
TIME
snap2          S-VOL PAIR 85000098 13000 1011 14536 2 100 G--- -
```

Displaying the snapshot data included in the specific snapshot group.

```
# raidcom get snapshot -snapshotgroup snap2
SnapShot_name P/S STAT Serial# LDEV# MU# P-LDEV# PID % MODE SPLT-
TIME
snap2          P-VOL PAIR 85000098 14536 1011 13000 2 100 G--- -
snap2          P-VOL PAIR 85000098 14537 1011 13001 2 100 G--- -
snap2          P-VOL PAIR 85000098 14538 1011 13002 2 100 G--- -
```

Description of each column in output example:

SnapShot_name: Displays the name of snapshot group defined in the device.

P/S: Displays the attribute of the target LDEV. It displays P-VOL for the P-VOL and S-VOL for the S-VOL. In the list of snapshot, "-" is displayed.

STAT: Displays the status of each snapshot data. For details, see [pairedisplay on page 2-45](#).

Serial#: Displays the product serial number.

LDEV#: Displays the LDEV number related to the snapshot.

MU#: Displays the Mirror ID.

P-LDEV#: Displays the LDEV number of the volume (P-VOL or S-VOL) of the pair associated with the snapshot data.

PID: Displays the pool ID.

%: Displays the concordance rate between P-VOL and S-VOL.

MODE: Displays the status of snapshot data:

- G: The snapshot data created in CTG mode.
- W: The status when the data are written in the secondary volume from the host in the PSUS/PFUS status.

SPLT-TIME: Displays the time when a snapshot data is created. Indicating accumulated time in seconds from January 1, 1970 (GMT).

raidcom add dp_pool

Create a pool for Dynamic Provisioning or Dynamic Provisioning for Mainframe. Or, add pool volumes to the pools for Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe. A device group can also be specified instead of an LDEV.

When specifying a pool that is already created for Dynamic Provisioning/ Dynamic Tiering, the specified LDEV is added as a pool volume.

Specify either one of Pool ID or Pool Name certainly. If both the Pool ID and Pool Name options are omitted, this command is rejected with EX_REQARG.

This command is executed asynchronously with the command input. Check the completion of this process on the raidcom get command_status command.

If you create multiple pools with specifying only the pool names, execute the raidcom get command_status command to each pool and confirm each completion.

Syntax

```
raidcom add dp_pool [{-pool_id <pool ID#> [-pool_name
    <pool naming>] | -pool_name <pool naming>[-pool_id
    <pool ID#>]} | -pool_id <pool ID#> -pool_name <pool naming>}
    {-ldev_id <ldev#> ...[-cnt <count>] | -grp_opt <group option>
    -device_grp_name <device group name> [<device name>]}
    [ -user_threshold <threshold_1>[<threshold_2>] ]
```

Options and parameters

Option	Description
-pool_id <pool ID#>	Specifies the Pool ID (0-127). When the specification of Pool ID is omitted, a Pool Name must be specified. When the Pool Name is specified and the Pool ID is omitted, a pool ID is allocated automatically.
-pool_name <pool naming>	Specifies the pool name of a pool for Dynamic Provisioning/ Dynamic Tiering. Up to 32 characters can be specified. When specifying a pool ID or a pool name, if the pool name exists in the specified pool ID, the pool name is overwritten. If the pool volume is added by specifying only a pool ID, the pool name will not be changed. When the specification of Pool Name is omitted, a Pool ID must be specified. When the Pool ID is specified and the Pool Name and -device_grp_name option are omitted, a pool name is allocated automatically in the form of "New Pool<number>".

Option	Description
-ldev_id <ldev#> ...	Specifies the LDEV number (0-65279). Up to 64 of LDEVs can be specified at a time. For example: • -ldev_id 100 • -ldev_id 100 - 110 • -ldev_id 100 -cnt 10
[-cnt <count>]	Specifies the count (2-64). If this specification is omitted, "1" is used. Up to 64 of LDEVs can be specified at a time.
-grp_opt <group option>	Specifies the device information extracted from the LDEV belonging to the device group. Specify "ldev" (fixed). The information of LDEV belonging to the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be operated. To operate an LDEV in the device group, specify the device name of LDEV (maximum 32 characters) within the device group. If the device name is omitted, all the LDEVs belonging in the device group are operated. When the -pool_name option is omitted, the device group name will change into the pool name.
[-user_threshold <threshold_1> [<threshold_2>]]	You may specify two user-defined thresholds, and their valid ranges are 1-100%, respectively. If you specify <threshold_1> and <threshold_2>: the value of <threshold_1> is set as the threshold for <i>WARNING</i> specified to a pool. the value of <threshold_2> is set as the threshold for <i>High water mark</i> specified to a pool. If you specify only <threshold_1>, your specified value and the system default value (80%) are applied. If you omit to specify the value, 70% and 80% are applied, automatically. When you add a pool volume, this option is ignored even if it is specified. If you want to change the user defined threshold value of the additional pool volume, execute the <code>raidcom modify pool</code> command.

Examples

By using LDEVs:400, 401, and 402, creating a pool of Pool ID:1, Pool Name: my_pool for Dynamic Provisioning/Dynamic Provisioning for Mainframe.

```
# raidcom add dp_pool -pool_id 1 -pool_name my_pool -ldev_id 400 401 402
```

By using LDEVs:500, 501, and 502, creating a pool of Pool ID: Allocated automatically, Pool Name: my_pool for Dynamic Provisioning/Dynamic Provisioning for Mainframe.

```
# raidcom add dp_pool -pool_name my_pool -ldev_id 500 501 502
```

By using LDEVs:600, 601, and 602, creating a pool of Pool ID: 2, Pool Name: Allocated automatically for Dynamic Provisioning/Dynamic Provisioning for Mainframe.

```
# raidcom add snap_pool -pool_id 2 -ldev_id 600 601 602
```

By using LDEVs: 700, 701, and 702, creating a pool of Pool ID: 3, Pool Name: my_pool for Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, or Dynamic Tiering for Mainframe with the user-defined thresholds *WARNING* specified to 70% and *High water mark* to 80%.

```
# raidcom add dp_pool -pool_id 3 -pool_name my_pool
-ldev_id 700 701 702 -user_threshold 70 80
```

Add LDEV: 368 to the pool ID: 10 for Dynamic Provisioning, Dynamic Provisioning for Mainframe, or Dynamic Tiering, or Dynamic Tiering for Mainframe.

```
# raidcom add dp_pool -pool_id 10 -ldev_id 368
```

Assigning a device name: data1 to an LDEV: 400 and adding it to the device group: grp1.

```
# raidcom add device_grp -device_grp_name grp1 data1 -ldev_id 400
```

By using LDEV belonging to the device group: grp1, creating a pool of Pool ID:1, pool name: Allocated automatically for Dynamic Provisioning/ Dynamic Provisioning for Mainframe.

```
# raidcom add dp_pool -pool_id 1 -grp_opt ldev -device_grp_name
grp1
```

raidcom get dp_pool

Displays pool information for Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe.

Syntax

```
raidcom get dp_pool [ -key <keyword> [-fx]] [-pool {<pool_id> |
<pool naming>}]
```

Options and parameters

Option	Description
[-key <keyword> [-fx]]	Specifies the display keyword. Specify opt as <keyword>. If you specify opt, information about Dynamic Tiering and Dynamic Tiering for Mainframe pool is displayed. If you specify the -fx option, TL_RANGE and TD_RANGE are displayed in hexadecimal notation.
[-pool {<pool_id> <pool naming >}]	Specifies the pool ID or the pool name of Dynamic Tiering/ Dynamic Tiering for Mainframe when you want to display the range for each tiering level of Dynamic Tiering/Dynamic Tiering for Mainframe pools. When you specify only digits, it is recognized as a pool ID. When the pool name consists of digits, specify the pool ID instead of the pool name.

Examples

Displaying the pool information of the pool for Dynamic Provisioning, Dynamic Provisioning for Mainframe, and Dynamic Tiering, and Dynamic Tiering for Mainframe.

```
# raidcom get dp_pool
PID POLS U(%) AV_CAP(MB) TP_CAP(MB) W(%) H(%) Num LDEV# LCNT
TL_CAP(MB)
001 10 45000000 50000000 50 80 2 265 33
65000000
002 POLF 95 10000 100000000 50 80 3 270 900
100000000
004 POLN 0 10000000 100000000 80 90 2 280 0
200000000
```

Description of each column in output example

PID: Displays the pool ID.

POLS: Displays the following status of the pool.

- POLN: "Pool Normal" (The pool is in the normal status.)
- POLF: "Pool Full"(Pool utilization exceeds the depletion threshold.)
- POLS: "Pool Suspend" (The pool is in the overflow status exceeding the threshold and is suspended.)
- POLE: "Pool failure" (The pool is suspended in the failure status.) In this status, the pool information cannot be displayed.

U(%): Displays the usage rate of the pool.

AV_CAP(MB): Displays the available capacity for the volumes mapped to this pool.

TP_CAP(MB): Displays the total capacity of the pool.

W(%): Displays the threshold value for "WARNING" set for the pool.

H(%): Displays the threshold value set for the pool as high water mark.

Num: Displays the number of LDEVs configuring the pool.

LDEV#: Displays the first number of the LDEV configuring the pool.

LCNT: Displays the LDEV number of the pool-VOL that includes the pool management area.

TL_CAP(MB): Displays the total capacity of all volumes mapped to the pool.

The tier information of the pool for is displayed. For details about the parameters, see the Provisioning Guide for the storage system.

```
# raidcom get dp_pool -key opt
PID POLS MODE STS DAT TNO TL_RANGE TD_RANGE TU_CAP(MB) TT_CAP(MB)
T(%) P(%) R(%) B(%) MM
001 POLN DEF STP VAL 1 00005000 00003000 200000 1000000
80 54 98 40 PM
001 POLN DEF STP VAL 2 00003000 00002000 400000 1000000
80 54 98 30 CM
```

```

001 POLN DEF STP VAL 3 00002000 00002000 600000 1000000
80 54 98 40 PM

002 POLF AUT MON PND 1 - - 500000 1000000
80 54 100 2 PM

```

When you specify -pool, displays the range for each tiering level of corresponding pools.

```

# raidcom get dp_pool -pool 1 -key opt
PID POLS MODE STS DAT TNO TL_RANGE TD_RANGE TU_CAP(MB)
TT CAP(MB) T(%) P(%) R(%) B(%) MM
001 POLN DEF STP VAL 0 4294967294 00000000 8064 8190 10 28
100 2 PM
001 POLN DEF STP VAL 0 4294967294 00000000 3948 3990 10 100
100 2 PM
001 POLN DEF STP VAL 0 00000000 00000000 504 8190 10 33
100 2 PM
001 POLN DEF STP VAL 1 00000000 00000000 8064 8190 10 28
100 2 PM
001 POLN DEF STP VAL 1 00000000 00000000 3948 3990 10 100
100 2 PM
001 POLN DEF STP VAL 1 00000000 00000000 504 8190 10 33
100 2 PM
001 POLN DEF STP VAL 2 00000039 00000000 8064 8190 10 28
100 2 PM
001 POLN DEF STP VAL 2 00000000 00000000 3948 3990 10 100
100 2 PM
001 POLN DEF STP VAL 2 00000000 00000000 504 8190 10 33
100 2 PM
001 POLN DEF STP VAL 3 00000100 00000000 8064 8190 10 28
100 2 PM
001 POLN DEF STP VAL 3 00000041 00000000 3948 3990 10 100
100 2 PM
001 POLN DEF STP VAL 3 00000000 00000000 504 8190 10 33
100 2 PM
001 POLN DEF STP VAL 4 00000001 00000000 8064 8190 10 28
100 2 PM
001 POLN DEF STP VAL 4 00000000 00000000 3948 3990 10 100
100 2 PM
001 POLN DEF STP VAL 4 00000000 00000000 504 8190 10 33
100 2 PM
001 POLN DEF STP VAL 5 00000001 00000000 8064 8190 10 28
100 2 PM
001 POLN DEF STP VAL 5 00000001 00000000 3948 3990 10 100
100 2 PM
001 POLN DEF STP VAL 5 00000000 00000000 504 8190 10 33
100 2 PM

```

Description of each column in output example

PID: Displays the pool ID.

POLS: Displays the following status of the pool.

- POLN: "Pool Normal" (The pool is in the normal status.)
- POLF: "Pool Full" (Pool utilization exceeds the depletion threshold.)
- POLS: "Pool Suspend" (The pool is in the overflow status exceeding the threshold and is suspended.)
- POLE: "Pool failure" (The pool is suspended in the failure status.) In this status, the pool information cannot be displayed.

MODE: Displays the execution mode.

- DEF: The start/termination of the monitor is performed by the instruction of the CLI, and the Tier range setting is performed by the automatic calculation of the storage system.
- AUT: The start/termination of the monitor is performed by time specification, and the Tier range setting is performed by the automatic calculation of the storage system.

Note: AUT cannot be instructed from the CLI. AUT can only be performed if displayed when set from the SN2.

STS: Displays the operational status of the performance monitor and the tier relocation.

- STP: The performance monitor and the tier relocation are stopped.
- RLC: The performance monitor is stopped. The tier relocation is operating.
- MON: The performance monitor is operating. The tier relocation is stopped.
- RLM: The performance monitor and the tier relocation are operating.
- UNK: The status of the performance monitor and tier relocation is not known.

DAT: Displays the status of the monitor information.

- VAL: Valid.
- INV: Invalid.
- PND: Being calculated.

TNO: Tiering number. When you specify the pool, displays the tiering level (0 means "all" is set to the level of tiering policy).

Tier range number

TL_RANGE: Lowest limit value of the Tier in IOPH.

0 (0x00000000) to 4294967294 (0xFFFFFFFF): When "all" is set to the level of tiering policy, the lowest limit value of the tier is displayed. When there is no V-VOL where "all" is set to the level of tiering policy, or when there is no V-VOL related to the pool, the invalid value "-" (0xFFFFFFFF) is displayed. If the -fix option is specified, this displays the value in parentheses given in hexadecimal.

TD_RANGE: Delta value of the Tier in IOPH. 0 (0x00000000) to 4294967294 (0xFFFFFFFF): When "all" is set to the level of tiering policy, the lowest limit value of the tier is displayed. When there is no V-VOL where "all" is set to the level of tiering policy, or when there is no V-VOL related to the pool, the invalid value "-" (0xFFFFFFFF) is displayed. If the -fix option is specified, this displays the value in parentheses given in hexadecimal.

TU_CAP(MB): Tier capacity (Usage amount)

TT_CAP(MB): Tier capacity (Total capacity)

T(%): The free space percentage for the new allocation

P(%): Performance working ratio

R(%): Progress percentage of relocation.

- 0 to 99: Shows one of the following statuses.
 - When the value of STS is RLC or RLM: relocation is in progress.
 - When the value of STS is STP or MON: relocation is suspended.
- 100: Shows if the relocation operation is not in progress, or the relocation is completed.

B(%): Displays the amount of buffer for the tier reallocation.

MM: Displays the mode of performance monitoring:

- PM: Periodical mode.
- CM: Continuous mode.

raidcom set hba_wwn

Sets a nickname (maximum 64 characters) to the specified WWN on the specified port.

If the specified port does not exist, the command is rejected with EX_ENOOBJ.

If a nickname exists to the specified WWN, it is changed as NEW.

Syntax

```
raidcom set hba_wwn -port <port#>[<host group name>]  
-hba_wwn <WWN strings> -wwn_nickname <WWN Nickname>
```

Options and parameters

Option	Description
-port <port#>[<host group name>]	Specifies the port number. For example: • CL1-A-g (g: 0-254) • CL1-A Linux_X86
-hba_wwn <WWN strings>	Specifies WWN values (hexadecimal value). For example: • 21000e08b0256f8 • 21000e0,8b0256f8 (The value can be split in units of 4 bytes by ",", (commas)).
-wwn_nickname <WWN Nickname>	Specifies the nickname (maximum 64 characters) to be assigned to the WWN of a specific port. You cannot specify the same nickname to another WWN in the same port.

Examples

Giving the nickname of "ORA_NODE0_CTL_0" to the connection host "WWN: 210000e0,8b0256f8" to which the CL4-E and host group #0 are set.

```
# raidcom set hba_wwn -port CL4-E-0 -hba_wwn 210000e0,8b0256f8  
-wwn_nickname ORA_NODE0_CTL_0
```

raidcom reset hba_wwn

Deletes the nickname from the specified WWN on the specified port.

If there is no specified port, the command is rejected with EX_ENOOBJ.

syntax

```
raidcom reset hba_wwn -port <port#>[<host group name>]  
-hba_wwn <WWN strings>
```

Options and parameters

Option	Description
-port <port#>[<host group name>]	Specifies the port number. For example: - CL1-A-g (g: 0-254) - CL1-A Linux_X86
-hba_wwn <WWN strings>	Specifies WWN value (Hexadecimal value). For example: 21000e08b0256f8 21000e0,8b0256f8 (The value can be split in units of 4 bytes by ",", (commas).

Examples

Deleting the nickname that is given to the connection host
"WWN:210000e0,8b0256f8" to which the CL4-E or Host group #0 are set.

```
# raidcom reset hba_wwn -port CL4-E-0 -hba_wwn 210000e0,8b0256f8
```

raidcom monitor pool

Sets the start or stop of performance monitoring of a pool for Dynamic Tiering and Dynamic Tiering for Mainframe.

Syntax

```
raidcom monitor pool -pool {<pool ID#> | <pool naming>}  
-operation <type>
```

Options and parameters

Option	Description
-pool {<pool ID#> <pool naming>}	Specifies the pool ID (0-127) or pool name of a pool for Dynamic Tiering or Dynamic Tiering for Mainframe. When specifying just a number, it is recognized as a pool ID. Therefore, when you specify a pool that the pool name is only a number, operate by specifying pool ID instead of specifying pool name.

Option	Description
-operation <type>	Instructs the operation of performance monitoring. The operational types that can be specified are shown below. start: Start the performance monitoring. stop: Stop the performance monitoring.

Examples

Starting the performance monitoring of a pool with Pool ID: 20.

```
# raidcom monitor pool -pool 20 -operation start
```

Starting the performance monitoring of a pool with Pool Name: my_tier_pool.

```
# raidcom monitor pool -pool my_tier_pool -operation start
```

Stopping the performance monitoring of a pool with Pool ID: 20.

```
# raidcom monitor pool -pool 20 -operation stop
```

Stopping the performance monitoring of a pool with Pool Name: my_tier_pool.

```
# raidcom monitor pool -pool my_tier_pool -operation stop
```

raidcom reallocate pool

Sets the start or stop of Tier relocation of a pool for Dynamic Tiering and Dynamic Tiering for Mainframe.

Syntax

```
raidcom reallocate pool -pool {<pool ID#> | <pool naming>}
      -operation <type>
```

Options and parameters

Option	Description
-pool {<pool ID#> <pool naming>}	Specifies the pool ID (0-127) or pool name of a Dynamic Tiering or Dynamic Tiering for Mainframe pool. When only a number is specified, it is recognized as a pool ID. Therefore, when you specify a pool whose name is only a number, use the pool ID instead of the pool name.
-operation <type>	Relocation operation instruction: start: Start the tier relocation. stop: Stop the tier relocation.

Examples

Starting the tier relocation of a pool with Pool: 20.

```
# raidcom reallocate pool -pool 20 -operation start
```

Starting the tier relocation of a pool with Pool Name: my_tier_pool.

```
# raidcom reallocate pool -pool my_tier_pool -operation start
Stopping the relocation of a pool with Pool: 20.

# raidcom reallocate pool -pool 20 -operation stop
Stopping the relocation of a pool with Pool Name: my_tier_pool.

# raidcom reallocate pool -pool my_tier_pool -operation stop
```

raidcom get command_status

It displays an error information of the configuration setting command (asynchronous command) to be executed asynchronously.

When an error occurs with the execution of an asynchronous command, the total number of errors or error information such as error codes (SSB1 and SSB2) are stored in the storage system at the first occurrence. After executing asynchronous command, check the error information by executing this command.

However, an error from the second time occurrence, error codes of SSB1 and SSB2 will not be stored. To be able to refer the error code when an error occurs, reset the error information that is stored by the storage system by executing **raidcom reset command_status** before and after executing asynchronous command.

Syntax

```
raidcom get command_status [-time <time(sec)>]
```

Options and parameters

Option	Description
[-time <time(sec)>]	Specifies waiting time to complete the process of asynchronous command. If this option is omitted, the default waiting time (CMD_DEF_TMOUT: 7200 sec.) is set.

Examples

Displaying error information of the asynchronous command.

```
# raidcom get command_status
HANDLE SSB1 SSB2 ERR_CNT Serial# Description
7E30 2E20 6000 4 64034 The pool ID is not installed
```

Description of each column in output example

HANDLE: handle number that uniquely identifies the user

SSB1: SSB1 error code. For details about error codes, see the Hitachi Command Control Interface User and Reference Guide.

SSB2: SSB2 error code. For details about error codes, see the Hitachi Command Control Interface User and Reference Guide.

ERR_CNT: total number of errors in this user handle

Serial#: serial number

Description: Error information. If no error occurred, a hyphen (-) is displayed.

Returned Value: Either of the following returned values is returned to exit (), which allows users to check the execution results using a user program or a script.

- 0: Normal Termination
- 1: One or more errors occurred.

Abnormal termination

EX_EWSTOT : Timeout while waiting the result of the command execution

raidcom reset command_status

Resets the error information of the configuration setting command that is stored in the storage system and executed asynchronously (Asynchronous command).

Syntax

```
raidcom reset command_status
```

Options and parameters

None

Examples

Resetting the error information of the asynchronous command.

```
# raidcom reset command_status
```

raidcom add resource

Creating resource groups. If you specify only the resource group name, an empty resource group is created.

When you input a resource group name and a resource group ID, the current name of the resource group whose ID you specify is changed to the new resource group name.

When you specify resource group name, LDEV number, port number, host group number, parity group ID or an external group ID, the specified resource is registered to the specified resource group. If the specified resource group does not exist, an error occurs. When the resource group is already created, the specified resource is added to the resource group. You can specify a device group name instead of an LDEV number.

When the relevant LDEVs configure the pool, journal, and LUSE, all LDEVs must be added to the same resource group or delete them.

Syntax

```
raidcom add resource -resource_name <resource group name>
[-resource_id <resource group_id | -ldev_id <ldev#>
| -port <port#> | -port <port#> [<host group name>]
| -parity_grp_id <gno-sgno>
| -external_grp_id <gno-sgno>
| -grp_opt <group option>
| -device_grp_name <device group name> [<device name>]
```

Options and parameters

Option	Description
-resource_name <resource group name>	Specifies the resource group name. Up to 32 characters can be specified.
-resource_id <resource group_id	Specifies the resource group ID (1-1023) (for example, 5).
-ldev_id <ldev#>	Specifies the LDEV number (0-65279) (for example, -ldev_id 200).
-port <port#>	Specifies the port number. Specifies the number of the port whose attribute is ELUN (External) (for example, CL1-A).
-port <port#> [<host group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID instead of the host group name (for example, CL1-A-g, where g is from 0 to 254).
-parity_grp_id <gno-sgno>	Specifies the parity group number (gno:1-32, sgno:1-16) (for example, 3-1).
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096) (for example, 52-11, "E" is not required).
-grp_opt <group option>	Specifies the device information extracted from the LDEV in the device group. Specify "ldev" (fixed). The information about the LDEV in the device group is used.
- device_grp_nam e <device group name> [<device name>]	Specifies the name of the device group (maximum 32 characters). To specify an LDEV in the device group, use the device name of the LDEV (maximum 32 characters). If the device name is omitted, this command is applied to all LDEVs in the specified device group.

Examples

Creating a resource group of resource group name: sql_srv.

```
# raidcom add resource -resource_name sql_srv
```

Changing the resource group name of the resource group ID:5 to sql_srv.

```
# raidcom add resource -resource_name sql_srv -resource_id 5
```

Add LDEV: 400 to the resource group: sql_srv.

```
# raidcom add resource -resource_name sql_srv -ldev_id 400
```

Adding a port of CL1-A to a resource group: sql_srv.

```
# raidcom add resource -resource_name sql_srv -port CL1-A
```

Adding a host group of CL1-A-0 to a resource group: sql_srv.

```
# raidcom add resource -resource_name sql_srv -port CL1-A-0
```

Adding a parity group:33-16 to a resource group: sql_srv.

```
# raidcom add resource -resource_name sql_srv -parity_grp_id 33-16
```

Adding an external volume group:01-02 to a resource group: sql_srv.

```
# raidcom add resource -resource_name sql_srv -external_grp_id 01-02
```

raidcom delete resource

Deletes resource groups. You can delete a resource group only after all resources that are registered to that resource group have been deleted.

LDEV number, port number, host group number, parity group, and external group are deleted from the specified resource groups. The deleted resources are moved to resource group 0. You can specify a device group name instead of a LDEV number.

If an LDEV is a volume that configures a pool, journal, or LUSE, all LDEVs of the pool, journal, or LUSE must be assigned to the same resource group.

Syntax

```
raidcom delete resource -resource_name <resource group name>  
[-ldev_id <ldev#> | -port <port#> | -port <port#>  
[<host_group name>] | -parity_grp_id <gno-sgno> |  
-external_grp_id <gno-sgno> | -grp_opt <group option>  
-device_grp_name <device group name> [<device name>]
```

Options and parameters

Option	Description
-resource_name <resource group name>	Specifies the resource group name. Up to 32 characters can be specified.
-ldev_id <ldev#>	Specifies the LDEV number (0-65279). For example: -ldev_id 200
-port <port#>	Specifies the port number. For example: CL1-A
-port <port#> [<host_group name>]	Specifies the port number, host group ID, and host group name. If the host group name is more than 64 characters, use the host group ID instead of the host group name. For example: CL1-A-g (g is from 0 to 254)
-parity_grp_id <gno-sgno>	Specifies the parity group number (gno:1-32, sgno:1-16). For example: 3-1

Option	Description
-external_grp_id <gno-sgno>	Specifies the external volume group number (gno:1-16384, sgno:1-4096). For example: 52-11 ("E" is not required)
-grp_opt <group option>	Specifies the device information for the LDEV in the device group. Specify "ldev" (fixed). The information about the LDEV in the device group is used.
-device_grp_name <device group name> [<device name>]	Specifies the name of device group (maximum 32 characters) to be deleted. To specify an LDEV in the device group, specify the device name of the LDEV (maximum 32 characters) in the device group. If the device name is omitted, the command is applied to all LDEVs in the device group.

Examples

Deleting the LDEV: 400 from the resource group: sql_srv.

```
# raidcom delete resource -resource_name sql_srv -ldev_id 400
```

Deleting a port of CL1-A from the resource group: sql_srv.

```
# raidcom delete resource -resource_name sql_srv -port CL1-A
```

Deleting a host group of CL1-A-0 from the resource group: sql_srv.

```
# raidcom delete resource -resource_name sql_srv -port CL1-A-0
```

Deleting a parity group: 33-16 from the resource group: sql_srv.

```
# raidcom delete resource -resource_name sql_srv -parity_grp_id 33-16
```

Deleting an external volume group: 01-02 from the resource group: sql_srv.

```
# raidcom delete resource -resource_name sql_srv -external_grp_id 01-02
```

Deleting the resource group: sql_srv.

```
# raidcom delete resource -resource_name sql_srv
```

raidcom get error_message

Displays the error message for the specified error code.

Syntax

```
raidcom get error_message -ssb <ssb1> <ssb2>
```

Options and parameters

Option	Description
-ssb <ssb1> <ssb2>	Specifies the error code as a hexadecimal number (add the 0x prefix). <ssb1>: Specifies SSB1 of the error code. <ssb2>: Specifies SSB2 of the error code.

Example

Displaying the error message for the error code whose SSB1 is 0x2E00 and SSB2 is 0x0023.

```
# raidcom get error_message -ssb 0x2E00 0x0023
CAUSE : Volume capacity is too small.
```

raidcom get clpr

Displays the CLPR information for the storage system.

Syntax

```
raidcom get clpr
```

Options and parameters

None

Examples

```
# raidcom get clpr
CLPR CLPR_NAME      TC_CAP(MB) TU_CAP(MB) WP_CAP(MB) SF_CAP(MB) U(%)
W(%) S(%)
001 Oracle_DB_PROD   20000    10000     2000      0 50 10 0
003 Oracle_DB_BACK   10000     5000      500       0 50  5 0
```

CLPR: CLPR number (decimal)

CLPR_NAME: nickname of the CLPR

TC_CAP(MB): capacity of cache memory of the CLPR

TU_CAP(MB): used capacity of cache memory of the CLPR

WP_CAP(MB): capacity of write pending data of the CLPR

SF_CAP(MB): capacity of sidefiles of the CLPR

U(%): usage rate of cache memory of the CLPR

W(%): rate of write pending data of the CLPR

S(%): usage rate of sidefiles of the CLPR

raidcom modify clpr

Modifies a CLPR, including migrating LDEVs, parity groups, and external volume groups to other CLPRs.

Syntax

```
raidcom modify clpr -clpr <clpr#> { -ldev_id <ldev#> | -  
parity_grp_id <gno-sgno> | -external_grp_id <gno-sgno> }
```

Options and parameters

Option	Description
-clpr <clpr#>	Specifies a CLPR number (0-31).
-ldev_id <ldev#>	Specifies an LDEV number (0-65279). For example: -ldev_id 200 You cannot specify an LDEV that is part of a LUSE using this command. For details and other important information, see the Hitachi Virtual Partition Manager User Guide.
-parity_grp_id <gno-sgno>	Specifies a parity group number (gno: 1-32, sgno: 1-16). For example: 3-1
- external_grp_id <gno-sgno>	Specifies an external volume group number (gno: 1-16384, sgno: 1-4096). For example: 52-11

Examples

Moving the LDEV 02:00 to the CLPR number 2.

```
# raidcom modify clpr -clpr 2 -ldev_id 0x0200
```

Moving the parity group 33-16 to the CLPR number 2

```
# raidcom modify clpr -clpr 2 -parity_grp_id 33-16
```

Moving the external volume group 1-1 to the CLPR number 2.

```
# raidcom modify clpr -clpr 2 -external_grp_id 01-01
```

raidcom add spm_wwn

Specifies the Server Priority Manager name for preferred/non-preferred WWNs.

Syntax

```
raidcom add spm_wwn -port <port#> -spm_name <nick_name>  
-hba_wwn <wwn_strings>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number with the Target attribute, for example: CL1-A
-spm_name <nick_name>	Specifies the SPM name, maximum of 64 characters. SPM names are managed uniquely in the entire system.
-hba_wwn <wwn_strings>	Specifies the monitored WWN: 16-digit hexadecimal (the 17th digit is ignored). Before setting the SPM name, the WWN must be registered as preferred or non-preferred.

Examples

Specifies the SPM name (WWN_NICK_LINUX) to WWN (50060e8005fa0f36).

```
# raidcom add spm_wwn -port CL4-E -spm_name WWN_NICK_LINUX  
-hba_wwn 50060e80,05fa0f36
```

raidcom add spm_group

Registers Server Priority Manager target WWN to Server Priority Manager group.

Syntax

```
raidcom add spm_group -port <port#> -spm_group <group_name>  
[<nick_name>]
```

```
raidcom add spm_group -port <port#> -spm_group <group_name> -  
hba_wwn <wwn_strings>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-spm_group <group_name> [<nick_name>]	Specifies the SPM group name (maximum 64 characters). If a <nick_name> is omitted, you must specify the -hbawwn option. SPM group names are managed uniquely in the entire system.
-hba_wwn <wwn_strings>	Specifies the SPM target WWN: 16-digit hexadecimal (the 17th digit is ignored).

Examples

Registers WWN (50060e8005fa0f36) as the group name (WWN_GRP_LINUX).

```
# raidcom add spm_group -port CL4-E -spm_group WWN_GRP_LINUX -  
hba_wwn 50060e80,05fa0f36
```

Registers the SPM name (WWN_NICK_LINUX) as the group name (WWN_GRP_LINUX).

```
# raidcom add spm_group -port CL4-E -spm_group WWN_GRP_LINUX  
WWN_NICK_LINUX
```

raidcom delete spm_wwn

Deletes WWN from the Server Priority Manager targets.

Syntax

```
raidcom delete spm_wwn -port <port#> [-hba_wwn <wwn_strings> | -  
spm_name <nick_name>]
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-hba_wwn <wwn_strings>	Specify WWN that will be monitored. Set the prioritized/non-prioritized option to WWN before setting SPM name.
-spm_name <nick_name>	Specifies the SPM name. Up to 64 characters can be set by CLI.

Examples

Deletes the SPM name (WWN_NICK_LINUX) from the SPM targets.

```
# raidcom delete spm_wwn -port CL4-E -spm_name WWN_NICK_LINUX
```

Deletes the WWN (50060e8005fa0f36) from the SPM targets.

```
# raidcom delete spm_wwn -port CL4-E -hba_wwn 50060e80,05fa0f36
```

raidcom delete spm_group

Deletes the Server Priority Manager target WWN from the Server Priority Manager group.

Syntax

```
raidcom delete spm_group -port <port#> -spm_group <group_name>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-spm_group <group_name>	Specifies the SPM group name. Up to 64 characters can be set by CLI.

Examples

Deletes the SPM group (WWN_GRP_LINUX).

```
# raidcom delete spm_group -port CL4-E -spm_group WWN_GRP_LINUX
```

raidcom modify spm_wwn

Specifies the Server Priority Manager information to the Server Priority Manager target WWN.

Syntax

```
raidcom modify spm_wwn -port <port#> [-spm_priority <y/n>]  
{-limit_io | -limit_kb | -limit_mb } <value>  
{-hba_wwn <wwn_strings> | -spm_name <nick_name>}
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-spm_priority <y/n>	Specifies preferred/non-preferred WWN. - y: preferred WWN - n: non-preferred WWN
{-limit_io -limit_kb -limit_mb } <value>	Specifies maximum value/threshold value by the I/O rate or the transmission rate. -limit_io: I/O rate, maximum value: 2,147,483,647 [IOPS] -limit_kb: transmission rate (unit of KB), maximum value: 2,147,483,647 [KB] -limit_mb: transmission rate (unit of MB), maximum value: 2,097,151 [MB] The threshold value for the prioritized WWN is the same as the threshold value for the entire system.
-hba_wwn <wwn_strings>	Specifies WWN that you set the SPM informartion. WWN is specified in hexadecimal of 16 digits. The 17th digit is ignored.
-spm_name <nick_name>	Specifies the SPM name. Up to 64 characters can be set by CLI.

Examples

Specifies WWN (50060e8005fa0f36) as non-preferred WWN, and specifies 5000/[I/O] (I/O rate) as the maximum value.

```
# raidcom modify spm_wwn -port CL4-E -spm_priority n -limit_io  
5000 -hba_wwn 50060e80,05fa0f36
```

Specifies WWN (WWN_NICK_LINUX) as non-preferred WWN, and specifies 500[MB/s] (transmission rate) as the maximum value.

```
# raidcom modify spm_wwn -port CL4-E -spm_priority n -limit_mb 500  
-spm_name WWN_NICK_LINUX
```

Specifies WWN (50060e8005fa0f36) as preferred WWN, and specifies 5000/[I/O] (I/O rate) as the threshold value.

```
# raidcom modify spm_wnn -port CL4-E -spmspm_priority y -limit_io 5000 -hba_wnn 50060e80,05fa0f36
```

Specifies the SPM name (WWN_NICK_LINUX) as preferred WWN, and specifies 500000[KB/s] (transmission rate) as the threshold value.

```
# raidcom modify spm_wnn -port CL4-E -spm_priority y -limit_kb 500000 -spm_name WWN_NICK_LINUX
```

Releases the SPM information of WWN (50060e8005fa0f36).

```
# raidcom modify spm_wnn -port CL4-E -hba_wnn 50060e80,05fa0f36
```

Releases the SPM information of the SPM name (WWN_NICK_LINUX).

```
# raidcom modify spm_wnn -port CL4-E -spm_name WWN_NICK_LINUX
```

raidcom modify spm_group

Specifies the Server Priority Manager information to the Server Priority Manager target group.

Syntax

```
raidcom modify spm_group -port <port> [-spm_priority <y/n>]
    {-limit_io | -limit_kb | -limit_mb } <value> -spm_group
    <group_name>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-spm_priority <y/n>	Specifies preferred/non-preferred WWN. - y: preferred WWN - n: non-preferred WWN
{-limit_io -limit_kb -limit_mb } <value>	Specifies maximum value/threshold value by the I/O rate or the transmission rate. -limit_io: I/O rate, maximum value: 2,147,483,647 [IOPS] -limit_kb: transmission rate (unit of KB), maximum value: 2,147,483,647 [KB] -limit_mb: transmission rate (unit of MB), maximum value: 2,097,151 [MB] If you specify the value per MB, 1 MB is calculated as 1024 KB. The threshold value for the prioritized WWN is the same as the threshold value for the entire system.
-spm_group <group_name>	Specifies the SPM group name that you set the SPM information. Up to 64 characters can be set by CLI.

Examples

Specifies the SPM group name (WWN_GRP_LINUX) as non-preferred WWN, and specifies 5000[I/O] (I/O rate) as the maximum value.

```
# raidcom modify spm_group -port CL4-E -spm_priority n -limit_io 5000 -spm_group WWN_GRP_LINUX
```

Specifies the SPM group name (WWN_GRP_LINUX) as non-preferred WWN, and specifies 500[MB/s] (transmission rate) as the maximum value.

```
# raidcom modify spm_group -port CL4-E -spm_priority n -limit_mb 500 -spm_group WWN_GRP_LINUX
```

Specifies the SPM group name (WWN_GRP_LINUX) as preferred WWN, and specifies 5000[I/O] (I/O rate) as the threshold value.

```
# raidcom modify spm_group -port CL4-E -spm_priority y -limit_io 5000 -spm_group WWN_GRP_LINUX
```

Specifies the SPM group name (WWN_NICK_LINUX) as preferred WWN, and specifies 500000[KB/s] (transmission rate) as the threshold value.

```
# raidcom modify spm_group -port CL4-E -spm_priority y -limit_kb 500000 -spm_group WWN_GRP_LINUX
```

Releases the SPM information of the SPM group name (WWN_NICK_LINUX).

```
# raidcom modify spm_group -port CL4-E -spm_group WWN_GRP_LINUX
```

raidcom get spm_wwn

Gets the Server Priority Manager information of the Server Priority Manager target WWN.

Syntax

```
raidcom get spm_wwn -port <port#> [ -hba_wwn <wwn_strings>
| -spm_name <nick_name>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-hba_wwn <wwn_strings>	Specifies WWN that you get the SPM information. WWN is specified in hexadecimal of 16 digits. The 17th digit is ignored.
-spm_name <nick_name>	Specifies the SPM name that you get the SPM information. Up to 64 characters can be set by CLI.

Examples

Gets the SPM information of WWN that belongs to the specified port (CL4-E).

```
# raidcom get spm_wnn -port CL4-EPORT SPM_MD PPC_WWN
NICK_NAME GRP_NAME Serial#
CL4-E WWN 210000e08b0256f8 WWN_NICK_LINUX_0 OLA_NODE0_CTL 63528
CL4-E WWN 210000e08b0256f7 WWN_NICK_LINUX_1 OLA_NODE0_CTL 63528
```

Specifies WWN (50060e8005fa0f36) to get the SPM information.

```
# raidcom get spm_wnn -port CL4-E -hba_wnn 50060e80,05fa0f36
PORT SPM_MD PRI IOps KBps Serial#
CL4-E WWN Y 5000 - 63528
```

Specifies the SPM name (WWN_NICK_LINUX) to get the SPM information.

```
# raidcom get spm_wnn -port CL4-E -spm_name WWN_NICK_LINUX
PORT SPM_MD PRI IOps KBps Serial#
CL4-E WWN Y - 5000 63528
```

Description on each column in output example

PORT

Displays the port to which the WWN is registered.

SPM_MD

Displays the Control mode of the SPM.

- WWN: WWN control
- PORT: Port control

SPM_WWN

Displays the registered WWN.

NICK_NAME

Displays the SPM name set to the WWN.

GRP_NAME

Displays the SPM group name to which the WWN belongs. If the WWN does not belong to the group, a hyphen is displayed.

Serial#

Displays the Seq#.

PRI

Displays the settings of the priority.

- Y: Preferred
- N: Non-preferred

IOps

If the PRI setting is Y, displays the threshold. If the PRI setting is N, displays the maximum value. If the value is set by traffic, displays a hyphen (-).

KBps

If the PRI setting is Y, displays the threshold. If the PRI setting is N, displays the maximum value. If the value is set by IOps, displays a hyphen (-). If the value is set by MB, 1 MB is calculated as 1024 KB, and displays the value by KB.

raidcom get spm_group

Gets the Server Priority Manager information of the Server Priority Manager target WWN by the Server Priority Manager group unit.

Syntax

```
raidcom get spm_group -port <port#> -spm_group <group_name>
```

Options and parameters

Option	Description
-port <port#>	Specifies the port number whose attribute is Target. For example: CL1-A
-spm_group <group_name>	Specifies the SPM group name. Up to 64 characters can be set by CLI.

Examples

Specifies the SPM group name (WWN_GRP_LINUX) to get the SPM information.

```
# raidcom get spm_group -port CL4-E -spm_group WWN_GRP_LINUX
PORT  SPM MD PRI IOps KBps Serial#
CL4-E PORT  Y 5000 - 63528
```

Description of each column in output example

PORT

Displays the port to which the WWN is registered.

SPM_MD

Displays the Control mode of the SPM.

- WWN: WWN control
- PORT: Port control

PRI

Displays the settings of the priority.

- Y: Preferred
- N: Non-preferred

IOps

If the PRI setting is Y, displays the threshold. If the PRI setting is N, displays the maximum value. If the value is set by traffic, displays a hyphen (-).

KBps

If the PRI setting is Y, displays the threshold. If the PRI setting is N, displays the maximum value. If the value is set by IOps, displays a hyphen (-). If the value is set by MB, 1 MB is calculated as 1024 KB, and displays the value by KB.

Serial#

Displays the Seq#.

raidcom monitor spm_wwn

Gets the monitoring information of Server Priority Manager target WWN.

Syntax

```
raidcom monitor spm_wwn {-hba_wwn <wwn_strings> | -spm_name  
<nick_name>}
```

Options and parameters

Option	Description
-hba_wwn <wwn_strings>	Specifies the WWN that you get the monitoring information: 16-digit hexadecimal (the 17th digit is ignored).
-spm_name <nick_name>	Specifies the SPM name that you get the monitoring information. Up to 64 characters can be set by CLI.

Examples

Specifies WWN (50060e8005fa0f36) to get the monitoring information.

```
# raidcom monitor spm_wwn -hba_wwn 50060e80,05fa0f36  
PORT  SPM_MD IOps      KBps Serial#  
CL4-E PORT  5000 5000000 63528
```

Specifies the SPM name (WWN_NICK_LINUX) to get the monitoring information.

```
# raidcom monitor spm_wwn -spm_name WWN_NICK_LINUX  
PORT  SPM_MD IOps      KBps Serial#  
CL4-E PORT  5000 5000000 63528
```

Description on each column in output example

PORT

Displays the port to which the WWN is registered.

SPM_MD

Displays the Control mode of the SPM.

- WWN: WWN control
- PORT: Port control

IOps

Displays the current IO rate (IOps) of the specified WWN of SPM name.

KBps

Displays the current transferred rate (KBps) of the specified WWN of SPM name.

Serial#

Displays the Seq#.

raidcom monitor spm_group

Gets the monitoring information of Server Priority Manager target WWN by the Server Priority Manager group unit.

Syntax

```
raidcom monitor spm_group -spm_group <group_name>
```

Options and parameters

Option	Description
-spm_group <group_name>	Specifies the SPM group name. Up to 64 characters can be set by CLI.

Examples

Specifies the SPM group name (WWN_GRP_LINUX) to get the monitoring information.

```
# raidcom monitor spm_group -spm_group WWN_GRP_LINUX
PORT  SPM_MD IOps KBps      Serial#
CL4-E PORT  5000 5000000 63528
```

Description on each column in output example:

PORT

Displays the port to which the WWN is registered.

SPM_MD

Displays the Control mode of the SPM.

- WWN: WWN control
- PORT: Port control

IOps

Displays the current IO rate (IOps) of the specified WWN of SPM name.

KBps

Displays the current transferred rate (KBps) of the specified WWN of SPM name.

Serial#

Displays the Seq#.

Hitachi Data Systems

Corporate Headquarters

2845 Lafayette Street
Santa Clara, California 95050-2639
U.S.A.
www.hds.com

Regional Contact Information

Americas

+1 408 970 1000
info@hds.com

Europe, Middle East, and Africa

+44 (0)1753 618000
info.emea@hds.com

Asia Pacific

+852 3189 7900
hds.marketing.apac@hds.com



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