

Quantum®

CLI Reference Guide

QX and QXS



QX and QXS CLI Reference Guide, 6-68385-01, December 2017, Product of USA.

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Contents

Chapter 1: About This Guide	1
About This Guide	1
Intended Audience	2
Prerequisites	2
Document Conventions and Symbols	4
Chapter 2: Using the CLI	5
Using the CLI	5
Accessing the CLI	6
CLI Output Formats	6
Use CLI Interactively	7
Use a Script to Access the CLI	7
Use the XML API	9
Scripting guidelines	11
XML API examples	12
XML API optimization	12
Command Syntax	13

General Rules For Specifying Commands	13
Specifying Drawers	14
Specifying Drives	14
Specifying Vdisks	14
Specifying Disk Groups	15
Specifying Pools	15
Specifying Volumes	15
Specifying Volume Groups	15
Specifying Ports	15
Specifying Initiators and Hosts	16
Specifying Host Groups	16
Specifying Fan Modules	16
User Password Rules	16
Command Completion, Editing, and History	17
View Help	17
Size Representations	18
Event Log	19
Chapter 3: Categorical List of Commands	20
Categorical list of commands	20
Deprecated commands	23
Removed Commands	25
Chapter 4: Alphabetical List of Commands (A-C)	28
Alphabetical List of Commands	30
abort copy	30
abort replication	31
For virtual storage	31
For linear storage	32

abort scrub	33
abort verify	35
abort volumecopy	36
add disk-group	37
add global-spare (Deprecated)	40
add host-group-members	40
add host-members	42
add replication-volume	43
add spares	45
add storage	46
add vdisk-spare (Deprecated)	48
add volume-group-members	48
check firmware-upgrade-health	49
clear cache	51
clear disk-metadata	52
clear events	54
clear expander-status	55
clear fde-keys (QXS-4 and QXS-6 Series Only)	56
convert master-to-std	57
convert std-to-master	58
copy volume	59
create certificate	61
create chap-record	63
create host	64
create host-group	66
create master-volume	67
create peer-connection	69
create remote-system	71
create replication-set	72

For virtual storage	72
For linear storage	74
create schedule	79
create snap-pool	81
create snapshots	82
create task	83
create user	88
create vdisk	92
create volume	95
create volume-group	98
create volume-set	100

Chapter 5: Alphabetical List of Commands (D-R) 104

Alphabetical List of Commands	107
delete all-master-volumes	107
delete all-snapshots	108
delete chap-records	110
delete global-spare (Deprecated)	111
delete host (Deprecated)	111
delete host-groups	111
delete hosts	113
delete initiator-nickname	114
delete master-volume (Deprecated)	115
delete peer-connection	115
delete pools	116
delete remote-system	118
delete replication-set	119
delete schedule	120
delete snap-pool	121

delete snapshot	122
delete snapshot-write-data	124
delete task	125
delete user	126
delete vdisks	127
delete vdisk-spare (Deprecated)	128
delete volume-groups	129
delete volumes	130
dequarantine	131
detach replication-volume	134
exit	136
expand disk-group	137
expand snap-pool	139
expand vdisk	140
expand volume	142
export snapshot	144
fail	145
help	146
load license	147
map volume	147
meta	149
ping	150
query peer-connection	151
reattach replication-volume	153
release volume	155
remote	156
remove disk-groups	157
remove host-group-members	159
remove host-members	160

remove replication-volume	161
remove spares	163
remove volume-group-members	164
replicate	165
replicate snapshot	166
replicate volume	167
rescan	168
reset all-statistics	169
reset controller-statistics	171
reset disk-error-statistics	172
reset disk-group-statistics	173
reset disk-statistics	175
reset host-link	176
reset host-port-statistics	177
reset pool-statistics	178
reset smis-configuration	179
reset snapshot	180
reset vdisk-statistics	182
reset volume-statistics	183
restart mc	184
restart sc	185
restore defaults	187
resume replication	188
resume replication-set	189
rollback master-volume (Deprecated)	190
rollback volume	190

Chapter 6: Alphabetical List of Commands (S) 193

Alphabetical List of Commands	198
-------------------------------------	-----

scrub disk-groups	199
scrub vdisk	200
scrub volume	201
set advanced-settings	202
set auto-write-through-trigger (Deprecated)	208
set awt (Deprecated)	208
set cache-parameters	208
set chap-record	210
set cli-parameters	212
set controller-date	215
set debug-log-parameters	217
set disk (QXS-4 and QXS-6 Series)	219
set disk-group	220
set disk-parameters	222
set email-parameters	223
set enclosure	225
set expander-fault-isolation	227
set expander-phy	228
set fde-import-key (QXS-4 and QXS-6 Series)	230
set fde-lock-key (QXS-4 and QXS-6 Series)	232
set fde-state (QXS-4 and QXS-6 Series)	233
set global-spare (Deprecated)	234
set host	234
set host-group	236
set host-name (Deprecated)	237
set host-parameters	237
set host-port-mode (QXS-4 and QXS-6 Series)	241
set initiator	242
set iscsi-parameters	243

set job-parameters (Deprecated)	245
set led	245
set network-parameters	247
set ntp-parameters	251
set password	252
set peer-connection	253
set pool	255
set priorities	256
set prompt	258
set protocols	259
set remote-system	261
set replication-primary-volume	263
set replication-set	266
set replication-volume-parameters	267
set schedule	269
set snap-pool-policy	271
set snap-pool-threshold	273
set snapshot-space	274
set snmp-parameters	276
set spares (Deprecated)	278
set syslog-parameters	278
set system	280
set task	281
set user	283
set vdisk	287
set vdisk-spare (Deprecated)	289
set volume	289
set volume-group	292
show advanced-settings	293

show auto-write-through-trigger (Deprecated)	298
show awt (Deprecated)	298
show cache-parameters	299
show certificate	301
show channels (Deprecated)	303
show chap-records	303
show cli-parameters	304
show configuration	307
show controller-date	308
show controllers	309
show controller-statistics	313
show degraded-disk-thresholds	314
show disk-groups	317
show disk-group-statistics	321
show disk-parameters	323
show disks	325
show disk-statistics	332
show email-parameters	337
show enclosures	338
show events	341
show expander-status	344
show fans	346
show fde-state (QXS-4 and QXS-6 Series)	348
show fenced-data	350
show frus	352
show host-groups	354
show host-maps (Deprecated)	356
show host-parameters (Deprecated)	357
show host-phy-statistics	357

show host-port-statistics	358
show hosts (Deprecated)	360
show initiators	360
show inquiry	362
show iscsi-parameters	363
show job-parameters (Deprecated)	365
show license	365
show maps	368
show master-volumes	371
show network-parameters	373
show ntp-status	375
show peer-connections	376
show pools	378
show pool-statistics	381
show ports	386
show power-supplies	390
show priorities	391
show protocols	393
show provisioning	395
show redundancy-mode	398
show refresh-counters	400
show remote-systems	401
show replication-images	403
show replication-sets	405
For virtual storage	405
For linear storage	408
show replication-volumes	411
show sas-link-health	415
show schedule-details (Deprecated)	416

show schedules	416
show sensor-status	418
show shutdown-status	420
show snap-pools	421
show snapshot-space	424
show snapshots	425
show snmp-parameters	428
show syslog-parameters	430
show system	431
show system-parameters	433
show task-details (Deprecated)	435
show tasks	435
show tiers (QXS-4 and QXS-6 Series Only)	442
show tier-statistics (QXS-4 and QXS-6 Series Only)	443
show unwritable-cache	446
show users	447
show vdisks	449
show vdisk-statistics	453
show versions	457
show volumecopy-status	458
show volume-copies	460
show volume-groups	461
show volume-maps (Deprecated)	463
show volume-names	463
show volume-reservations	465
show volumes	467
show volume-statistics	471
shutdown	473
start drawer	474

start vdisk	475
stop drawer	477
stop vdisk	478
suspend replication	480

Chapter 7: Alphabetical List of Commands (T-V) 482

Alphabetical List of Commands	482
test	483
trust	485
unfail controller	491
unmap volume	492
verify disk-groups	493
verify links	495
verify remote-link	496
verify vdisk	498
versions (Deprecated)	499
volumecopy	500

Chapter 8: XML API Basetype Properties 503

XML API Basetype Properties	508
advanced-settings-table	510
attribute-priorities	518
cache-parameter	518
cache-settings	520
certificate-status	521
chap-records	522
cli-parameters	523
code-load-readiness	527
code-load-readiness-reasons	527

compact-flash	528
controller-cache-parameters	529
controllers	530
controller-statistics	536
copy-volumes	538
cs-replicate-tasks	539
cs-replication	539
cs-replication-set	541
debug-log-parameters	543
disk-groups	549
disk-group-statistics	558
disk-group-statistics-paged	560
disk-hist-statistics	560
disk-statistics	563
drawer-sensors	566
drawers	568
drive-parameters	571
drive-summary	572
drives	573
email-parameters	583
enclosure-fru	585
enclosure-list	588
enclosures	590
events	594
eventsLogs	596
expander-ports	597
fan	599
fc-port	601
fde-state (QXS-4 and QXS-6 Series)	602

host	603
host-group	604
host-group-view	604
host-port-statistics	605
hosts	607
host-view	608
host-view-mappings	609
initiator	609
initiator-view	610
inquiry	611
io-modules	612
iscsi-parameters	614
iscsi-port	615
license	617
local-ports	622
local-ports-detail	622
log-header-table	623
master-volumes	624
network-parameters	625
ntp-status	627
peer-connection-info	627
peer-connections	628
peer-controllers	629
peer-ports	630
policy-threshold	630
pool-hist-statistics	632
pool-statistics	633
pool-summary	634
pools	634

port	640
power-supplies	642
product-info	645
provisioning	645
readcache-hist-statistics	647
redundancy	648
refresh-counters	650
remote-addresses	651
remote-links	651
remote-ports	652
remote-ports-detail	652
remote-system	653
replicate-volume-tasks	655
replication-image	656
replication-image-params	657
replication-set	658
replication-volume	659
replication-volume-summary	663
reset-snapshot-tasks	664
resettable-statistics	664
sas-host-phy-statistics	665
sas-port	666
sas-status-controller-a	667
sas-status-drawer	672
schedules	672
security-communications-protocols	673
sensors	676
show-other-mc-status	678
shutdown-status	679

snap-pools	679
snap-space	680
snapshots	681
snapshot-with-retention-tasks	686
snap-tasks	687
snmp-parameters	687
status	689
syslog-parameters	689
system	690
system-parameters-table	693
tasks	697
tier-hist-statistics (QXS-4 and QXS-6 Series Only)	699
tier-statistics (QXS-4 and QXS-6 Series Only)	702
tier-summary (QXS-4 and QXS-6 Series Only)	703
tiers (QXS-4 and QXS-6 Series Only)	703
time-settings-table	705
unhealthy-component	706
unwritable-cache	708
users	708
vdisk-hist-statistics	711
vdisk-statistics	712
versions	714
virtual-disk-summary	715
virtual-disks	716
volume-copy-status	723
volume-copy-tasks	724
volume-groups	725
volume-group-view	725
volume-group-view-mappings	726

volume-names	727
volume-reservations	727
volumes	729
volume-statistics	738
volume-view	740
volume-view-mappings	741
Chapter 9: Settings Changed By Restore Defaults	743
Settings Changed By Restore Defaults	743
Glossary	747



Chapter 1: About This Guide

This chapter contains the following topics:

About This Guide	1
Intended Audience	2
Prerequisites	2
Document Conventions and Symbols	4

About This Guide

This guide provides information about managing QX and QXS storage systems by using its CLI.

- Note:** Some CLI commands may or may not be supported on your system (depending on firmware version).
- Note:** This guide uses “disk” throughout the document. You must understand that the word and/or command usage of “disk” can be a hard disk drive (HDD) or a solid state drive (SSD). HDDs and SSDs can be used in any RAID type and/or vdisk (as long as the correct number of drives are available to create the RAID type and/or vdisk).
- Caution:** When creating a particular RAID type and/or vdisk, if there are not enough available HDDs or SSDs, the process will fail.

This guide provides information about CLI commands for the following QX and QXS systems:

- QXS-312/412 Hybrid
- QXS-324/424 Hybrid
- QXS-448/648 Hybrid
- QXS-456/656 Hybrid
- StorNext QXS-1200/2400
- StorNext QXS-5600
- StorNext QX-1200/2400

Intended Audience

This guide is intended for storage system administrators and service personnel.

Prerequisites

Prerequisites for using this product include knowledge of:

- Network administration
- Storage system configuration
- Storage area network (SAN) management and direct attach storage (DAS)
- Fibre Channel protocol
- Serial Attached SCSI (SAS) protocol
- Internet SCSI (iSCSI) protocol
- Ethernet protocol
- RAID technology

Before you begin to follow procedures in this guide, you must have already installed enclosures and learned of any late-breaking information related to system operation, as described in the Setup Guide and in Release Notes.

Related Documentation

For information about	See
Web links to download Quantum QX and QXS Storage guides listed below, but not shipped with the product	<i>QX and QXS Documentation Sheet*</i>
Enhancements, known issues, and late-breaking information not included in product documentation	<i>QX or QXS Release Notes</i>
Product overview and overview of setup tasks	<i>QX and QXS Getting Started Guide</i>
Regulatory compliance and safety and disposal information	<i>QX and QXS Series Product Regulatory Compliance and Safety *</i>
Using a 12- and 24-drive rackmount bracket kit to install an enclosure into a rack	<i>QX/QXS 12- and 24-Drive Rackmount Bracket Kit Installation Guide</i>
Using a 48-drive rackmount bracket kit to install an enclosure into a rack	<i>QXS 48-Drive Rackmount Bracket Kit Installation Guide</i>
Using a 56-drive rackmount bracket kit to install an enclosure into a rack	<i>QXS 56-Drive Rackmount Bracket Kit Installation Guide</i>
Installing the front bezel on a QX and QXS system	<i>QX and QXS Bezel Installation Guide</i>
Product hardware setup and related troubleshooting	<i>QX and QXS Setup Guide</i>
Using the CLI to configure and manage the product	<i>QX and QXS CLI Reference Guide</i>
Identifying and installing or replacing CRUs	<i>QX & QXS CRU Installation and Replacement Guide</i>
Events that the QX and QXS Series may report, and recommended actions to take in response to those events	<i>QX and QXS Event Descriptions Reference Guide</i>
Managing a QXS system by using its primary web interface (V3), the Disk Management Utility	<i>QXS Disk Management Utility User Guide V3</i>
Managing a QX and QXS system by using its secondary web interface (V2), the Disk Management Utility	<i>QX and QXS Disk Management Utility User Guide V2</i>

* Printed document included with product


For additional information, go to [Quantum's website](#).


Document Conventions and Symbols

Table 1: Document conventions

Convention	Element
Blue text	Cross-reference links and e-mail addresses
<u>Blue, underlined text</u>	Web site addresses
Bold text	<ul style="list-style-type: none">• Key names• Text typed into a GUI element, such as into a box• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italic text</i>	Text emphasis
Monospace text	<ul style="list-style-type: none">• File and directory names• System output• Code• Text typed at the command-line
<i>Monospace, italic text</i>	<ul style="list-style-type: none">• Code variables• Command-line variables
Monospace, bold text	Emphasis of file and directory names, system output, code, and text typed at the command-line

 **Note:** Note emphasizes important information related to the main topic.

 **Caution:** Caution indicates potential hazards to equipment or data.

 **WARNING:** Warning indicates potential hazards to personal safety.



Chapter 2: Using the CLI

This chapter contains the following topics:

Using the CLI	5
Accessing the CLI	6
CLI Output Formats	6
Use CLI Interactively	7
Use a Script to Access the CLI	7
Use the XML API	9
Command Syntax	13
Command Completion, Editing, and History	17
View Help	17
Size Representations	18
Event Log	19

Using the CLI

This chapter introduces the QX and QXS storage command-line interface (CLI).

In this guide:

- The term *disk group* refers to either a vdisk for linear storage or a virtual disk group for virtual storage.
- The term *pool* refers to either a single vdisk for linear storage or a virtual pool for virtual storage.

Accessing the CLI

The CLI software embedded in the controller modules enables you to manage and monitor storage-system operation. You can access the CLI in two ways:

- By using HTTP, HTTPS, Telnet, an SSH application, or a terminal emulator on a management host that is remotely connected through a LAN to a controller module's network port.
- By using a terminal emulator on a management host that is directly connected to a controller module's serial CLI port.

For information about accessing the CLI and obtaining IP values for storage-system management, see your product's Setup Guide.

Table 2: Default usernames and passwords

Username	Password	Roles
monitor	!monitor	Monitor (view only)
manage	!manage	Monitor, Manage (view and change)

CLI Output Formats

The CLI has two output formats:

- Console format, which is the human-to-computer interface (HCI).
- XML API format, which is the computer-to-computer interface (CCI).

Console format enables users to interact with the CLI and obtain easily readable information. This format automatically sizes fields according to content and adjusts content to window resizes. These capabilities would present problems for a CCI in the form of scripts or other client software. In console format, some commands display confirmation prompts.

XML API format enables any external application to interact with the storage system. The XML format is constructed to permit new fields to be added without impacting existing clients if they follow standard XML parsing conventions. In API format, commands do *not* use confirmation prompts.

Scripting is not supported using console format because labels, field sizes, and order of fields may change in future firmware releases. To properly script CLI commands use XML API format, which is expected to

remain consistent from release to release; field names will be consistent and new functionality will be added as new fields. These types of changes in XML output will not impact a conventional XML parsing engine.

You can change the CLI output format by using the [set cli-parameters on page 212](#) command.

Use CLI Interactively

By default the CLI is an interactive application. When you are logged into the CLI, the CLI waits for a command to be entered and then responds to it.

⚠ Caution: In the interactive mode, confirmation is required for commands that may cause data unavailability or data loss.

The following example shows interactively starting an SSH session, logging into the CLI, executing a command to show the system's current date and time, and exiting the CLI.

```
$: ssh manage@IP-address
Password:

product
System Name: Test
System Location: Lab
Version: version
# show controller-date
Controller Date: 2015-02-06 10:53:06
Time Zone Offset: -07:00

Success: Command completed successfully. (2015-02-06 10:53:06)

# exit
```

Use a Script to Access the CLI

Because basic command-line semantics provide prompts for user input and response time is indeterminate, scripts would need to use an “expect”-type mechanism to scan output for prompts. It is strongly recommended and more efficient to use the HTTP interface to access the XML API. The following example shows how to construct a Perl script to communicate with the XML API via HTTPS.

```
# Include required libraries
use LWP::UserAgent;
use Digest::MD5 qw(md5_hex);
use XML::LibXML;

# Generate the login hash used to authenticate the user. The default username
# and password are hardcoded here to illustrate the requirements for the string.
# The username and password must be joined with an underscore.

my $md5_data = "manage!manage";
my $md5_hash = md5_hex( $md5_data );

# Create a user agent for sending https requests and generate a request object.

$user_agent = LWP::UserAgent->new( );
$url = 'https://IP-address/api/login/' . $md5_hash;
$request = HTTP::Request->new( GET => $url );

# Send the request object to the system. The response will be returned.
$response = $user_agent->request($request);

# Once the script has logged in, the response returns back a session key.
# This code shows how to retrieve that session key.

my $parser = XML::LibXML->new();
my $document = $parser->parse_string( $response->content );

my $root = $document->getDocumentElement;
my @objects = $root->getElementsByTagName( 'OBJECT' );
my @properties = $objects[0]->getElementsByTagName( 'PROPERTY' );
```

```
my $sessionKey;

foreach my $property ( @properties ) {
    my $name = $property->getAttribute( 'name' );

    if( $name eq 'response' ) {
        $sessionKey = $property->textContent;
    }
}
```

The following code segment shows how to get the entire configuration information from the CLI and print the output. The output can easily be redirected to a file for archiving.

```
$url = 'https://IP-address/api/show/configuration';
$request = HTTP::Request->new(GET => $url );
$request->header('sessionKey' => $sessionKey );
$request->header('dataType' => 'ipa' );

$response = $user_agent->request( $request );

print $response->content;
```

The `dataType` in the request header can also be set to `console` which allows the standard CLI text output to be shown. This should not be used for parsing, but may be useful for tabular reports obtained directly from the CLI commands.

The next section provides more information about using the XML API.

Use the XML API

The Management Controller provides access for monitoring and management via the Telnet and SSH protocols for command-line interface semantics, or via the HTTP and HTTPS protocols for XML API request/response semantics.

You can use an XML parser, such as `XML::Parser` in Perl, to process the XML output and store this information as objects.

The output of each CLI command is composed of valid XML data until the CLI prompt (typically #) is encountered. The output contains a valid XML header followed by the XML elements described in the following table.

Table 3: XML API elements


Element	Description and attributes
RESPONSE	<p>The <code>RESPONSE</code> element is the top-level element, which contains all data output for the CLI command that was issued. The response includes:</p> <ul style="list-style-type: none">• A number of <code>OBJECT</code> elements, which varies by command.• A status object that provides a message and return code. A return code of 0 indicates that the command succeeded. Any other return code is an error code. <p>There is only one <code>RESPONSE</code> element per issued command.</p>
OBJECT	<p>In general, an <code>OBJECT</code> element describes a storage-system component such as a drive or a volume. An object has these attributes:</p> <ul style="list-style-type: none">• <code>basetype</code>. This attribute allows output in brief mode to be correlated with metadata to reduce the overhead of each command, as described in XML API optimization on page 12. This is also a good field to use to detect the type of the object (e.g., a drive, a volume, etc.).• <code>name</code>. The name of the object.• <code>oid</code>. The unique identifier for the object in the scope of the response. <p>The <code>OBJECT</code> element can contain <code>PROPERTY</code> elements.</p>
PROPERTY	<p>A <code>PROPERTY</code> element provides detail about the attributes of an <code>OBJECT</code>. A property has these attributes:</p> <ul style="list-style-type: none">• <code>name</code>. The unique name for the property within the object.• <code>key</code>. Indicates whether this property is a key value to identify this object.• <code>type</code>. The type of data represented by the element data.• <code>size</code>. Typically the maximum size of the output. Usually only important if the console output is displayed in rows.• <code>draw</code>. Whether to show or hide this data in console format.• <code>sort</code>. The type of sorting that can be applied to this property.• <code>display-name</code>. The label for this data to show in user interfaces.
COMP	<p>A <code>COMP</code> (composition) element associates nested objects, such as a task object within a schedule object. A composition element has these attributes:</p> <ul style="list-style-type: none">• <code>P</code> The oid of the part component.• <code>G</code> The oid of the group component. <p>An alternative to using <code>COMP</code> elements is described in XML API optimization on page 12.</p>

Element	Description and attributes
ASC	The association element provides a simple association description between two objects in the response. <ul style="list-style-type: none">• A. First object.• B. Second object.

Scripting guidelines

When scripting command input, use CLI syntax as defined in this guide. For use with Telnet or SSH, use a space character between command names, parameters, and their values (as shown throughout this guide). For use with the HTTP interface, use a `'` character instead of a space character between command names, parameters, and their values.

When writing scripts to parse XML API output, use an XML library to parse the data. For parsing, a script should *not* rely on ordering, spacing, or column position. To find a specific property, a script should compare property names as it searches through the data. This allows the script to be compatible with future versions that could potentially add new fields to the output.

 **Caution:** Because API format does not use confirmation prompts, use caution when scripting commands that may cause data unavailability or data loss.

The output of show commands is intended for monitoring or obtaining the current configuration. Other commands provide configuration data and display one or more status objects that specify the status of command processing. The last status object specifies the overall status of the command; other status objects indicate intermediate processing status.

The following example shows the XML API status object:

```
<OBJECT basetype="status" name="status" oid="1">
  <PROPERTY name="response-type" type="string" size="12" draw="false"
  sort="nosort" display-name="Response Type">Success</PROPERTY>
  <PROPERTY name="response-type-numeric" type="uint32" size="12" draw="false"
  sort="nosort" display-name="Response Type">0</PROPERTY>
  <PROPERTY name="response" type="string" size="180" draw="true" sort="nosort"
  display-name="Response">Command completed successfully. (2014-07-10
  13:52</PROPERTY>
  <PROPERTY name="return-code" type="sint32" size="15" draw="false"
  sort="nosort" display-name="Return Code">0</PROPERTY>
  <PROPERTY name="component-id" type="string" size="80" draw="false"
  sort="nosort" display-name="Component ID"></PROPERTY>
  <PROPERTY name="time-stamp" type="string" size="25" draw="false"
  sort="datetime" display-name="Time">2014-07-10 13:52:45</PROPERTY>
  <PROPERTY name="time-stamp-numeric" type="uint32" size="25" draw="false"
  sort="datetime" display-name="Time">1405000365</PROPERTY>
```

```
</OBJECT>
```

In a script, each command should check the previous command's status before proceeding. If the value of the status object's return-code property is 0, the command succeeded; any other value means that the command failed.

XML API examples

The following example shows a command formatted for use with the command-line interface and for use with the HTTPS interface, and its XML API output.

- Command-line interface format: `create user JSmith interfaces wbi password Abc#1379`
- HTTP interface format: `create/user/JSmith/interfaces/wbi/password/Abc#1379`

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE VERSION="L100">
  <OBJECT basetype="status" name="status" oid="1">
    <PROPERTY name="response-type" type="string" size="12" draw="false"
sort="nosort" display-name="Response Type">Success</PROPERTY>
    <PROPERTY name="response-type-numeric" type="uint32" size="12" draw="false"
sort="nosort" display-name="Response Type">0</PROPERTY>
    <PROPERTY name="response" type="string" size="180" draw="true" sort="nosort"
display-name="Response">Command completed successfully. (JSmith) - The new user
was created. (2014-07-10 14:16:29)</PROPERTY>
    <PROPERTY name="return-code" type="sint32" size="15" draw="false"
sort="nosort" display-name="Return Code">0</PROPERTY>
    <PROPERTY name="component-id" type="string" size="80" draw="false"
sort="nosort" display-name="Component ID">JSmith</PROPERTY>
    <PROPERTY name="time-stamp" type="string" size="25" draw="false"
sort="datetime" display-name="Time">2014-07-10 14:16:29</PROPERTY>
    <PROPERTY name="time-stamp-numeric" type="uint32" size="25" draw="false"
sort="datetime" display-name="Time">1405001789</PROPERTY>
  </OBJECT>
</RESPONSE>
```

XML API optimization

The following are two ways to optimize XML API performance:

- Use embedded objects. This allows one object to contain not only properties but also other objects. In general, parsing a structure such as this is easier as the association between objects is simpler. This is an alternative to using COMP elements.

- Use brief mode. In brief mode, which is disabled by default, returns a subset of attributes of object properties. The name and type attributes are always returned. Other properties can be obtained by using the [meta on page 149](#) command with the basetype of the object. This optimization reduces the number of bytes transmitted for each request and allows caching of CLI metadata. Brief mode can be enabled or disabled by using the [set cli-parameters on page 212](#) command.

The following example shows brief mode output, in which a subset of attributes is returned, and use of embedded objects:

```
# show ports
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE VERSION="L100" REQUEST="show ports">
  <OBJECT basetype="port" name="ports" oid="1" format="rows">
    <PROPERTY name="durable-id" type="string">hostport_A0</PROPERTY>
    <PROPERTY name="controller" key="true" type="string">A</PROPERTY>
    <PROPERTY name="controller-numeric" key="true" type="string">1</PROPERTY>
    <PROPERTY name="port" key="true" type="string">A0</PROPERTY>
    <PROPERTY name="port-type" type="string">FC</PROPERTY>
    ...
  <OBJECT basetype="fc-port" name="port-details" oid="2" format="rows">
    <PROPERTY name="configured-topology" type="string">PTP</PROPERTY>
    <PROPERTY name="primary-loop-id" type="string">N/A</PROPERTY>
    <PROPERTY name="sfp-status" type="string">Not present</PROPERTY>
    ...
  </OBJECT>
</OBJECT>
...
<OBJECT basetype="status" name="status" oid="17">
  <PROPERTY name="response-type" type="string">Success</PROPERTY>
  ...
</OBJECT>
</RESPONSE>
```

Command Syntax

General Rules For Specifying Commands

Command names and parameter names are not case sensitive.

Parameters enclosed in square brackets ([]) are optional. Do not type the bracket characters.

Parameter values separated by '|' characters are options. Enter only one of the values. Unless specified otherwise, enumerated values are not case sensitive.

Parameter values in italics are variables. Substitute text that is appropriate for the task you want to perform. Unless specified otherwise, variable values such as names of users and volumes are case sensitive and have a maximum length in bytes. When encoded in UTF-8, a single character can occupy multiple bytes. Standard US-ASCII characters require 1 byte; most Latin (Western European), Cyrillic, and Arabic characters are encoded with 2 bytes; most Asian characters are 3 bytes.

Unless otherwise specified, a parameter value can include spaces and printable UTF-8 characters except: ", < > \

A parameter value that includes a space must be enclosed in double quotes.

Parameters can be entered in any order. However, for a parameter with no keyword, if you want to specify a value that is partially or entirely the same as the keyword of an optional parameter, you must specify the optional parameter before the value. For example, to create a user named base you must specify the optional base parameter before the name **base**: `create user base 2 base`

Specifying Drawers

In an enclosure with drawers:

- Drive drawers are specified by enclosure ID and drawer number. Enclosure IDs increment from 0. Drawer IDs increment from 0 in each enclosure. Example: 2.1
- Drives are specified without the drawer number, as described below.

Specifying Drives

Drives are specified by enclosure ID and slot number. Enclosure IDs increment from 0. Drive IDs increment from 0 in each enclosure. You can specify:

- A drive. Example: 1.4
- A hyphenated range of drives. Example: 1.4-7
- A comma-separated list of individual drives, ranges, or both (with no spaces). Example: 1.4,1.6-9
- A RAID 10 or 50 disk group with drives in subgroups separated by colons (with no spaces). RAID-10 example: 1.1-2:1.3-4:1.7,1.10

Specifying Vdisks

For linear storage, you can specify:

- A vdisk by its name or serial number. A unique serial number is automatically assigned when a vdisk is created, and does not change for the life of the vdisk.

- A list of vdisk names or serial numbers separated by commas (with no spaces). Not all commands support lists. List example: `vd1, "My vdisk"`

Specifying Disk Groups

For virtual storage, you can specify:

- A disk group by its name or serial number.
- A list of disk-group names or serial numbers separated by commas (with no spaces). Not all commands support lists. Example: `dg1, "Disk group 1"`

Specifying Pools

For virtual storage, you can specify:

- A pool by its name or serial number.
- A list of pool names or serial numbers separated by commas (with no spaces). Not all commands support lists. Example: `A, B`

Specifying Volumes

You can specify:

- A volume by its name or serial number. A unique serial number is automatically assigned when a volume is created, and does not change for the life of the volume.
- A list of volume names or serial numbers separated by commas (with no spaces). Not all commands support lists. List example: `vd1_v1, "Vol #1"`

Specifying Volume Groups

For virtual storage, you can specify:

- A volume group by its name in the format `volume-group.*`, where `*` represents all volumes in the group. Example: `TestVolumes.*`

Specifying Ports

Controller module host ports are specified by port number only (to use the same port in both controllers) or by controller ID and port number (to specify a port in one controller).

In a 2U12 or 2U24 controller enclosure, the top controller module's ID is A and the bottom controller module's ID is B. In a 2U48 controller enclosure, the top controller module's ID is A and the bottom controller module's ID is B. In a 4U56 controller enclosure, the right controller module's ID is A and the left controller module's ID is B. Controller IDs are not case sensitive.

Port IDs increment from 0 in each controller module.

You can specify:

- A port ID in both controllers. Example: 1
- A port ID in one controller. Example: A1
- A hyphenated range of IDs. Do not mix controller IDs in a range. Example: b1-b2 or 1-2
- A comma-separated list of IDs, ranges, or both (with no spaces). Example: A1, b1-b2 or A1, 2

Specifying Initiators and Hosts

You can specify:

- An FC initiator by its nickname or 16-hex-digit WWPN.
- A SAS initiator by its nickname or 16-hex-digit WWPN.
- An iSCSI initiator by its nickname or node name (typically the IQN).
- A host by name in the format `host-name.*`, where `*` represents all initiators in the host. Example: Mail_Server.*

Specifying Host Groups

For virtual storage, you can specify:

- A host group by name in the format `host-group.*.*`, where the first `*` represents all hosts in the group and the second `*` represents all initiators in those hosts. Example: TestLab.*.*

Specifying Fan Modules

In a 4U56 enclosure:

- Fan modules are specified by enclosure ID and module number. Enclosure IDs increment from 0. Module IDs increment from 0 in each enclosure. Example: 1.1

User Password Rules

- The value is case sensitive.

- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character. This rule does not apply if the password contains UTF-8 characters that are outside the range of printable ASCII characters.

Command Completion, Editing, and History

The CLI supports command completion, command editing, and command history.

When entering commands interactively you can abbreviate their names and keywords. For example, you can enter **sho cl** to run the `show cli-parameters` command. If you press **Tab** or **Ctrl+i** after typing sufficient characters to uniquely identify the command or keyword, the remainder of the command or keyword is displayed so you can confirm your intent. If you enter too few letters to uniquely identify a keyword, pressing **Tab** or **Ctrl+i** will list commands or keywords that match the entered string and redisplay the string so you can complete it.

When scripting commands, type commands in full to aid readability.

The history contains commands entered in the active CLI session. You can recall a command from the history, edit it, and run it.

Table 4: Keyboard shortcuts for command completion, editing, and history

To	Press
Complete a partially entered keyword	Tab or Ctrl+i
Show command history	F6
Get previous command from history	Up Arrow
Get next command from history	Down Arrow
Move cursor left	Left Arrow
Move cursor right	Right Arrow
Delete previous character	Backspace

View Help

To view brief descriptions of all commands that are available to the user role you logged in as, enter:

help

To view full help for a command name, enter:

help command-name

To view the information shown in [Command Syntax on page 13](#) above, enter:

help syntax

To view the information shown in this topic and in [Command Completion, Editing, and History on the previous page](#) above, enter:

help help

Size Representations

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

In the CLI, the base for entry and display of storage-space sizes can be set per user or per session; see [create user on page 88](#) and [set cli-parameters on page 212](#). When entering storage-space sizes only, either base-2 or base-10 units can be specified.

Table 5: Size representations in base 2 and base 10

Base 2		Base 10	
Unit	Size in bytes	Unit	Size in bytes
KiB (kibibyte)	1024	KB (kilobyte)	1000
MiB (mebibyte)	1024 ²	MB (megabyte)	1000 ²
GiB (gibibyte)	1024 ³	GB (gigabyte)	1000 ³
TiB (tebibyte)	1024 ⁴	TB (terabyte)	1000 ⁴
PiB (pebibyte)	1024 ⁵	PB (petabyte)	1000 ⁵
EiB (exbibyte)	1024 ⁶	EB (exabyte)	1000 ⁶

The locale setting determines the character used for the decimal (radix) point, as shown below.

Table 6: Decimal (radix) point character by locale

Language	Character	Examples
Arabic, English, Chinese, Japanese, Korean, Russian	Period (.)	146.81 GB 3.0 Gb/s

Language	Character	Examples
Dutch, French, German, Italian, Portuguese, Spanish	Comma (,)	146,81 GB 3,0 Gb/s

Event Log

A controller enclosure's event log records all events that have occurred in or been detected by the controller modules and encompasses all field-replaceable units (FRUs) in the storage system.

Each event has one of the following levels, in decreasing severity:

- **Critical.** A failure occurred that may cause a controller to shut down. Correct the problem *immediately*.
- **Error.** A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
- **Warning.** A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.
- **Informational.** A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
- **Resolved.** A condition that caused an event to be logged has been resolved.

For information about viewing events, see the [show events on page 341](#) command.



Chapter 3: Categorical List of Commands

This chapter contains the following topics:

Categorical list of commands	20
Deprecated commands	23
Removed Commands	25

Categorical list of commands

The following table helps you find a command within a category of functionally related commands. A command might appear in more than one category.

Table 7: Commands by category

Category	Commands
CLI and users	create user on page 88 , delete user on page 126 , exit on page 136 , help on page 146 , set cli-parameters on page 212 , set password on page 252 , set prompt on page 258 , set user on page 283 , show cli-parameters on page 304 , show users on page 447

Category	Commands
Disks, disk groups, pools, tiers, and spares	abort scrub on page 33 , abort verify on page 35 , add disk-group on page 37 , add spares on page 45 , add storage on page 46 , clear degraded-disk , clear disk-metadata on page 52 , clear fde-keys (QXS-4 and QXS-6 Series Only) on page 56 , create vdisk on page 92 , delete pools on page 116 , delete vdisks on page 127 , dequarantine on page 131 , expand vdisk on page 140 , recover vdisk , remove spares on page 163 , rescan on page 168 , scrub disk-groups on page 199 , scrub vdisk on page 200 , set degraded-disk-policy , set degraded-disk-threshold , set disk (QXS-4 and QXS-6 Series) on page 219 , set disk-group on page 220 , set expander-fault-isolation on page 227 , set fde-import-key (QXS-4 and QXS-6 Series) on page 230 , set fde-lock-key (QXS-4 and QXS-6 Series) on page 232 , set fde-state (QXS-4 and QXS-6 Series) on page 233 , set led on page 245 , set pool on page 255 , set vdisk on page 287 , show degraded-disk-policy , show degraded-disk-thresholds on page 314 , show disks on page 325 , show disk-groups on page 317 , show fde-state (QXS-4 and QXS-6 Series) on page 348 , show pools on page 378 , show profiles , show tiers (QXS-4 and QXS-6 Series Only) on page 442 , show vdisks on page 449 , trust on page 485 , verify disk-groups on page 493 , verify vdisk on page 498
Volumes, volume groups, initiators, hosts, host groups, and mapping	add global-spare (Deprecated) on page 40 , add host-members on page 42 , add vdisk-spare (Deprecated) on page 48 , create host on page 64 , create host-group on page 66 , create volume on page 95 , create volume-group on page 98 , create volume-set on page 100 , delete host-groups on page 111 , delete hosts on page 113 , delete initiator-nickname on page 114 , delete vdisk-spare (Deprecated) on page 128 , delete volumes on page 130 , expand disk-group on page 137 , expand volume on page 142 , map volume on page 147 , recover volume , release volume on page 155 , remove disk-groups on page 157 , remove host-group-members on page 159 , remove host-members on page 160 , remove volume-group-members on page 164 , scrub volume on page 201 , set awt (Deprecated) on page 208 , set global-spare (Deprecated) on page 234 , set host-group on page 236 , set host-port-mode (QXS-4 and QXS-6 Series) on page 241 , set initiator on page 242 , set vdisk-spare (Deprecated) on page 289 , set volume-group on page 292 , show cache-parameters on page 299 , show host-groups on page 354 , show hosts (Deprecated) on page 360 , show maps on page 368 , show ports on page 386 , show unwritable-cache on page 446 , show volume-groups on page 461 , show volume-maps (Deprecated) on page 463 , show volume-reservations on page 465 , show volumes on page 467 , unmap volume on page 492
Snapshots, and snap pools	convert master-to-std on page 57 , convert std-to-master on page 58 , create master-volume on page 67 , create snap-pool on page 81 , create snapshots on page 82 , delete all-master-volumes on page 107 , delete all-snapshots on page 108 , delete snap-pool on page 121 , delete snapshot on page 122 , delete snapshot-write-data on page 124 , expand snap-pool on page 139 , reset snapshot on page 180 , rollback volume on page 190 , set priorities on page 256 , set snap-pool-policy on page 271 , set snap-pool-threshold on page 273 , show master-volumes on page 371 , set syslog-parameters on page 278 , show snap-pools on page 421 , show snapshots on page 425
Linear volume copy	abort volumecopy on page 36 , show volumecopy-status on page 458 , versions (Deprecated) on page 499
Virtual volume copy	abort copy on page 30 , copy volume on page 59 , show volume-copies on page 460

Category	Commands
Scheduled tasks	create schedule on page 79 , create task on page 83 , delete schedule on page 120 , delete task on page 125 , set schedule on page 269 , set task on page 281 , show schedules on page 416 , show task-details (Deprecated) on page 435
Event notification	set email-parameters on page 223 , set snmp-parameters on page 276 , set syslog-parameters on page 278 , show email-parameters on page 337 , show events on page 341 , show snmp-parameters on page 428 , show syslog-parameters on page 430 , test on page 483
System configuration and utilities	check firmware-upgrade-health on page 49 , clear cache on page 51 , create certificate on page 61 , create chap-record on page 63 , create temp-license , delete chap-records on page 110 , ping on page 150 , reset host-link on page 176 , restart mc on page 184 , restart sc on page 185 , set advanced-settings on page 202 , set awt (Deprecated) on page 208 , set chap-record on page 210 , set controller-date on page 215 , set disk-parameters on page 222 , set enclosure on page 225 , set expander-fault-isolation on page 227 , set expander-phy on page 228 , set host-name (Deprecated) on page 237 , set host-port-mode (QXS-4 and QXS-6 Series) on page 241 , set iscsi-parameters on page 243 , set led on page 245 , set network-parameters on page 247 , set ntp-parameters on page 251 , set protocols on page 259 , set system on page 280 , show advanced-settings on page 293 , show cache-parameters on page 299 , show certificate on page 301 , show channels (Deprecated) on page 303 , show configuration on page 307 , show controller-date on page 308 , show controllers on page 309 , show disk-parameters on page 323 , show enclosures on page 338 , show expander-status on page 344 , show fans on page 346 , show fenced-data on page 350 , show frus on page 352 , show inquiry on page 362 , show iscsi-parameters on page 363 , show license on page 365 , show network-parameters on page 373 , show ntp-status on page 375 , show ports on page 386 , show power-supplies on page 390 , show provisioning on page 395 , show protocols on page 393 , show redundancy-mode on page 398 , show sas-link-health on page 415 , show sensor-status on page 418 , show shutdown-status on page 420 , show system on page 431 , show system-parameters on page 433 , show versions on page 457 , shutdown on page 473
Service utilities	clear events on page 54 , clear expander-status on page 55 , fail on page 145 , reset smis-configuration on page 179 , restore defaults on page 187 , set debug-log-parameters on page 217 , set expander-fault-isolation on page 227 , set expander-phy on page 228 , show debug-log-parameters , show expander-status on page 344 , unfail controller on page 491
API specific	meta on page 149 , show refresh-counters on page 400
Remote systems	create remote-system on page 71 , delete remote-system on page 118 , remote on page 156 , set remote-system on page 261 , show remote-systems on page 401 , verify links on page 495 , verify remote-link on page 496

Category	Commands
Linear volume replication	abort replication on page 31 , add replication-volume on page 43 , create replication-set on page 72 , delete replication-set on page 119 , detach replication-volume on page 134 , export snapshot on page 144 , reattach replication-volume on page 153 , remove replication-volume on page 161 , replicate snapshot on page 166 , replicate volume on page 167 , resume replication on page 188 , set replication-primary-volume on page 263 , set replication-volume-parameters on page 267 , show replication-images on page 403 , show replication-sets on page 405 , show replication-volumes on page 411 , start vdisk on page 475 , stop vdisk on page 478 , suspend replication on page 480
Peer connections	create peer-connection on page 69 , delete peer-connection on page 115 , query peer-connection on page 151 , set peer-connection on page 253 , show peer-connections on page 376
Virtual volume replication	abort replication on page 31 , create replication-set on page 72 , delete replication-set on page 119 , replicate on page 165 , resume replication-set on page 189 , set replication-set on page 266 , show replication-sets on page 405 , suspend replication-set
Statistics	reset all-statistics on page 169 , reset controller-statistics on page 171 , reset disk-error-statistics on page 172 , reset disk-group-statistics on page 173 , reset disk-statistics on page 175 , reset host-port-statistics on page 177 , reset pool-statistics on page 178 , reset vdisk-statistics on page 182 , reset volume-statistics on page 183 , show controller-statistics on page 313 , show disk-group-statistics on page 321 , show disk-statistics on page 332 , show host-parameters (Deprecated) on page 357 , show host-port-statistics on page 358 , show pool-statistics on page 381 , show tier-statistics (QXS-4 and QXS-6 Series Only) on page 443 , show vdisk-statistics on page 453 , show volume-statistics on page 471

Each basetype topic includes the following information:

- References to CLI commands that directly use the basetype.
- For each property, the values of its name and type elements, and a description of the values that the property may show. For descriptions of other elements see .
- References to embedded or nested basetypes that the output may show.

Deprecated commands

The following table lists commands that are deprecated and specifies other commands to use instead, if any. Deprecated commands remain usable in this release but may be removed in a future release. If you have scripts that use deprecated commands, update the scripts to use the replacement commands instead.

Table 8: Deprecated commands

Deprecated command	Replacement command
add global-spare	add spares
add vdisk-spare	add spares
delete global-spare	remove spares
delete host	delete initiator-nickname
delete master-volume	delete volumes
delete vdisk-spare	remove spares
rollback master-volume	rollback volume
set auto-write-through-trigger	set advanced-settings
set awt	set advanced-settings
set global-spare	add spares
set host-name	set initiator
set job-parameters	set advanced-settings
set spares	add spares, remove spares
set storage-pool overcommit	set pool
set storage-pool	set pool
set vdisk-spare	add spares
show auto-write-through-trigger	show advanced-settings
show awt	show advanced-settings
show channels	show ports
show host-maps	show maps
show host-parameters	show ports
show hosts	show initiators
show job-parameters	show advanced-settings
show schedule-details	show schedules

Deprecated command	Replacement command
show task-details	show tasks
show volume-maps	show maps
verify storage-pool-components	verify disk-groups
versions	show versions

Removed Commands

The following table lists commands that were removed in previous releases and specifies commands to use instead, if any.

Table 9: Commands removed in previous releases

Removed command	Replacement command
add storage-pool-components	add disk-groups
clear disk metadata	clear disk-metadata
cls	None
create host-name	set initiator
create host-wwn-name	set initiator
create iscsi-host	set initiator
create storage-pool	None
delete all-volumes	delete all-master-volumes
delete host-wwn-name	delete initiator-nickname
delete iscsi-host	delete initiator-nickname
delete storage-pool	delete pools
delete vdisk	delete vdisks
echo	None
exec	None

Removed command	Replacement command
expand master-volume	expand volume
history	None
remove storage-pool-components	remove disk-groups
reset host-channel-link	reset host-link
reset snap-pool	None
scrub disk	None
scrub storage-pool-components	None
set drive-parameters	set disk-parameters
set host-port-interconnects	None – not applicable to QXS-3/4 Series, QX, or QXS-1200/2400/5600
set host-wwn-name	set initiator
set iscsi-host	set initiator
set output-format	set cli-parameters
set replication-external-view	set replication-primary-volume
set snap-pool-parameters	None
set snap-pool policy	set snap-pool-policy
set snap-pool threshold	set snap-pool-threshold
set snapshot-policy	None
show drive-parameters	show disk-parameters
show enclosure-status	show enclosures, show frus, show sensor-status
show host-port-interconnects	None – not applicable to QXS-3/4 Series, QX, or QXS-1200/2400/5600
show host-wwn-names	show initiators
show iscsi-hosts	show initiators
show lun-maps	show maps
show output-format	show cli-parameters
show port-wwn	show ports

Removed command	Replacement command
show storage-pool-components	show disk-groups
show storage-pools	show pools
show storage-status	show disk-group-statistics
show volume copy-status	show volumecopy-status
stty	None
tInfo	None



Chapter 4: Alphabetical List of Commands (A-C)

This chapter contains the following topics:

Alphabetical List of Commands	30
abort copy	30
abort replication	31
abort scrub	33
abort verify	35
abort volumecopy	36
add disk-group	37
add global-spare (Deprecated)	40
add host-group-members	40
add host-members	42
add replication-volume	43
add spares	45
add storage	46
add vdisk-spare (Deprecated)	48
add volume-group-members	48
check firmware-upgrade-health	49

clear cache	51
clear disk-metadata	52
clear events	54
clear expander-status	55
clear fde-keys (QXS-4 and QXS-6 Series Only)	56
convert master-to-std	57
convert std-to-master	58
copy volume	59
create certificate	61
create chap-record	63
create host	64
create host-group	66
create master-volume	67
create peer-connection	69
create remote-system	71
create replication-set	72
create schedule	79
create snap-pool	81
create snapshots	82
create task	83
create user	88
create vdisk	92
create volume	95
create volume-group	98
create volume-set	100

Alphabetical List of Commands

This chapter is organized to help you find a command by name. Each command topic includes one or more of the following sections:

Description	The command's purpose and notes about its usage
Minimum role	The minimum user role required to use the command
Syntax	The command's syntax
Parameters	Descriptions of the command's parameters
Output	Descriptions of fields shown in console format
Examples	One or more examples of the command's usage in console format
Basetypes	References to descriptions of basetype properties shown in XML API format
See also	References to commands that are used with the command

abort copy

Description

Aborts a copy volume operation.

When the operation is complete, the destination volume is deleted.

Minimum role

manage

Syntax

```
abort replication  
source-volume-ID
```

Parameters

source-volume-ID

The name or serial number of the source volume. A name that includes a space must be enclosed in double quotes.

Examples

```
Abort copying volume SourceVol to volume DestVol.  
# abort copy SourceVol
```

See also

- [copy volume on page 59](#)
- [show volume-copies on page 460](#)
- [show volumes on page 467](#)

abort replication

For virtual storage

Description

Aborts the current replication operation for the specified replication set.

The current replication may be running or suspended. Aborting a replication for a replication set in a Ready or Unsynchronized state will generate an error. This command must be run on the replication set's primary system.

- **Note:** If you abort a replication operation, the snapshot space allocated for that replication in the primary pool and the secondary pool will not be freed. To free that space, either re-run the initial replication or delete the replication set.

Minimum role

manage

Syntax

```
abort replication  
replication-ID
```

Parameters

replication-ID

The name or serial number of the replication set in which to abort replications.

Examples

```
Abort active replications in replication set RS1.  
# abort replication RS1
```

See also

- [replicate on page 165](#)
- [resume replication-set on page 189](#)
- [show replication-sets on page 405](#)
- [suspend replication-set](#)

For linear storage

Description

Aborts the current replication operation for the specified secondary volume.

The current replication may be running or suspended. This command must be issued on the system that owns the secondary volume.

Minimum role

manage

Syntax

```
abort replication  
[set replication-set]  
replication-volume
```

Parameters

set replication-set-ID

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

replication-ID

The name or serial number of the secondary volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the set parameter.

Examples

```
Abort replication of primary volume V1 to secondary volume rV1.  
# abort replication rV1
```

See also

- [resume replication on page 188](#)
- [suspend replication on page 480](#)
- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

abort scrub

Description

Aborts a media scrub operation.

Minimum role

manage

Syntax

```
abort scrub  
[disk-group disk-groups]  
[vdisk vdisks]  
[volume volumes]
```

Parameters

Specify only one of the following parameters.

disk-group disk-groups

Optional. A comma-separated list of the names or serial numbers of the disk groups to stop scrubbing. A name that includes a space must be enclosed in double quotes.

vdisk vdisks

Optional. A comma-separated list of the names or serial numbers of the vdisks to stop scrubbing. A name that includes a space must be enclosed in double quotes.

volume volumes

Optional. A comma-separated list of the names or serial numbers of the volumes to stop scrubbing. A name that includes a space must be enclosed in double quotes.

Examples

```
Abort scrubbing disk group dg1.  
# abort scrub disk-group dg1  
  
Abort scrubbing vdisk vd1.  
# abort scrub vdisk vd1  
  
Abort scrubbing volume vol1.  
# abort scrub volume vol1
```

See also

[scrub disk-groups on page 199](#)

[scrub vdisk on page 200](#)

[scrub volume on page 201](#)

[show disk-groups on page 317](#)

[show vdisks on page 449](#)

[show volumes on page 467](#)

abort verify

Description

Aborts a media verify operation.

Minimum role

manage

Syntax

```
abort verify  
[disk-group disk-groups]  
[vdisk vdisks]
```

Parameters

disk-group disk-groups

Optional. A comma-separated list of the names or serial numbers of the disk groups to stop verifying. A name that includes a space must be enclosed in double quotes.

vdisk vdisks

Optional. A comma-separated list of the names or serial numbers of the vdisks to stop verifying. A name that includes a space must be enclosed in double quotes.

Examples

```
Abort verifying disk group dg1.  
# abort verify disk-group dg1  
  
Abort verifying vdisk vd1.  
# abort verify vdisk vd1
```

See also

[show disk-groups on page 317](#)

[show vdisks on page 449](#)

[verify disk-groups on page 493](#)

[verify vdisk on page 498](#)

abort volumecopy

Description

Aborts copying a volume. This command applies to linear storage only. When the abort is complete, the destination volume is deleted.

Minimum role

manage

Syntax

```
abort volumecopy  
volume
```

Parameters

volume

The name or serial number of the source volume, the destination volume, or if a snapshot is being copied, its associated master volume. A name that includes a space must be enclosed in double quotes.

Examples

```
Abort creating destination volume vd1_copy.  
# abort volumecopy v1_copy
```

See also

[show volumecopy-status on page 458](#)

[show volumes on page 467](#)

[versions \(Deprecated\) on page 499](#)

add disk-group

Description

Creates a disk group using specified drives.

For linear storage, you can create a linear disk group.

For virtual storage, with the Virtualization license, you can create a virtual disk group or a read-cache disk group. For QXS-312 and QXS-324, virtualization is not supported.

All drives in a disk group must be the same type (enterprise SAS, for example).

-
- Note:** A disk group can contain a mix of 512-byte native sector size (512n) disks and 512-byte emulated sector size (512e) disks. For consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

For virtual storage, a disk group of midline SAS disks will be used in the Archive tier. A disk group of enterprise SAS disks will be used in the Standard tier. A group of SAS SSDs can be used either in the Performance tier (with the Performance tier license) or as read cache. A virtual pool can contain only one read-cache group. A virtual pool cannot contain both read cache and a Performance tier. At least one virtual group must exist before a read-cache group can be added. A read-cache disk group can contain a maximum of two disks.

When you add a virtual disk group, the system will first prepare the disk group to be added to a virtual pool. During preparation, the disk group's status will be VPREP and the disk group cannot be removed. When preparation is complete, the disk group will start initializing. During initialization, the disk group's status will be INIT and the disk group will be available to store user data—or the disk group can be removed.

-
- Note:** All virtual disk groups in the same tier in a virtual pool should have the same RAID level, capacity, and physical number of disks. This will provide consistent performance across the tier.

-
- Note:** To replace a single-disk read-cache disk group with a multiple-disk read-cache disk group, simply remove the read cache and re-add it.

-
- Note:** If the only disk group in a virtual pool is quarantined, the pool will be inaccessible and attempting to add a new disk group to that pool will fail with a “duplicate name” error. Before you can add a disk group to that pool, you must resolve the problem with the quarantined disk group.

Minimum role

manage

Syntax

```
add disk-group
[assigned-to a|b|auto]
[chunk-size 16k|32k|64k|128k|256k|512k]
disks disks
[level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10|raid50|r50]
[mode online|offline]
[pool a|b]
[spare disks]
type linear|virtual|read-cache
[name]
```

Parameters

assigned-to a|b|auto

Optional for linear storage. Prohibited for virtual storage. For a system operating in Active-Active ULP mode, this specifies the controller module to own the group. To let the system automatically load-balance groups between controller modules, use auto or omit this parameter. In Single Controller mode, this parameter is ignored; the system automatically load-balances groups in anticipation of the insertion of a second controller in the future.

chunk-size 16k|32k|64k|128k|256k|512k

Optional for linear storage. Prohibited for virtual storage. For linear storage, this specifies the amount of contiguous data, in KB, that is written to a disk group member before moving to the next member of the group. For NRAID and RAID 1, chunk-size has no meaning and is therefore not applicable. For RAID 50, this option sets the chunk size of each RAID-5 subgroup. The chunk size of the RAID-50 group is calculated as: *configured-chunk-size* x (*subgroup-members* - 1). The default is 512k.

i Note: For virtual storage, the system will use one of the following chunk sizes, which cannot be changed:

- RAID 1: Not applicable.
- RAID 5 and RAID 6:
 - With 2, 4, or 8 non-parity disks: 512k. For example, a RAID-5 group with 3, 5, or 9 total disks or a RAID-6 group with 4, 6, or 10 total disks.
 - Other configurations: 64k.
- RAID 10: 512k.

disks disks

Specifies the IDs of the disks to include in the group. For disk syntax, see [Command Syntax on page 13](#).

The minimum and maximum numbers of disks supported for each RAID level are:

NRAID: 1

RAID 0: 2–16

RAID 1: 2

RAID 3: 3–16

add disk-group

RAID 5: 3–16

RAID 6: 4–16

RAID 10: 4–16

RAID 50: 6–32 (linear storage only)

RAID 10 requires a minimum of two RAID-1 subgroups each having two disks. RAID 50 requires a minimum of two RAID-5 subgroups each having three disks. NRAID is automatically used for a read-cache group with a single disk. RAID 0 is automatically used for a read-cache group with multiple disks.

level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10|raid50|r50

Required for a linear or virtual group. Prohibited for a read-cache group. Specifies the RAID level to apply to the member disks. Fault-tolerant RAID levels are RAID 1, 3, 5, 6, 10, and 50. A linear group can use any RAID level. A virtual group can use only RAID 1, 5, 6, or 10.

mode online|offline

Optional for a linear group. Prohibited for a virtual or read-cache group. Specifies whether the group is initialized online or offline.

- **online:** After a brief initialization period (seconds), the disk-group state is set to FTOL and I/O operations can be performed on the disk group. Subsequently, an initialization pass across the LBA extent is performed during which the existing data on the member data disks of the disk group is read, parity is generated, and only parity is written to the disk group (the data-area contents are preserved and not zeroed). This pass can take hours to complete on a large disk group. Online mode is the default for a linear disk group. Online mode is always used for a virtual disk group.
- **offline:** The disk group will be in an unavailable, offline (OFFL) state during the initialization process, during which zeros are written to all data and parity sectors of the LBA extent of the disk group. This can take hours to complete on a large disk group but is faster than online mode. When initialization is complete, the disk group state is set to FTOL and I/O operations can be performed on the disk group.

pool a|b

Required for a virtual or read-cache disk group. Prohibited for a linear disk group. Specifies the name of the virtual pool to contain the disk group. If the pool does not already exist, it will be created.

spare disks

Optional for a linear disk group. Prohibited for a virtual or read-cache disk group. Specifies the IDs of 1–4 dedicated spares to assign to a RAID 1, 3, 5, 6, 10, or 50 disk group. For disk syntax, see [Command Syntax on page 13](#). Only global spares are used for virtual disk groups.

type linear|virtual|read-cache

Required. Specifies the type of disk group to create.

- **linear:** A disk group for linear storage.
- **virtual:** A disk group for virtual storage.
- **read-cache:** A disk group for use as read cache for a virtual pool. Not supported.

name

Optional for a virtual or read-cache disk group. Required for a linear disk group. Specifies a name for the new disk group. The name must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \

add global-spare (Deprecated)

- A value that includes a space must be enclosed in double quotes.

If this parameter is omitted, the system will generate the name `dgcontroller-ID#` where # starts at 0 for a virtual disk group, or `rccontroller-ID` for a read-cache disk group.

Examples

Add linear RAID-1 disk group `dg1` with one spare.

```
# add disk-group type linear disks 1.20-21 level r1 spare 1.22 dg1
```

Add virtual RAID-5 disk group `dg2` to pool A.

```
# add disk-group type virtual disks 1.17-19 level r5 pool a
```

Add a read-cache disk group to pool B. The resulting group will be named `rcB`.

```
# add disk-group type read-cache disks 1.18-19 pool b
```

See also

[expand disk-group on page 137](#)

[remove disk-groups on page 157](#)

[set disk-group on page 220](#)

[show disk-groups on page 317](#)

[show disks on page 325](#)

add global-spare (Deprecated)

Use [add spares on page 45](#).

add host-group-members

Description

Adds hosts to a host group. A host group can contain a maximum of 256 hosts.

To add a host to a host group, the host must have the same mappings as all other members of the group. This means that the host must be mapped with the same access, port, and LUN settings to the same volumes or volume groups.

Minimum role

manage

Syntax

```
add host-group-members  
hosts hosts  
host-group
```

Parameters

hosts hosts

A comma-separated list of the names of hosts to add to the specified host group. A name that includes a space must be enclosed in double quotes.

host-group

The name of an existing host group.

Examples

```
Add existing hosts Host3 and Host4 to existing host group HostGroup1.  
# add host-group-members hosts Host3,Host4 HostGroup1
```

See also

[remove host-group-members on page 159](#)

[show host-groups on page 354](#)

[show hosts \(Deprecated\) on page 360](#)

add host-members

Description

Adds initiators to a host. A host can contain a maximum of 128 initiators.

To add an initiator to a host, the initiator must have the same mappings as all other initiators in the host. This means that the initiator must be mapped with the same access, port, and LUN settings to the same volumes or volume groups.

Minimum role

manage

Syntax

```
add host-members  
initiators initiators  
  
host-name
```

Parameters

`initiators initiators`

A comma-separated list of the nicknames or IDs of initiators to add to the specified host. A name that includes a space must be enclosed in double quotes.

`host-name`

The name of an existing host.

Examples

```
Add existing initiators Init3 and Init4 to existing host Host1.  
# add host-members initiators Init3,Init4 Host1
```

See also

[create host on page 64](#)

[remove host-group-members on page 159](#)

[show host-groups on page 354](#) (and hosts)

[show hosts \(Deprecated\) on page 360](#)

add replication-volume

Description

Adds an existing secondary volume to a replication set. This command applies to linear storage only.

The volume can be in the same system as the primary volume or in a remote system.

A secondary volume is a master volume created specifically for use as the destination for a replication by using the [create master-volume on page 67](#) command's `prepare-replication-volume` parameter.

Secondary volumes serve as the destination for replicated data from the primary volume. When a [replicate snapshot on page 166](#) or [replicate volume on page 167](#) command is issued, data is replicated from the primary volume to the associated secondary volume in the replication set.

This command must be run on the primary system.

Minimum role

manage

Syntax

```
add replication-volume
link-type FC|iSCSI
[max-queue #]
[nowait]
primary-volume volume
[priority low|medium|high]
[remote-system system]
secondary-address ip=IPs | wwn=WWNNs | wwpn=WWPNs
[set replication-set]
replication-volume
```

Parameters

link-type FC|iSCSI

Specifies the type of ports being used for the inter-system link:

- FC: FC ports

add replication-volume

- iSCSI: iSCSI ports

max-queue #

Optional. The number of replication images to consider when determining the next image to replicate: 1–64. Used only if the on-collision parameter is set to oldest.

nowait

Optional. Adding a volume to a replication set can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands.

primary-volume volume

The name or serial number of the replication volume to be the primary volume for the replication set. A name that includes a space must be enclosed in double quotes.

priority low|medium|high

Optional. The priority of the replication process on the replication volume: low, medium, or high.

remote-system system

Optional for a local volume; required for a remote volume if the secondary-address parameter is not specified. The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

secondary-address ip=IPs|wwn=WWNNs|wwpn=WWPNs

Optional for a local volume; required for a remote volume if the remote-system parameter is not specified. Specifies host ports in the remote system by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.2.1:3260. Multiple values must be separated by commas and no spaces. For example: ip=10.134.2.1,10.134.2.2.

set replication-set

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

replication-volume

The name or serial number of the secondary volume to add. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the set parameter.

Examples

Add secondary volume MV2 to the replication set whose primary volume is MV1, set the replication priority to high, and allow a maximum of 2 queued images to be considered for replication.

```
# add replication-volume link-type FC secondary-address  
wwpn=207000c0ffd52c31,217000c0ff52c31 primary-volume MV1 priority high max-queue  
2 MV2
```

Add secondary volume LosAngeles to a replication set that uses iSCSI links and whose primary volume is NewYork.

```
# add replication-volume LosAngeles primary-volume NewYork link-type iSCSI  
secondary-address ip=10.134.69.5,10.134.69.6
```

See also

- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

add spares

Description

Designates specified available disks to be spares. A spare can replace a failed disk of the same type (enterprise SAS, for example) and the same or lower capacity in a disk group with a fault-tolerant RAID level.

For virtual storage, all spares are global spares.

For linear storage, you can add global spares or dedicated spares.

A global spare is available to a fault-tolerant disk group with the same disk type. The system can have 16 global spares. Global spares will be used for both virtual and linear disk groups as needed.

A dedicated spare is assigned to a fault-tolerant linear disk group with the same disk type. A linear disk group can have 4 dedicated spares.

For information about sparing rules, see the “About spares” topic in the Storage Management Guide.

i Note: A disk group can contain a mix of 512-byte native sector size (512n) disks and 512-byte emulated sector size (512e) disks. For consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

Minimum role

manage

Syntax

```
add spares  
[disk-group disk-group]  
[vdisk vdisk]  
disks
```


Parameters

`disk-group disk-group`

Optional. The name or serial number of a linear disk group to assign the disks to as dedicated spares. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, the disks will be global spares.

`vdisk vdisk`

Optional. The name or serial number of the vdisk to assign the disks to as dedicated spares. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, the disks will be global spares.

`disks`

The IDs of the disks to designate as spares. For disk syntax, see [Command Syntax on page 13](#).

Examples

Designate disk 1.2 as a global spare.

```
# add spares 1.2
```

Designate disk 1.3 as a dedicated spare for vdisk VD1.

```
# add spares vdisk VD1 1.3
```

Designate disk 1.3 as a dedicated spare for linear disk group dg1.

```
# add spares disk-group dg1 1.3
```

See also

[remove spares on page 163](#)

[show disk-groups on page 317](#)

[show disks on page 325](#)

[show vdisks on page 449](#)

add storage

Description

Enables you to add new storage to the system.

Easily provisions disks into a disk group using a specified storage profile. One or more volumes spanning the entire disk group are created and mapped to all hosts. Then, each volume is labeled with a GUID Partition Table (GPT) as defined by the Uniform Extensive Firmware Interface (UEFI) standard.

add storage

Volume names will use the format `snfs_type_system-name_L1un` where:

- `type` is defined by the storage profile.
- `system-name` is the storage system name shown by `show system` [on page 431](#).
- `1un` is the LUN number assigned to the volume.

In cases where a profile has multiple volumes defined, the disk-group name LUN suffix indicates the first volume's LUN number.

If a problem prevents the operation from succeeding, changes made by the `add storage` operation are reverted to remove the new disk group from the system. If a problem prevents the disk group from being automatically deleted, you must manually delete it. In such cases, review the health of the system and the event log to understand why the operation failed.

Minimum role

manage

Syntax

```
add storage
profile profile-ID
[enclosure enclosure-ID]
```

Parameters

`profile profile-ID`

Adds storage defined by the specified ID. Details for the available storage profiles are displayed using the [show profiles](#) command.

`enclosure enclosure-ID`

Optional. Adds disks from the specified enclosure only. If this parameter is omitted, the command will add disks from the first enclosure that has enough available disks to satisfy the requirements of the specified profile.

Examples

Add storage using the profile 1+1 and the first enclosure with two available disks.

```
# add storage 1+1
```

Add storage from enclosure 2, which is a 12-disk enclosure, for the profile 10+2 which uses ten data and two parity disks.

```
# add storage profile 10+2 enclosure 2
```

See also

- [show profiles](#)

add vdisk-spare (Deprecated)

Use [add spares](#) on page 45.

add volume-group-members

Description

Adds virtual volumes to a volume group.

To add a volume to a volume group, the volume must have the same mappings as all other members of the group. This means that the volume must be mapped with the same access, port, and LUN settings to the same initiators, hosts, or host groups.

You cannot add a virtual volume to a volume group that is in a replication set.

Minimum role

manage

Syntax

```
add volume-group-members  
volumes volumes  
volume-group
```

Parameters

volumes volumes

A comma-separated list of the names or serial numbers of virtual volumes to add to the specified volume group. A name that includes a space must be enclosed in double quotes.

volume-group
The name of an existing volume group. A name that includes a space must be enclosed in double quotes.

Examples

```
Add existing volumes Vol0002 and Vol0003 to existing volume group VolumeGroup1.  
# add volume-group-members volumes Vol0002,Vol0003 VolumeGroup1
```

See also

- [create volume-group on page 98](#)
- [remove volume-group-members on page 164](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)

check firmware-upgrade-health

Description

Checks that the system is ready for a firmware upgrade.

Under normal conditions, firmware upgrade can be performed safely without risk to data availability or integrity. However, when the system is degraded—for example, because of failed or missing components or lack of multi-pathing to disks—upgrade failure or loss of availability can occur.

This command performs a series of health checks to determine whether any conditions exist that need to be resolved before upgrading firmware. Any conditions that are detected are listed with their potential risks. You can use commands in the “See also” section to determine which components have health problems to be resolved.

For information about using the Disk Management Utility or FTP to update firmware, see the Storage Management Guide.

Minimum role

manage

Syntax

```
check firmware-upgrade-health
```

Output

Upgrade Health

- Pass: There are no risks to performing firmware upgrade.
- Fail: At least one condition exists that presents a risk of upgrade failure or loss of availability.

Condition Detected

The condition that was detected.

Risks

The problems that are likely to result if you do not resolve the conditions before performing a firmware upgrade.

Examples

Check firmware upgrade health for a system that is ready for upgrade.

```
# check firmware-upgrade-health
```

```
Upgrade Health
```

```
-----
```

```
Pass
```

```
-----
```

Check firmware upgrade health for a system that has problems to be resolved before upgrade.

```
# check firmware-upgrade-health
```

```
Upgrade Health
```

```
-----
```

```
Fail
```

```
Condition Detected
```

```
Risks
```

```
-----
```

```
One or more disks are currently single ported.
```

```
Data unavailability
```

```
At least one controller is not up.
```

```
Data unavailability
```

```
One or more temperature sensors indicate a critical temperature.
```

```
Code load failure
```

clear cache

```
At least one controller contains unwritten cache data.  
Data corruption, data loss  
One or more supercapacitors have failed.  
Code load failure  
One or more power supplies are not functioning.  
Code load failure  
One or more fans are not functioning.  
Code load failure
```

```
-----
```

```
Success: Command completed successfully. (2014-06-7 17:13:07)
```

Basetypes

- [code-load-readiness on page 527](#)
- [code-load-readiness-reasons on page 527](#)
- [status on page 689](#)

See also

- [show controllers on page 309](#)
- [show disks on page 325](#)
- [show enclosures on page 338](#)
- [show fans on page 346](#)
- [show power-supplies on page 390](#)
- [show sensor-status on page 418](#)
- [show system on page 431](#)

clear cache

Description

Clears unwritable cache data from both controllers. This data cannot be written to disk because it is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume's disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host and disk. Unwritable cache is also called orphan data.

⚠ Caution: Only use this command when all disk groups are online. Clearing cache for a volume that is offline or quarantined could result in data loss.

You can clear unwritable cache data for a specified volume or for all volumes.

Minimum role

manage

Syntax

```
clear cache  
[volume volume]
```

Parameters

volume *volume*

Optional. The name or serial number of a specific volume for which to clear unwritable cache data. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, unwritable cache data is cleared for all volumes.

Examples

Clear unwritable cache data for volume V1 from both controllers.

```
# clear cache volume v1
```

See also

- [show unwritable-cache on page 446](#)
- [show volumes on page 467](#)

clear disk-metadata

Description

Clears metadata from leftover disks. For a leftover disk, the [show disks on page 325](#) command shows the Usage value LEFTOVR.

clear disk-metadata

⚠ Caution: Only use this command when all disk groups are online and leftover disks exist. Improper use of this command may result in data loss.

If you are uncertain whether to use this command, contact technical support for further assistance.

Each disk in a disk group has metadata that identifies the owning disk group, the other members of the disk group, and the last time data was written to the disk group. The following situations cause a disk to become a *leftover*:

- Disk group members' timestamps do not match so the system designates members having an older timestamp as leftovers.
- A disk is not detected during a rescan, then is subsequently detected.

When a disk becomes a leftover, the following changes occur:

- The disk's health becomes Degraded and its How Used state becomes LEFTOVR.
- The disk is automatically excluded from the disk group, causing the disk group's health to become Degraded or Fault, depending on the RAID level.
- The disk's fault LED becomes illuminated.

If spares are available, and the health of the disk group is Degraded, the disk group will use them to start reconstruction. When reconstruction is complete, you can clear the leftover disk's metadata. Clearing the metadata will change the disk's health to OK and its How Used state to AVAIL, making the disk available for use in a new disk group or as a spare.

If spares are not available to begin reconstruction, or reconstruction has not completed, keep the leftover disk so that you'll have an opportunity to recover its data.

This command clears metadata from leftover disks only. If you specify disks that are not leftovers, the disks are not changed.

Minimum role

manage

Syntax

```
clear disk-metadata
disks
```

Parameters

disks

The IDs of the leftover disks from which to clear metadata. For disk syntax, see [Command Syntax on page 13](#).

Examples

```
Clear metadata from leftover disk 1.1.  
# clear disk-metadata 1.1
```

See also

- [show disks on page 325](#)

clear events

Description

Clears the event log in controller A, B, or both. For use by or with direction from technical support.

Minimum role

manage

Syntax

```
clear events  
[a|b|both]
```

Parameters

a|b|both

Optional. The controller event log to clear. If this parameter is omitted, both event logs are cleared.

Examples

```
Clear the event log for controller A.  
# clear events a
```

See also

- [show events on page 341](#)

clear expander-status

Description

Clears the counters and status for SAS expander lanes. For use by or with direction from technical support. Counters and status can be reset to a good state for all enclosures, or for a specific enclosure whose status is Error as shown by the [show expander-status on page 344](#) command.

i Note: If a rescan is in progress, the clear operation will fail with an error message saying that an EMP does exist. Wait for the rescan to complete and then retry the clear operation.

Minimum role

manage

Syntax

```
clear expander-status  
[enclosure ID]
```

Parameters

enclosureID

Optional. The enclosure number. If this parameter is omitted, the command clears the counters and status of all enclosures.

Examples

```
Clear the expander status for the enclosure with ID 1.  
# clear expander-status enclosure 1
```

See also

- [show expander-status on page 344](#)

clear fde-keys (QXS-4 and QXS-6 Series Only)

Description

Removes the lock keys used with Full Disk Encryption.

You can use this command to temporarily deny access to data on the disks during a period when the system will not be under your physical control. If the lock keys are cleared while the system is secured, the system will enter the Secured, Lock Ready state, in preparation for the system being powered down and transported. The disks will still be in the Secured, Unlocked state. After the system has been transported and powered back up, the system and disks will be in the Secured, Locked state. Set the system's lock key to restore access to data.

Minimum role

manage

Syntax

```
clear fde-keys  
[current-passphrase value]
```

Parameters

current-passphrasevalue

Optional. If the system is currently secured, you can provide the current passphrase as part of the command. If this parameter is omitted, the command will prompt you for the current passphrase.

Examples

```
Clear the lock keys in preparation for shipping a system to a new location.  
# clear fde-keys current-passphrase myPassphrase
```


See also

- [set fde-import-key \(QXS-4 and QXS-6 Series\) on page 230](#)
- [set fde-lock-key \(QXS-4 and QXS-6 Series\) on page 232](#)
- [set fde-state \(QXS-4 and QXS-6 Series\) on page 233](#)
- [show fde-state \(QXS-4 and QXS-6 Series\) on page 348](#)

convert master-to-std

Description

Converts a specified master volume into a standard volume. This command applies to linear storage only. This disables snapshot functionality for the volume. If the specified volume has associated snapshots, you must delete the snapshots before converting the volume.

 **Caution:** Data loss is possible if the snap pool is unavailable.

Minimum role

manage

Syntax

```
convert master-to-std  
master-volume
```

Parameters

master-volume

The name or serial number of the master volume to convert. A name that includes a space must be enclosed in double quotes.

Examples

```
Convert a master volume having no snapshots to a standard volume.  
# convert master-to-std MV1
```

See also

- [delete all-snapshots on page 108](#)
- [show master-volumes on page 371](#)

convert std-to-master

Description

Converts a standard volume to a master volume. This command applies to linear storage only.

This enables snapshot functionality for the volume and associates it with an existing snap pool. The standard volume and the snap pool must be owned by the same controller, though they can be in different vdisks.

Minimum role

manage

Syntax

```
convert std-to-master  
snap-pool snap-pool  
standard-volume
```

Parameters

snap-pool snap-pool

The name or serial number of the snap pool to associate with the new master volume. A name that includes a space must be enclosed in double quotes.

standard-volume

The name or serial number of the standard volume to convert. A name that includes a space must be enclosed in double quotes.

Examples

Convert standard volume V1 to a master volume and associate it with snap pool SP1.

```
# convert std-to-master snap-pool SP1 V1
```

See also

- [show snap-pools on page 421](#)
- [show volumes on page 467](#)

copy volume

Description

Copies all data in a specified source volume to a destination volume.

The source volume can be a virtual base volume or a virtual snapshot. The destination volume will be completely independent of the source volume and will have a different serial number.

You can use this command to:

- Copy a base volume to a new base volume.
- Promote a snapshot to a base volume to make the snapshot independent of its parent volume.

Reasons to promote a snapshot include:

- You want to delete the snapshot's base volume without losing the data in the snapshot.
- You want to set a different tier preference for a snapshot than for its parent (or for another snapshot in the same tree).
- You don't want the volume's unique data to be counted against overall pool snapshot space (because it might cause deletion of other snapshots).
- The volume's snapshot tree is full and no more snapshots can be taken, but you don't want to delete any snapshots. Instead, you can promote them.
- The volume's purpose has changed and is no longer considered a subordinate volume.

To ensure the data integrity of the destination volume, unmount and unmap the source volume from host access before starting the copy operation. When the copy operation is complete, mount the destination

copy volume

volume and test to ensure that it is functional. Then you may remount the source volume—or if it's no longer needed, delete it.

To see the progress of a volume copy operation, use the `show volume-copies` command.

During a copy operation:

- Progress will be periodically logged to allow it to resume if it is interrupted by controller failover or failure.
- The source volume and destination volume cannot be deleted.
- If the source volume or the destination volume fails, the copy operation will fail and be automatically canceled, the destination volume will be automatically deleted, and event 267 will be logged with Error severity.
- If the destination pool runs out of space, or the destination volume was not created due to a shortage of physical storage in a non-thin-provisioned system, the copy operation will fail and be automatically canceled, the destination volume will be automatically deleted, and event 267 will be logged with Error severity.

Minimum role

manage

Syntax

```
copy volume
  [destination-pool destination-pool-ID]
  name destination-volume-name
  source-volume-ID
```

Parameters

`destination-pool` *destination-pool-ID*

Optional. The name or serial number of the virtual pool in which to create the destination volume. This must be the pool that contains the source volume. If this parameter is omitted, the destination volume will be created in the same pool as the source volume. 62 Alphabetical list of commands

`name` *destination-volume-name*

A name for the volume to create in the destination pool. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`source-volume-ID`

The name or serial number of the source volume to copy. A name that includes a space must be enclosed in double quotes.

Examples

```
Copy volume SourceVol to new volume DestVol in pool A.  
# copy volume SourceVol destination-pool A name DestVol
```

See also

- [abort copy on page 30](#)
- [show pools on page 378](#)
- [show volume-copies on page 460](#)
- [show volumes on page 467](#)

create certificate

Description

Creates or removes a custom security certificate.

The storage system supports use of unique certificates for secure data communications, to authenticate that the expected storage systems are being managed. Use of authentication certificates applies to the HTTPS protocol, which is used by the web server in each controller module. The Disk Management Utility and SMI-S interfaces use the same certificate.

After using this command you must restart each Management Controller to which the change is applied to have the change take effect.

Minimum role

manage

Syntax

```
create certificate
```



```
[a|b|both]
[contents content-string]
[noprompt]
[restore]
[unique]
```

Parameters

a|b|both

Optional. Specifies whether to apply the change to controller A, B, or both. If this parameter is omitted, the change is applied to the controller being accessed.

contents content-string

Optional. A security certificate is generated based on the supplied content. The content becomes the subject of the certificate creation request and must be formatted as `/type0=value0/type1=value1/type2=...`, where types include `CO` for country, `ST` for state or province, `L` for location, `CN` for common name, and `O` for organization. The content string cannot exceed 1024 characters and can include printable UTF-8 characters except space or semicolon. An example is `/CO=US/ST=CO/O=MyOrganization/CN=www.mysite.com`. You must specify either this parameter or the `restore` parameter or the `unique` parameter.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

restore

Optional. The system-generated certificate is restored and the custom certificate is discarded. The custom certificate may have been created with this CLI command or uploaded using FTP. You must specify either this parameter or the `contents` parameter or the `unique` parameter.

unique

Optional. A security certificate is generated based on the system's serial number and other standard values. This certificate is installed, and the original certificate is archived. You must specify either this parameter or the `contents` parameter or the `restore` parameter.

Examples

Regenerate the system certificate with a new private key.

```
# create certificate unique
```

Create a custom certificate using a content string.

```
# create certificate contents /CO=US/ST=CO/L=NewYork/O=MyCompany/CN=
www.mycompany.com
```

Restore the system-generated certificate and remove the custom certificate.

```
# create certificate restore
```

See also

- [restart mc on page 184](#)
- [restart sc on page 185](#)
- [show certificate on page 301](#)

create chap-record

Description

For iSCSI, creates a CHAP record to authenticate login requests. When CHAP is enabled, the record enables authentication between the originator (initiator) and recipient (target) of a login request. This command is permitted whether or not CHAP is enabled.

i Note: For information about setting up CHAP for use in a peer connection, see the topic about creating a peer connection in SMC documentation.

The CHAP record can specify one name-secret pair to authenticate the originator only (one-way CHAP) or two pairs to authenticate both the originator and the recipient (mutual CHAP).

For a login request from an iSCSI host to a storage system, the host is the originator and the storage system is the recipient. Because CHAP works during login, to make CHAP changes take effect you must reset any active iSCSI host links.

In a peer connection, a storage system can act as the originator or recipient of a login request. As the originator, with a valid CHAP record it can authenticate CHAP even if CHAP is disabled. This is possible because the system will supply the CHAP secret requested by its peer and the connection will be allowed.

Minimum role

manage

Syntax

```
create chap-record
name originator-name
secret originator-secret
[mutual-name recipient-name mutual-secret recipient-secret]
```

`create host`

Parameters

`name originator-name`

The originator name, typically in IQN format. The name is case sensitive and can have a maximum of 223 bytes, including 0–9, lowercase a–z, hyphen, colon, and period.

`secret originator-secret`

The secret that the recipient uses to authenticate the originator. The secret is case sensitive and can include 12–16 bytes.

`mutual-name recipient-name`

Optional; for mutual CHAP only. The recipient name, typically in IQN format. The name is case sensitive and can have a maximum of 223 bytes, including 0–9, lowercase a–z, hyphen, colon, and period. To determine a storage system's IQN, use the [show ports on page 386](#) command to view an iSCSI port Target ID value. This parameter and `mutual-secret` must be set together.

`mutual-secret recipient-secret`

Optional; for mutual CHAP only. The secret that the originator uses to authenticate the recipient. The secret is case sensitive, can include 12–16 bytes, and must differ from the originator secret. A storage system's secret is shared by both controllers. This parameter and `mutual-name` must be set together.

Examples

Create a one-way CHAP record to enable a storage system to authenticate a host initiator.

```
# create chap-record name iqn.1991-05.com.microsoft:myhost.domain secret
123456abcDEF
```

See also

- [delete chap-records on page 110](#)
- [set chap-record on page 210](#)
- [show channels \(Deprecated\) on page 303](#)
- [show iscsi-parameters on page 363](#)
- [show ports on page 386](#)

create host

Description

Creates a host with an associated name.

create host

You can use the `create host` command to create a host that groups together specified initiators, and optionally to add the host to a host group. You can create a maximum of 512 hosts, each containing a maximum of 128 initiators.

To create a single initiator, use the [set initiator on page 242](#) command.

Minimum role

manage

Syntax

```
create host
[host-group host-group]
[initiators initiators]
[profile standard|hp-ux]
name
```

Parameters

host-group host-group

Optional. The name of an existing host group to which to add the new host.

initiators initiators

A comma-separated list of initiator nicknames, IDs, or both, with no spaces. For FC or SAS the ID is a WWPN. A WWPN can include a colon between each byte but the colons will be discarded. For iSCSI the ID is an IQN.

profile standard|hp-ux

Optional.

- standard: Default profile.
- hp-ux: The host uses Flat Space Addressing.

name

A name for the host. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1532 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , . < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create host Host1 that includes two FC initiators.

```
# create host initiators 10000090fa13870e,10000090fa13870f Host1
```

Create host Host2 that includes two iSCSI initiators.

```
# create host initiators iqn.1992-01.com.example:storage.host2.port1,  
iqn.1992-01.com.example:storage.host2.port2 Host2
```

Create host Host4 by pasting a WWPN that includes colons.

```
# create host initiators 20:70:00:c0:ff:d7:4c:07 Host4
```

See also

- [set global-spare \(Deprecated\) on page 234](#)
- [set initiator on page 242](#)
- [show host-groups on page 354](#)
- [show hosts \(Deprecated\) on page 360](#)

create host-group

Description

Creates a host group that includes specified hosts. You can create a maximum of 32 host groups, each containing a maximum of 256 hosts.

Minimum role

manage

Syntax

```
create host-group  
hosts hosts  
host-group
```

Parameters

hosts hosts

A comma-separated list of the names of hosts to include in the host group. A name that includes a space must be enclosed in double quotes.

host-group

A name for the host group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1532 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , . < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create a host group named HostGroup1 that includes hosts Host1 and Host2.

```
# create host-group hosts Host1,Host2 HostGroup1
```

See also

- [add global-spare \(Deprecated\) on page 40](#)
- [delete host-groups on page 111](#)
- [remove host-group-members on page 159](#)
- [set host-group on page 236](#)
- [show host-groups on page 354](#)

create master-volume

Description

Creates a volume that is enabled for snapshots. This command applies to linear storage only.

The master volume is created in a specified vdisk and is associated with a specified snap pool. You can either associate the master volume with an existing snap pool owned by the same controller, or optionally specify the size of a new snap pool to automatically create. The vdisk and snap pool must be owned by the same controller.

create master-volume

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

For use with remote replication, you can create a replication-prepared volume that is intended to be added to a replication set as its secondary volume. A secondary volume cannot be assigned a LUN or mapped to hosts.

Minimum role

manage

Syntax

```
create master-volume
[lun LUN]
[prepare-replication-volume]
[reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
[snap-pool snap-pool]
vdisk vdisk

name
```

Parameters

lun *LUN*

Optional. A default LUN to assign to the new, regular master volume. If this parameter is omitted, no LUN is assigned. Use either this parameter or the `prepare-replication-volume` parameter.

prepare-replication-volume

Optional. Specifies to create a replication volume instead of a regular master volume. Use either this parameter or the `lun` parameter.

reserve *size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]*

Optional. The size of the snap pool to create in the vdisk. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks. The default size is either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Use either this parameter or the `snap-pool` parameter.

size *size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]*

Sets the volume size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

snap-pool *snap-pool*

Optional. Name or serial number of the snap pool to associate with the new master volume. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, the system automatically

creates a snap pool that is either 20% of the master volume's size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Use either this parameter or the reserve parameter.

`vdiskvdisk`

The name or serial number of the vdisk to create the volume in. A name that includes a space must be enclosed in double quotes.

`name`

A name for the new master volume. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create the 20-GB master volume MV1 on vdisk VD1, and associate it with snap pool SP1.

```
# create master-volume vdisk VD1 size 20GB snap-pool SP1 lun 3 MV1
```

Create the 50-GB replication volume MV2 on vdisk VD1, and automatically create an associated 20-GB snap pool.

```
# create master-volume vdisk VD1 size 50GB prepare-replication-volume reserve
20GB MV2
```

See also

- [show master-volumes on page 371](#)
- [show snap-pools on page 421](#)
- [show vdisks on page 449](#)

create peer-connection

Description

Creates a peer connection between two storage systems.

The peer connection is defined by the ports that connect the two peer systems, as well as the name of the peer connection. The local system uses the remote address to internally run the query peer-connection command. The results of the query are used to configure the peer connection.

create peer-connection

The prerequisites to create a peer connection are:

- Both systems must be licensed to use virtual replication.
- Both systems must have iSCSI ports.
- Each system must have a virtual pool.
- Neither system can have a linear replication set.
- If iSCSI CHAP is configured for the peer connection, the authentication must be valid.

The limit is one peer connection per storage system.

i Note: Host port evaluation is done at the start or resumption of each replication operation.

- At most, two ports will be used.
- Ports with optimized paths will be used first. Ports with unoptimized paths will be used if no optimized path exists. If only one port has an optimized path, then only that port will be used.
- The replication will not use another available port until all currently used ports become unavailable.

Minimum role

manage

Syntax

```
create peer-connection
remote-port-address remote-port-address
name
```

Parameters

remote-port-address remote-port-address

Specifies the iSCSI IP address of the remote system with which to create a peer connection.

name

Specifies a name for the peer connection. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

```
Create peer connection Peer1 with the remote system 192.168.200.22.  
# create peer-connection remote-port-address 192.168.200.22 Peer1
```

See also

- [delete peer-connection on page 115](#)
- [query peer-connection on page 151](#)
- [set peer-connection on page 253](#)
- [show peer-connections on page 376](#)

create remote-system

Description

Creates a persistent association with a remote storage system. This command applies to linear storage only. This command is not applicable to a system with SAS controller modules.

This allows a local system to track remote systems by their network-port IP addresses and cache their login credentials. The IP address you specify is used to connect to the remote system and obtain information such as the system name and both controllers' IP addresses. You can then use the system name or an IP address in commands that need to interact with the remote system.

Minimum role

manage

Syntax

```
create remote-system  
password password  
username username  
  
system
```

Parameters

`password password`

The password for that user.

`username username`

The name of a user in the remote system. This must be a user with the manage role to remotely configure or provision that system.

`system`

The network-port IP address of the remote system.

Examples

Create a remote system.

```
# create remote-system username manage password !manage 10.122.1.21
```

See also

- [delete remote-system on page 118](#)
- [remote on page 156](#)
- [set remote-system on page 261](#)
- [show remote-systems on page 401](#)

create replication-set

For virtual storage

Description

Creates a replication set for a specified volume or volume group. This command is supported on systems having iSCSI host ports. Linear replication sets and virtual peer connections and replication sets cannot exist on a system at the same time.

This command designates the specified source volume or volume group as the primary volume or volume group, creates the secondary volume or volume group, and creates the internal snapshots required to support replications.

A peer connection must already be defined to create and use a replication set.

create replication-set

The command will fail if the volume names already exist, or if the local system cannot reach the remote system.

Secondary volumes cannot be mapped, moved, expanded, deleted, or participate in a rollback operation. Create a snapshot of the secondary volume and use the snapshot for mapping and accessing data.

A volume or volume group can belong to only one replication set. If the volume group is already in a replication set, individual volumes may not be included in separate replication sets. The maximum number of individual volumes that can be replicated is 32. If a volume group is being replicated, the maximum number of volumes that can exist in the group is 16.

Minimum role

manage

Syntax

```
create replication-set
  peer-connection peer-connection-ID
  primary-volume volume-ID/volume-group-ID
  [secondary-pool A|B]
  [secondary-volume-name name]
  name
```

Parameters

peer-connection *peer-connection-ID*

Specifies the name or serial number of the peer connection on which to create the replication set.

primary-volume *volume-ID/volume-group-ID*

Specifies the name or serial number of a volume or volume group on the local system. Volume-groups must be specified with the name and .* notation utilized in mapping.

secondary-pool A|B Optional.

Specifies an existing virtual pool on the remote peer. If this is not specified, the system will use the corresponding pool on the remote system. For example, if pool A is used on the local system, pool A will be used on the remote system. If this is not specified and the corresponding pool on the remote side does not exist, this command will fail.

secondary-volume-name *name*

Optional. Specifies a name for the secondary volume. If this is not specified the name from the primary volume will be used. For volume-group targets, all contained volume names must be unique. Input rules: • The value is case sensitive. • The value can have a maximum of 32 bytes. • The value can include spaces and printable UTF-8 characters except: " , < \ • A value that includes a space must be enclosed in double quotes.

name

Specifies a name for the replication set. Input rules: • The value is case sensitive. • The value can have a maximum of 32 bytes. • The value can include spaces and printable UTF-8 characters except: " , < \ • A value that includes a space must be enclosed in double quotes.

Examples

Create replication set RS1 for primary volume Vol1 on the peer connection Peer1.

```
# create replication-set peer-connection Peer1 primary-volume Vol1 RS1
```

Create replication set RS1 for volume group VG1.* on the peer connection Peer1.

```
# create replication-set peer-connection Peer1 primary-volume VG1.* RS1
```

See also

- [delete replication-set on page 119](#)
- [resume replication-set on page 189](#)
- [set replication-set on page 266](#)
- [show replication-sets on page 405](#)
- [suspend replication-set](#)

For linear storage

Description

Creates a replication set from a specified standard or master volume. This command applies to linear storage only. This command is not applicable to a system with SAS controller modules.

If you specify a standard volume, it is converted to a master volume using default policies for snap-pool creation. You can optionally use the `reserve` parameter to set the snap-pool size. The specified volume becomes the replication set's primary volume.

You can specify a remote volume to be the replication set's secondary volume, or one will be created. When a [replicate snapshot on page 166](#) or [replicate volume on page 167](#) command is issued, data in the primary volume is replicated to the associated secondary volume.

You can associate the primary volume with a remote system in the following ways:

- If the local and remote MCs cannot communicate, you must use the `secondary-address` parameter to specify the remote system, and you must use the `remote-volume` parameter to specify the serial number of an existing replication-prepared volume in the remote system to be the secondary volume.
- If the local and remote MCs can communicate and the remote system is defined in the local system, you can do one of the following:

create replication-set

- Use the `remote-volume` parameter to specify the name or serial number of a replication-prepared volume to use as a secondary volume. If the remote volume is in a remote system, also use the `remote-system` parameter. If you want to limit replication to specific host ports, also use the `secondary-address` parameter.
- Use the `remote-vdisk` parameter to specify the name or serial number of the vdisk in which to create the remote volume and snap pool.

You can also start the initial replication by specifying the `snapshot` parameter.

If you create a replication set without specifying a replication destination, a partial set is created and you must use the [add replication-volume on page 43](#) command to complete the set before you can perform replication.

⚠ Caution: Before starting this procedure, if you intend to use CHAP to authenticate iSCSI login requests between the local system and a remote system, do the following:

- Create a one-way CHAP record on each system. On the local system, the CHAP record must refer to the node name of the remote system. On the remote system, the CHAP record must refer to the node name of the local system. Both records must use the same secret. (Mutual CHAP is not used between storage systems. CHAP records' mutual fields can be set but are not used.) To create a CHAP record, use the [create chap-record on page 63](#) command.
- After the CHAP records are created, enable CHAP on the primary system, the secondary system, or both. To enable CHAP, use the [set iscsi-parameters on page 243](#) command.

If both records don't exist or don't use the same secret, replication-set creation will fail.

If the create transaction fails, a prompt asks if you want to revert the transaction, which undoes any changes made in attempting to create the replication set. To revert, enter yes; otherwise, enter no.

Replication within the same system is allowed only if the primary and secondary volumes are in vdisks owned by different controllers.

Minimum role

manage

Syntax

```
create replication-set
[link-type FC|iSCSI]
[max-queue #]
[noprompt]
[nowait]
[primary-address ip=IPs|wwnn=WNNs|wwpn=WPNs]
[priority low|medium|high]
[remote-storage-pool pool]
[remote-system system]
```

create replication-set

```
[remote-vdisk vdisk]
[remote-volume volume]
[reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]
[secondary-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs]
[set name]
[snapshot snapshot]

primary-volume
```

Parameters

link-type FC|iSCSI

Optional; required if the primary-address parameter is *not* specified. Specifies the type of ports being used for the inter-system link:

- FC: FC ports.
- iSCSI: iSCSI ports.

max-queue #

Optional. The number of replication images to consider when determining the next image to replicate: 1–64. Used only if the on-collision parameter is set to oldest.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

nowait

Optional. Adding a volume to a replication set can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands. You cannot specify both the nowait parameter and the snapshot parameter.

primary-address ip=address|wwnn=WWNNs|wwpn=WWPNs

Optional. Specifies host ports in the local system by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.2.1:3260. Multiple values must be separated by commas and no spaces. For example: ip=10.134.2.1,10.134.2.2.

priority low|medium|high

Optional. The priority of the replication process for the replication volumes: low, medium, or high.

remote-storage-pool pool

Optional. The name or serial number of the virtual pool in which the remote volume should be created. A name that includes a space must be enclosed in double quotes. If the storage pool is in a remote system:

- You must specify the remote-system parameter.
- If the local and remote MCs can communicate, you can specify a name or serial number. Otherwise, you must specify a serial number.

The snap pool created on the secondary system will be the same size as the snap pool on the primary system.

remote-system system

Optional; required if the remote-storage-pool or remote-vdisk or remote-volume parameter specifies

create replication-set

a destination in a remote system. The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

remote-vdisk vdisk

Optional. The name or serial number of the vdisk in which to create the remote volume and snap pool. A name that includes a space must be enclosed in double quotes.

To use this parameter, the local and remote MCs must be able to communicate. If the MCs cannot communicate, instead of using this parameter specify both the `remote-volume` parameter and the `secondary-address` parameter. If the vdisk is in a remote system, you must also specify the `remote-system` parameter. The snap pool created in the secondary system will be the same size as the snap pool on the primary system.

remote-volume volume

Optional; do not use with the `remote-storage-pool` or `remote-vdisk` parameter. The name or serial number of a replication-prepared volume to use as a secondary volume. A name that includes a space must be enclosed in double quotes. If the volume is in a remote system and the local and remote MCs can communicate, you can specify a name or serial number. Otherwise, you must specify a serial number.

reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Optional. Specifies the size of the snap pool to create if the primary volume is a standard volume. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the unit is 512-byte blocks. If this parameter is omitted, the size will be either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB.

secondary-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs

Optional if the MCs can communicate and the `remote-system` parameter is specified; required if the MCs cannot communicate and the `remote-volume` parameter is specified. Specifies host ports in the remote system by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.2.1:3260. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

set name

Optional. A name for the new replication set. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

If this parameter is omitted, the set is named `rsprimary-volume`.

snapshot snapshot

Optional. A name for the replication snapshot that will be created during the replication process. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

create replication-set

Specifying this parameter will start the initial replication. You cannot specify both the snapshot parameter and the nowait parameter.

primary-volume

The name or serial number of a standard or master volume to use as the primary volume. A name that includes a space must be enclosed in double quotes.

Examples

For two systems connected with FC links, set up replication from local standard volume Data to remote vdisk VD1 in remote system System2.

```
# create replication-set link-type FC remote-system System2 remote-vdisk VD1 Data
```

For two systems connected with FC links, set up replication from local master volume Source to remote replication-prepared volume Dest.

```
# create replication-set link-type FC remote-system System2 remote-volume Dest
Source
```

For two systems whose MCs aren't currently connected, set up replication from local master volume MV to a remote replication-prepared volume.

```
# create replication-set primary-address wwpn=207000c0ffd52c31,217000c0ffd52c31
remote-volume 00c0ffda421f000089b16b4d01000000 secondary-address
wwpn=207000c0ffd52c31,217000c0ffd52c31 MV
```

For two systems whose MCs aren't currently connected but will use iSCSI links, set up replication from local master volume MV to a remote replication-prepared volume.

```
# create replication-set link-type iSCSI primary-address ip=10.134.9.1 remote-
volume 00c0ffda421f000089b16b4d01000000 secondary-address
ip=10.134.11.10,10.134.11.11 MV
```

Create a local replication set using existing master volume Personnel as the primary volume and a new volume in vdisk vd1 for the secondary volume.

```
# create replication-set link-type FC remote-vdisk vd1 Personnel
```

Create a local replication set using existing master volume Test as the primary volume and existing replication-prepared volume Test-backup as the secondary volume.

```
# create replication-set link-type FC remote-volume Test-backup Test
```

See also

- [add replication-volume on page 43](#)
- [delete replication-set on page 119](#)
- [remove replication-volume on page 161](#)
- [replicate snapshot on page 166](#)
- [show remote-systems on page 401](#)
- [show replication-images on page 403](#)

- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

create schedule

Description

Schedules a task to run automatically.

For linear storage, schedule no more than three volumes to start replicating at the same time and schedule those replications to recur no less than 60 minutes apart. If you schedule more replications to start at the same time, or schedule replications to start more frequently, some scheduled replications may not have time to complete.

You can schedule a replication task on the replication set's primary system only.

Virtual replication tasks are not queued: if a replication task is running and the time comes for that replication task to start again, that task will be skipped, though it will be counted against the schedule's count constraint (if set).

Minimum role

manage

Syntax

```
create schedule
schedule-specification "specification"
task-name task-name
schedule-name
```

Parameters

`schedule-specification` "*specification*"

Defines when the task will first run, and optionally when it will recur and expire. You can use a comma to separate optional conditions. Dates cannot be in the past. For times, if neither AM nor PM is specified, a 24-hour clock is used.

- `start yyyy-mm-dd hh:mm [AM|PM]`
Specifies a date and a time in the future to be the first instance when the scheduled task will run, and to be the starting point for any specified recurrence.

create schedule

- [every # minutes | hours | days | weeks | months | years]
Specifies the interval at which the task will run.
For better performance when scheduling a TakeSnapshot task that will run under heavy I/O conditions or on more than three volumes, the retention count and the schedule interval should be set to similar values. For example if the retention count is 10 then the interval should be set to 10 minutes.
For a Replicate task, the minimum interval is 1 hour.
For a ReplicateVolume task, the minimum interval is 30 minutes.
- [between hh:mm [AM|PM] and hh:mm [AM|PM]]
Constrains the time range during which the task is permitted to run. Ensure that the start time is within the specified time range.
- [only any | first | second | third | fourth | fifth | last | #st | #nd | #rd | #th
weekday | weekendday | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday
| Saturday of year | month | January | February | March | April | May | June | July
| August | September | October | November | December]
Constrains the days or months when the task is permitted to run. Ensure that this constraint includes the start date.
- [count #]
Constrains the number of times the task is permitted to run.
- [expires yyyy-mm-dd hh:mm [AM|PM]]
Specifies when the schedule expires, after which the task will no longer run.

task-name *task-name*

The name of an existing task to run. The name is case sensitive. A name that includes a space must be enclosed in double quotes.

schedule-name

A name for the new schedule. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create schedule Sched1 that runs Task1 for the first time on March 1, 2014, runs daily between midnight and 1:00 AM, and runs for the last time in the morning of January 1, 2015.

```
# create schedule schedule-specification "start 2014-03-01 00:01, every 1 days,
between 12:00 AM and 1:00 AM, expires 2015-01-01 1:00 AM" task-name Task1 Sched1
```

Create schedule Sched2 that runs Task2 for the first time on March 1, 2014, and on the first weekday of each month, with no expiration.

```
# create schedule schedule-specification "start 2012-03-01 00:01 only first
weekday of month" task-name Task2 Sched2
```

See also

- [delete schedule on page 120](#)
- [set schedule on page 269](#)
- [show schedules on page 416](#)
- [show task-details \(Deprecated\) on page 435](#)

create snap-pool

Description

Creates a snap pool to use for snapshot data. This command applies to linear storage only. A snap pool is an internal volume and cannot be mapped.

Minimum role

manage

Syntax

```
create snap-pool
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
vdisk vdisk
name
```

Parameters

size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Sets the snap-pool size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

Although a snap pool can be as small as 5.37 GB, the recommended minimum size is 50 GB.

vdisk *vdisk*

The name or serial number of the vdisk to create the snap pool in. A name that includes a space must be enclosed in double quotes.

name

A name for the new snap pool. Input rules:

create snapshots

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

```
Create the 50-GB snap pool SP1 on vdisk VD1.  
# create snap-pool vdisk VD1 size 50GB SP1
```

See also

- [show snap-pools on page 421](#)
- [show vdisks on page 449](#)

create snapshots

Description

Creates a snapshot of each specified source volume.

For virtual storage, the source volume can be a base volume or a snapshot. For linear storage, the source volume can be a standard volume or a master volume. The first time a snapshot is created of a standard volume, the volume is converted to a master volume and a snap pool is created in the volume's disk group. The snap pool's size is either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Before creating or scheduling snapshots, verify that the disk group has enough free space to contain the snap pool.

Minimum role

manage

Syntax

```
create snapshots
```

```
[master-volumes master-volumes]  
volumes volumes  
  
snap-names
```

Parameters

`master-volumes master-volumes`
Deprecated—use the `volumes` parameter instead.

`volumes volumes`
A comma-separated list of the names or serial numbers of 1–16 source volumes of which to create snapshots. A name that includes a space must be enclosed in double quotes.

`snap-names`
A comma-separated list of names for the resulting snapshots. Snapshot names must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

```
Create snapshots of volumes V1 and V2.  
# create snapshots volumes V1,V2 V1snap,V2snap
```

See also

- [show snapshots on page 425](#)
- [show volumes on page 467](#)

create task

Description

Creates a task that can be scheduled.

You can create a task to:

create task

- Enable drive spin down for disks that are not in a virtual pool. You can use this to enable or resume spin down during hours of infrequent activity.
- Disable drive spin down for disks that are not in a virtual pool. You can use this to disable or suspend spin down during hours of frequent activity.
- Create a snapshot of a source volume. For virtual storage, the source volume can be a base volume or a snapshot. For linear storage, the source volume can be a standard volume or a master volume.
- Reset a snapshot. This deletes the data in the snapshot and resets it to the current data in the volume from which the snapshot was created. The snapshot's name and other volume characteristics are not changed.
- Copy a source volume to a new volume. The command creates the destination volume you specify, which must be in a disk group owned by the same controller as the source volume. For virtual storage, the source volume can be a base volume or a snapshot. For linear storage, the source volume can be a standard volume, a master volume, or a snapshot.
- Replicate a linear replication set's primary volume to a remote system.
- Replicate a virtual replication set's primary volume or volume group to a peer system.

The first time a snapshot or volume copy is created of a standard volume, the volume is converted to a master volume and a snap pool is created in the volume's disk group. The snap pool's size is either 20% of the volume size or 5.37 GB, whichever is larger. Before creating or scheduling snapshots or copies, verify that the disk group has enough free space to contain the snap pool. The recommended minimum size for a snap pool is 50 GB.

⚠ Caution: Before scheduling a ResetSnapshot task, consider that if the snapshot is mounted/presented/mapped to a host, the snapshot must be unmounted/unpresented/unmapped before the reset is performed. Leaving it mounted/presented/mapped can cause data corruption. You should create a scheduled job on the host to unmount/unpresent/unmap the snapshot prior to resetting it.

Minimum role

manage

Syntax

To create a task to take a snapshot:

```
create task
retention-count #
snapshot-prefix prefix
source-volume volume
type TakeSnapshot
name
```

create task

To create a task to reset a snapshot:

```
create task
snapshot-volume volume
type ResetSnapshot
```

name

To create a task to copy a linear volume:

```
create task
dest-prefix prefix
dest-vdisk vdisk
[modified-snapshot yes|no]
source-volume volume
type VolumeCopy
```

name

To create a task to replicate a linear volume:

```
create task
[replication-mode new-snapshot|last-snapshot]
retention-count #
snapshot-prefix prefix
source-volume volume
type ReplicateVolume
```

name

To create a task to replicate a virtual volume:

```
create task
  replication-set replication-set-ID
  type Replicate
  name
```

To create a task to enable spin down for all disks:

```
create task
type EnabledDSD
```

name

To create a task to disable spin down for all disks:

```
create task
type DisabledDSD
```

name

Parameters

`dest-prefix prefix`

A label to identify the volume copy created by this task. Input rules:

- The value is case sensitive.

create task

- The value can have a maximum of 1426 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`dest-vdisk` *vdisk*

For a `VolumeCopy` task, this specifies the name or serial number of the destination disk group for the volume copy. A name that includes a space must be enclosed in double quotes.

`modified-snapshot` *yes|no*

Optional. For a `VolumeCopy` task, specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot.

- `yes`: Include modified snapshot data.
- `no`: Exclude modified snapshot data.

If this parameter is omitted for a snapshot, modified snapshot data is excluded.

`replication-mode` *new-snapshot|last-snapshot*

Optional. For `ReplicateVolume` task, this specifies whether to replicate a new snapshot of the volume to the remote system, or to replicate the last (most recent existing) snapshot of the volume to the remote system.

- `new-snapshot`: Replicate a new snapshot.
- `last-snapshot`: Replicate the most recent existing snapshot.

If this parameter is omitted, a new snapshot is replicated.

`replication-set` *replication-set-ID*

For a `Replicate` task, this specifies the ID of the replication set to replicate.

`retention-count` *#*

For a `TakeSnapshot` task this parameter specifies the number of snapshots created by this task to retain, from 1 to the licensed limit. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.

For a `ReplicateVolume` task this parameter specifies the number of replication images created by this task to retain, from 2 to 32. When a new image exceeds this limit, the oldest image with the same prefix is deleted. This parameter applies to the primary volume and the secondary volume.

`snapshot-prefix` *prefix*

For a `TakeSnapshot` or `ReplicateVolume` task, this specifies a label to identify snapshots created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1426 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`snapshot-volume` *volume*

For a `ResetSnapshot` task, this specifies the name or serial number of the snapshot to reset. A name that includes a space must be enclosed in double quotes.

`source-volume` *volume*

For a `TakeSnapshot` task, the name or serial number of the source volume of which to take a snapshot. For

create task

a VolumeCopy task, the name or serial number of the source volume to copy. For a ReplicateVolume task, the name or serial number of the primary volume to replicate. A name that includes a space must be enclosed in double quotes.

type TakeSnapshot | ResetSnapshot | VolumeCopy | ReplicateVolume | EnableDSD | DisableDSD

The task type:

- TakeSnapshot: Create a snapshot.
- ResetSnapshot: Reset the data in a snapshot.
- VolumeCopy: Copy a volume to a new volume.
- ReplicateVolume: Replicate a replication set's primary volume to a remote system.
- EnableDSD: Enables drive spin down.
- DisableDSD: Disables drive spin down

name

A name for the new task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create task Snap that creates a snapshot of volume VD1_V1 and retains only the latest four snapshots with the prefix VD1_V1 (for example, VD1_V1_S0001).

```
# create task type TakeSnapshot source-volume VD1_V1 snapshot-prefix VD1_V1
retention-count 4 Snap
```

Create task Reset that resets snapshot VD1_V1_S0001.

```
# create task type ResetSnapshot snapshot-volume VD1_V1_S0001 Reset
```

Create task Copy that copies volume VD1_V1 to vdisk VD2 with name C_V0001.

```
# create task type VolumeCopy source-volume VD1_V1 dest-vdisk VD2 dest-prefix C
modified-snapshot yes Copy
```

Create task replicateVD1_V2 that replicates linear volume VD1_V2.

```
# create task type ReplicateVolume source-volume VD1_V2 snapshot-prefix VD1_V2
retention-count 4 replicateVD1_v2
```

Create task replicateRS1 that replicates virtual replication set RS1.

```
# create task type Replicate replication-set RS1 replicateRS1
```

Create a task to enable or resume spin down.

```
# create task type EnableDSD taskDSDresume
```

Create a task to disable or suspend spin down.

```
# create task type DisableDSD taskDSDsuspend
```

See also

- [create schedule on page 79](#)
- [delete task on page 125](#)
- [set task on page 281](#)
- [show task-details \(Deprecated\) on page 435](#)
- [show volumes on page 467](#)

create user

Description

Creates a user account. The system supports 12 user accounts. You can create a general user that can access the Disk Management Utility, CLI, or FTP interface, or an SNMPv3 user that can access the MIB or receive trap notifications. SNMPv3 user accounts support SNMPv3 security features such as authentication and encryption.

Minimum role

manage

Syntax

```
create user
[authentication-type MD5|SHA|none]
[base 2|10]
[interfaces interfaces]
[locale Arabic|ar|Portuguese|br|English|en|Spanish|es|French|fr|German|de
|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Russian|ru|Chinese-simplified|zh-s
|Chinese-traditional|zh-t]
[password password]
```

create user

```

[precision #]
[privacy-password encryption-password]
[privacy-type DES|AES|none]
[roles roles]
[storage-size-base 2|10]
[storage-size-precision #]
[storage-size-units auto|MB|GB|TB]
[temperature-scale celsius|c|fahrenheit|f]
[timeout #]
[trap-host IP-address]
[type novice|standard|advanced|diagnostic]
[units auto|MB|GB|TB]

name

```

Parameters

`authentication-type MD5|SHA|none`

Optional. For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.

- MD5: MD5 authentication. This is the default.
- SHA: SHA (Secure Hash Algorithm) authentication.
- none: No authentication.

`base 2|10`

Optional. Sets the base for entry and display of storage-space sizes:

- 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. In base 2 when you set a size, whether you specify a base-2 or base-10 size unit, the resulting size will be in base 2.
- 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. In base 10 when you set a size, the resulting size will be in the specified unit. This option is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

`interfaces interfaces`

Optional. Specifies the interfaces that the user can access. Multiple values must be separated by commas and no spaces. A command that specifies `snmpuser` or `snmptarget` cannot also specify a non-SNMP interface.

- `cli`: Command-line interface. This is enabled by default.
- `wbi`: Web-browser interface. This is enabled by default.
- `ftp`: FTP interface.
- `smis`: Storage Management Initiative Specification (SMI-S) interface.
- `snmpuser`: Allows an SNMPv3 user to view the SNMP MIB.

create user

- `snmptarget`: Allows an SNMPv3 user to receive SNMP trap notifications. This option requires the `trap-host` parameter.
- `none`: No interfaces.

`locale` Arabic|ar|Portuguese|br|English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Russian|ru|Chinese-simplified|zh-s|Chinese-traditional|zh-t

Optional. The display language. The default is English.

`password` password

Optional in console format; required for XML API format. Sets a new password for the user. Password rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

If this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed obscured for security reasons. For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password.

`precision` #

Optional. Sets the number of decimal places (1–10) for display of storage-space sizes.

`privacy-password` *encryption-password*

Optional. For an SNMPv3 user whose `privacy-type` parameter is set to use encryption, this specifies the encryption password. Password rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

`privacy-type` DES|AES|none

Optional. For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the `privacy-password` parameter and the `authentication-type` parameter.

- `DES`: Data Encryption Standard.
- `AES`: Advanced Encryption Standard.
- `none`: No encryption. This is the default.

`roles` *roles*

Optional. Specifies the user's roles as one or more of the following values:

- `monitor`: User can view but not change system settings. This is the default.
- `manage`: User can view and change system settings.
- `diagnostic`: User can view and change system settings.

create user

Multiple values must be separated with a comma (with no spaces). If multiple values are specified, the user's access to commands will be determined by the highest role specified.

`storage-size-base 2|10`

Optional. Alias for base.

`storage-size-precision #`

Optional. Alias for precision.

`storage-size-units auto|MB|GB|TB`

Optional. Alias for units.

`temperature-scale celsius|c|fahrenheit|f`

Optional. Sets the scale for display of temperature values:

- `fahrenheit` or `f`: Temperatures are shown in degrees Fahrenheit.
- `celsius` or `c`: Temperatures are shown in degrees Celsius. This is the default.

`timeout #`

Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

`trap-host IP-address`

Optional. For an SNMPv3 user whose `interface` parameter is set to `snmptarget`, this specifies the IP address of the host that will receive SNMP traps.

`type novice|standard|advanced|diagnostic`

Optional. Identifies the user's experience level. This parameter is informational only and does not affect access to commands. The default is `standard`.

`units auto|MB|GB|TB`

Optional. Sets the unit for display of storage-space sizes:

- `auto`: Sizes are shown in units determined by the system. This is the default.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

Based on the `precision` setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `units` is set to `TB`, `precision` is set to `1`, and `base` is set to `10`, the size `0.11709 TB` is instead shown as `117.1 GB`.

`name`

A name for the new user, which cannot already exist in the system. Input rules:

- The value is case sensitive.
- The value can have a maximum of 29 bytes, where ASCII characters are 1 byte.
- The value can include printable UTF-8 characters except a space or: `"`, `<`, `\`
- A value that includes a space must be enclosed in double quotes.

Examples

Create user John who will view system information using base 2 in the Disk Management Utility.

```
# create user base 2 interfaces wbi roles monitor John
```

```
Enter new password: *****
```

```
Re-enter new password: *****
```

Create user MIB that can view the SNMP MIB, using authentication and encryption.

```
# create user interfaces snmpuser password Abcd1234 authentication-type SHA  
privacy-type AES privacy-password Abcd5678 MIB
```

Create user Traps that can receive SNMP trap notifications, using authentication without encryption.

```
# create user interfaces snmptarget authentication-type MD5 trap-host  
172.22.4.171 Traps
```

```
Enter new password: *****
```

```
Re-enter new password: *****
```

See also

- [delete user on page 126](#)
- [set snmp-parameters on page 276](#)
- [set user on page 283](#)
- [show users on page 447](#)

create vdisk

Description

Creates a vdisk using the specified RAID level, disks, and spares. This command applies to linear storage only.

All disks in the vdisk must be the same type (enterprise SAS, for example).

i Note: A disk group can contain a mix of 512-byte native sector size (512n) disks and 512-byte emulated sector size (512e) disks. For consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

For each RAID level, the minimum and maximum numbers of disks supported are:

- NRAID: 1
- RAID 0: 2–16

create vdisk

- RAID 1: 2
- RAID 3: 3–16
- RAID 5: 3–16
- RAID 6: 4–16
- RAID 10: 4–16
- RAID 50: 6–32

For best practices for creating vdisks, see the Storage Management Guide.

When you create a vdisk, also called a linear disk group, the system creates a linear pool with the same name. A linear pool can contain a single linear disk group.

Minimum role

manage

Syntax

```
create vdisk
[assigned-to a|b|auto]
[chunk-size 16k|32k|64k|128k|256k|512k]
disks disks
level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10
|raid50|r50
[mode online|offline]
[spare disks]

name
```

Parameters

assigned-to a|b|auto

Optional. For a system operating in Active-Active ULP mode, this specifies the controller to own the vdisk. To let the system automatically load-balance vdisks between controllers, use `auto` or omit this parameter. In Single Controller mode, this parameter is ignored; the system automatically load-balances vdisks in anticipation of the insertion of a second controller in the future.

chunk-size 16k|32k|64k|128k|256k|512k

Optional. The amount of contiguous data, in KB, that is written to a vdisk member before moving to the next member of the vdisk. For RAID 50, this option sets the chunk size of each RAID-5 subvdisk. The chunk size of the RAID-50 vdisk is calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For NRAID and RAID 1, `chunk-size` has no meaning and is therefore not applicable. The default size is 512k.

disks disks

The IDs of the disks to include in the vdisk. RAID 10 requires a minimum of two RAID-1 sub-vdisks each

create vdisk

having two disks. RAID 50 requires a minimum of two RAID-5 sub-vdisks each having three disks. For disk syntax, see [Command Syntax on page 13](#).

```
level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10
|raid50|r50
```

Specifies the RAID level.

```
mode online|offline
```

Optional. Specifies whether the vdisk is initialized online or offline.

- **online**: Enables you to use the vdisk immediately after creating it while it is initializing. Because online uses the verify method to create the vdisk, it takes longer to complete initializing than offline. Online initialization is fault-tolerant. This option is the default.
- **offline**: You must wait for the vdisk initialization process to finish before using the vdisk. However, offline takes less time to complete initializing than online.

```
spare disks
```

Optional. The IDs of 1–4 dedicated spares to assign to a RAID 1, 3, 5, 6, 10, or 50 vdisk. For disk syntax, see [Command Syntax on page 13](#).

```
name
```

A name for the new vdisk. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create the RAID-1 vdisk VD1 using two disks.

```
# create vdisk level raid1 disks 0.1,0.3 VD1
```

Create the RAID-50 vdisk VD2 having three RAID-5 sub-vdisks, each having three disks.

```
# create vdisk level r50 disks 0.1-3:0.4-6:0.7-9 VD2
```

Create the RAID-6 vdisk vdR6 using four disks.

```
# create vdisk level r6 disks 2.3-4,2.8-9 vdR6
```

See also

- [delete vdisks on page 127](#)
- [set vdisk on page 287](#)
- [show disks on page 325](#)
- [show vdisks on page 449](#)

create volume

Description

Creates a volume in a disk group or pool. You must specify a size for the volume. You can create the volume unmapped or set its default mapping. Default mapping settings apply to all hosts, unless overridden by an explicit mapping between a host and the volume. You can later change the mapping by using the [map volume on page 147](#) and [unmap volume on page 492](#) commands. By default, this command will not map the created volume.

⚠ Caution: Using a default mapping for a volume will allow multiple hosts to access the volume. To avoid multiple hosts mounting the volume and causing corruption, the hosts must be cooperatively managed, such as by using cluster software.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

If you intend to use the volume as the secondary volume in a replication set, you can create a replication-prepared volume. A secondary volume cannot be mapped.

To create multiple volumes at once, use the [create volume-set on page 100](#) command.

i Note: For virtual storage, you cannot add a volume to a volume group that is in a replication set.

For virtual storage, you can set the retention priority for snapshots of the volume. If automatic deletion of snapshots is enabled, the system uses the retention priority of snapshots to determine which, if any, snapshots to delete. Snapshots are considered to be eligible for deletion if they have any retention priority other than never-delete. Eligible snapshots are considered for deletion by priority and age. The oldest, lowest priority snapshots are deleted first. Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.

Minimum role

manage

Syntax

```
create volume  
[access read-write|rw|read-only|ro|no-access]  
[lun LUN]  
[pool pool]  
[ports ports]
```

create volume

```
[prepare-replication-volume]
[reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
[snap-pool snap-pool]
[snappable]
[snapshot-retention-priority never-delete|high|medium|low]
[tier-affinity no-affinity|archive|performance]
vdisk vdisk
[volume-group volume-group]
name
```

Parameters

access read-write|rw|read-only|ro|no-access

Optional. The access permission to use for the mapping: read-write (rw), read-only (ro), or no-access. If no-access is specified, the volume is not mapped. The default is read-write.

lun LUN

Optional if the access parameter is set to no-access. Specifies the LUN to assign to the mapping on all ports.

pool pool

Optional for linear volumes. Required for virtual volumes. The name or serial number of the pool in which to create the volume.

ports ports

Optional. The ports through which the host can access the volume. All specified ports must be the same type (FC, for example). For port syntax, see [Command Syntax on page 13](#). If this parameter is omitted, all ports are selected.

prepare-replication-volume

Optional. Linear storage only. Specifies to create a secondary volume for use in a replication set. This parameter precludes use of the lun and ports parameters because a secondary volume cannot be mapped.

reserve size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Optional. Linear storage only. Specifies the size of the snap pool to create in the disk group. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks. If this parameter is omitted, the size will be either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Use either this parameter or the snap-pool parameter.

size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

Sets the volume size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

A value less than 4 MB (3.8 MiB) will be rounded up to that size. Any larger value will be rounded down to the next multiple of that size. The maximum volume size is 140 TB (128 TiB). If overcommit is enabled, the

create volume

size can exceed the physical capacity of the storage pool. To see whether overcommit is enabled, use the [show pools on page 378](#) command.

snap-pool snap-pool

Optional. The name or serial number of the snap pool to associate with the new volume. A name that includes a space must be enclosed in double quotes.

snappable

Optional. Specifies to create a master volume instead of a standard volume.

snapshot-retention-priority never-delete|high|medium|low

Optional. For virtual storage, this specifies the retention priority for snapshots of the volume.

- never-delete: Snapshots will never be deleted.
- high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.
- medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.
- low: Snapshots may be deleted.

tier-affinity no-affinity|archive|performance

Optional. For virtual storage, this specifies how to tune the tier-migration algorithm for the volume.

- no-affinity: This setting uses the highest available performing tiers first and only uses the Archive tier when space is exhausted in the other tiers. Volume data will swap into higher performing tiers based on frequency of access and tier space availability. This is the default.
- archive: This setting prioritizes the volume data to the least performing tier available. Volume data can move to higher performing tiers based on frequency of access and available space in the tiers.
- performance: This setting prioritizes volume data to the higher performing tiers. If no space is available, lower performing tier space is used. Performance affinity volume data will swap into higher tiers based upon frequency of access or when space is made available

vdisk vdisk

Optional; required for linear volumes. The name or serial number of the disk group in which to create the volume. A name that includes a space must be enclosed in double quotes.

volume-group volume-group

Optional. The name of a volume group to which to add the volume. A name that includes a space must be enclosed in double quotes. If the group does not exist, it will be created.

name

A name for the new volume. The name must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create the 20-GB volume V1 in disk group VD1, and map it to ports A1 and B1 using LUN 5.

```
# create volume vdisk VD1 size 20GB ports a1,b1 lun 5 V1
```

Create a 100-GB standard volume named MyVolume in pool A, map it to use LUN 5 with read-write access through port 1 in each controller, and add it to volume group MyGroup, and tune tier-migration for performance.

```
# create volume MyVolume pool A size 100GB access rw lun 5 ports 1 volume-group MyGroup preference performance
```

Create a 20-GB standard volume named Secrets in storage pool A, and map it to use LUN 333 with read-only access through all ports.

```
# create volume Secrets pool A size 20GB lun 333 access read-only
```

Create a 1-TB secondary volume named NewYork in storage pool B.

```
# create volume NewYork pool B size 1TB prepare-replication-volume
```

Create volume Vol1 with snapshot retention priority high.

```
# create volume snapshot-retention-priority high Vol1
```

See also

- [create volume-set on page 100](#)
- [delete volumes on page 130](#)
- [set vdisk-spare \(Deprecated\) on page 289](#)
- [show pools on page 378](#)
- [show ports on page 386](#)
- [show vdisks on page 449](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)

create volume-group

Description

Creates a volume group that includes specified volumes. You can create a maximum of 256 volume groups. A volume group can contain a maximum of 1024 volumes.

create volume-group

Minimum role

manage

Syntax

```
create volume-group  
volumes volumes  
volume-group
```

Parameters

volumes volumes

A comma-separated list of the names of volumes to include in the volume group. A name that includes a space must be enclosed in double quotes.

volume-group

A name for the volume group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Create a volume group named VGroup1 that includes hosts Vol0001 and Vol0002.

```
# create volume-group volumes Vol0001,Vol0002 VGroup1
```

See also

- [add vdisk-spare \(Deprecated\) on page 48](#)
- [delete vdisk-spare \(Deprecated\) on page 128](#)
- [remove volume-group-members on page 164](#)
- [set volume-group on page 292](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)

create volume-set

Description

Creates a specified number of volumes in a disk group. You must specify a base name and a size for the volumes. You can create the volumes unmapped or set their default mapping. Default mapping settings apply to all hosts, unless overridden by an explicit mapping between a host and the volume. You can later change mappings by using the [map volume on page 147](#) and [unmap volume on page 492](#) commands. By default, this command will not map the created volumes.

⚠ Caution: Using a default mapping for a volume will allow multiple hosts to access the volume. To avoid multiple hosts mounting the volume and causing corruption, the hosts must be cooperatively managed, such as by using cluster software.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

You can enable the host PI process of the E2E PI feature for the volumes in a volume set when creating the volume set. Host PI ensures the integrity of the data sent from the host server to the volumes, and vice versa. Once enabled, you will be unable to change this setting for the life of the volumes. For more information, see the topics on creating a volume set in the Storage Management Guide.

Minimum role

manage

Syntax

```
create volume-set  
[access read-write|rw|read-only|ro|no-access]  
[baselun base-LUN]  
basename base-name  
count #  
[pool pool]  
[ports ports]  
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]  
[snapshot-retention-priority never-delete|high|medium|low]  
[tier-affinity no-affinity|archive|performance]  
[vdisk vdisk]  
[volume-group volume-group]
```

Parameters

`access` *read-write|rw|read-only|ro|no-access*

Optional. The access permission to use for the mapping: read-write (*rw*), read-only (*ro*), or no-access. If no-access is specified, the volume is not mapped. The default is read-write.

`baseLun` *base-LUN*

Optional. The first in a sequence of LUNs to assign to map the volumes through ports specified by the `ports` parameter. If the `baseLun` and `ports` parameters are omitted, the volumes are not mapped. If a LUN to be assigned to a volume is already in use, an error message is displayed and that volume and any subsequent volumes are not mapped.

`basename` *base-name*

A name to which a number will be appended to generate a different name for each volume. Volume names must be unique system-wide. Input rules:

- The value is case sensitive.
- The value can have a maximum of 16 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Resulting volumes are numbered sequentially starting with 0000. If volumes with the specified `basename` already exist, names of new volumes start with the first available name in the sequence. For example: for `basename` `vd1_v`, if `vd1_v0000` and `vd1_v0002` exist, the next volumes created will be `vd1_v0001` and `vd1_v0003`.

`count` *#*

The number of volumes to create, from 1 to 128. Volumes will be created up to the maximum number supported per disk group.

`pool` *pool*

Optional; required for virtual volumes. The name or serial number of the pool in which to create the volumes. A name that includes a space must be enclosed in double quotes.

`ports` *ports*

Optional. The controller ports to use for the mapping. All ports must be the same type. For port syntax, see [Command Syntax on page 13](#). If not all ports are specified, the unspecified ports are not mapped. If the `ports` and `baseLun` parameters are omitted, the volumes are not mapped.

`size` *size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]*

Sets the volume size. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks. If the combined size of the volumes exceeds the capacity of the disk group, an error message is displayed and no volumes are created.

A value less than 4 MB (3.8 MiB) will be rounded up to that size. Any larger value will be rounded down to the next multiple of that size. The maximum volume size is 140 TB (128 TiB). If overcommit is enabled, the volume size can exceed the physical capacity of the storage pool. To see whether overcommit is enabled, use the [show system-parameters on page 433](#) command. If overcommit is disabled and the combined size of the volumes will exceed the capacity of the storage pool, an error message is displayed and no volumes are created.

`snapshot-retention-priority` *never-delete|high|medium|low*

create volume-set

Optional. For virtual storage, this specifies the retention priority for snapshots of the volume set.

- `never-delete`: Snapshots will never be deleted.
- `high`: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.
- `medium`: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.
- `low`: Snapshots may be deleted.

tier-affinity `no-affinity|archive|performance`

Optional. For virtual storage, this specifies how to tune the tier-migration algorithm for the volume:

- `no-affinity`: This setting uses the highest available performing tiers first and only uses the Archive tier when space is exhausted in the other tiers. Volume data will swap into higher performing tiers based on frequency of access and tier space availability. This is the default.
- `archive`: This setting prioritizes the volume data to the least performing tier available. Volume data can move to higher performing tiers based on frequency of access and available space in the tiers.
- `performance`: This setting prioritizes volume data to the higher performing tiers. If no space is available, lower performing tier space is used. Performance affinity volume data will swap into higher tiers based upon frequency of access or when space is made available.

vdisk `vdisk`

Optional; required for linear volumes. The name or serial number of the disk group in which to create the volumes. A name that includes a space must be enclosed in double quotes.

volume-group `volume-group`

Optional. The name of a volume group to which to add the volume. A name that includes a space must be enclosed in double quotes. If the group does not exist, it will be created.

Examples

Create two unmapped, 100-GB volumes with base name `MyVol1-` in pool B and add them to volume group `MyVG`.

```
# create volume-set count 2 size 100GB pool b basename MyVol1- volume-group MyVG
```

Create two unmapped, 100-GB volumes with base name `data-` in disk group `data`.

```
# create volume-set count 2 size 100GB vdisk data basename data-
```

Create ten 20-GB volumes with the base name `vd1_v` in disk group `vd1`, mapped starting with LUN 5 with read-only access through port `A1`.

```
# create volume-set count 10 size 20GB vdisk vd1 basename vd1_v baselun 5
access ro ports a1
```

Create four 5-MB volumes with the base name `BV1_` with snapshot retention priority `high`.

```
# create volume-set count 4 size 5MB basename BV1_ snapshot-retention-priority
high Vol1
```

See also

- [create volume on page 95](#)
- [delete volumes on page 130](#)
- [map volume on page 147](#)
- [set vdisk-spare \(Deprecated\) on page 289](#)
- [show maps on page 368](#)
- [show pools on page 378](#)
- [show vdisks on page 449](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)
- [unmap volume on page 492](#)



Chapter 5: Alphabetical List of Commands (D-R)

This chapter contains the following topics:

Alphabetical List of Commands	107
delete all-master-volumes	107
delete all-snapshots	108
delete chap-records	110
delete global-spare (Deprecated)	111
delete host (Deprecated)	111
delete host-groups	111
delete hosts	113
delete initiator-nickname	114
delete master-volume (Deprecated)	115
delete peer-connection	115
delete pools	116
delete remote-system	118
delete replication-set	119
delete schedule	120
delete snap-pool	121

delete snapshot	122
delete snapshot-write-data	124
delete task	125
delete user	126
delete vdisks	127
delete vdisk-spare (Deprecated)	128
delete volume-groups	129
delete volumes	130
dequarantine	131
detach replication-volume	134
exit	136
expand disk-group	137
expand snap-pool	139
expand vdisk	140
expand volume	142
export snapshot	144
fail	145
help	146
load license	147
map volume	147
meta	149
ping	150
query peer-connection	151
reattach replication-volume	153
release volume	155
remote	156
remove disk-groups	157
remove host-group-members	159
remove host-members	160

remove replication-volume	161
remove spares	163
remove volume-group-members	164
replicate	165
replicate snapshot	166
replicate volume	167
rescan	168
reset all-statistics	169
reset controller-statistics	171
reset disk-error-statistics	172
reset disk-group-statistics	173
reset disk-statistics	175
reset host-link	176
reset host-port-statistics	177
reset pool-statistics	178
reset smis-configuration	179
reset snapshot	180
reset vdisk-statistics	182
reset volume-statistics	183
restart mc	184
restart sc	185
restore defaults	187
resume replication	188
resume replication-set	189
rollback master-volume (Deprecated)	190
rollback volume	190

Alphabetical List of Commands

This chapter is organized to help you find a command by name. Each command topic includes one or more of the following sections:


Description	The command's purpose and notes about its usage
Minimum role	The minimum user role required to use the command
Syntax	The command's syntax
Parameters	Descriptions of the command's parameters
Output	Descriptions of fields shown in console format
Examples	One or more examples of the command's usage in console format
Basetypes	References to descriptions of basetype properties shown in XML API format
See also	References to commands that are used with the command


delete all-master-volumes

Description

Deletes all master volumes associated with a specified snap pool. This command applies to linear storage only.

The volumes' schedules and tasks are also deleted.

 **Caution:** When the master volumes are deleted, all data in those volumes will be lost.

 **Note:** You must delete all snapshots that exist for the master volumes before you can delete the master volumes.

Minimum role

manage

Syntax

```
delete all-master-volumes  
snap-pool volume
```

Parameters

snap-pool volume

The name or serial number of the snap pool whose master volumes should be deleted. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete all master volumes associated with snap pool SP1.  
# delete all-master-volumes snap-pool SP1
```

See also

- [delete all-snapshots below](#)
- [show master-volumes on page 371](#)
- [show snap-pools on page 421](#)

delete all-snapshots

Description

Deletes all snapshots associated with a specified source volume. All data associated with the snapshots is deleted and their space in the snap pool is freed for use.

For virtual storage, the source volume can be a base volume or a snapshot. For linear storage, the source volume can be a master volume or a snap pool.

The snapshots' schedules and tasks are also deleted.

 **Caution:** When the snapshots are deleted, all data in those snapshots will be lost.

Minimum role

manage

Syntax

```
delete all-snapshots  
[delete-type all-standard-snapshots|all-replication-snapshots|all-snapshot-types]  
volume volume
```

Parameters

`delete-type all-standard-snapshots|all-replication-snapshots|all-snapshot-types`
Optional. Specifies the type of snapshots that can be deleted. If this parameter is omitted, the default is `all-standard-snapshots`, which means that the command will try to delete only standard snapshots and will not succeed if replication snapshots exist.

`volume volume`

The name or serial number of the source volume. A name that includes a space must be enclosed in double quotes.

Examples

Delete all snapshots associated with volume MV1.

```
# delete all-snapshots volume MV1
```

Delete all replication snapshots associated with volume MV2, which is the primary volume in a replication set.

```
# delete all-snapshots volume MV2 delete-type all-replication-snapshots
```

See also

- [show snapshots on page 425](#)
- [show volumes on page 467](#)


delete chap-records

Description

For iSCSI, deletes a specified CHAP record or all CHAP records. This command is permitted whether or not CHAP is enabled.

For a login request from an iSCSI initiator to a storage system, the initiator is the originator and the storage system is the recipient. Because CHAP works during login, to make CHAP changes take effect you must reset any active iSCSI host links.

In a peer connection, a storage system can act as the originator or recipient of a login request. As the originator, with a valid CHAP record it can authenticate CHAP even if CHAP is disabled. This is possible because the system will supply the CHAP secret requested by its peer and the connection will be allowed.

 **Caution:** Deleting CHAP records may make volumes inaccessible and the data in those volumes unavailable.

Minimum role

manage

Syntax

To delete the CHAP record for a specific originator:

```
delete chap-records  
name originator-name
```

To delete all CHAP records:

```
delete chap-records  
all
```

Parameters

name originator-name

The originator name, typically in IQN format.

all

Delete all CHAP records in the database.

Examples

Delete the CHAP record for a specific originator.

```
# delete chap-records name iqn.1991-05.com.microsoft:myhost.domain
```

Delete all CHAP records.

```
# delete chap-records all
```

See also

- [create chap-record on page 63](#)
- [set chap-record on page 210](#)
- [show channels \(Deprecated\) on page 303](#)
- [show iscsi-parameters on page 363](#)

delete global-spare (Deprecated)

Use [remove spares on page 163](#).

delete host (Deprecated)

Use [delete initiator-nickname on page 114](#).

delete host-groups

Description

Deletes specified host groups and optionally all hosts in those groups.

Before using the option to delete all the hosts in the groups, ensure that the hosts are unmapped.

Minimum role

manage

Syntax

```
delete host-groups  
[delete-hosts]  
host-groups | all
```

Parameters

`delete-hosts`

Optional. Specifies to delete all hosts in the groups. If this parameter is omitted, the host groups will be deleted but their hosts will not be deleted.

`host-groups | all`

Specifies either:

- A comma-separated list of the names of host groups to delete. A name that includes a space must be enclosed in double quotes.
- `all`: Deletes all host groups.

Examples

Delete host group HGroup1 but not the hosts in those groups.

```
# delete host-groups HGroup1
```

Delete all host groups and the hosts in those groups.

```
# delete host-groups delete-hosts all
```

See also

- [show host-groups on page 354](#)

delete hosts

Description

Deletes specified hosts that are not in a host group. Mapped and unmapped hosts can be deleted. Deleting a host does not delete its initiators. Volume maps continue to apply to the initiators in the host that is deleted.

Minimum role

manage

Syntax

```
delete hosts  
hosts | all
```

Parameters

hosts | all

Specifies either:

- A comma-separated list of the names of hosts to delete. A name that includes a space must be enclosed in double quotes.
- all: Deletes all hosts.

Examples

```
Delete hosts Host1 and Host2.  
# delete hosts Host1,Host2  
  
Delete all hosts.  
# delete hosts all
```

See also

- [create host on page 64](#)
- [set global-spare \(Deprecated\) on page 234](#)
- [set initiator on page 242](#)
- [show host-groups on page 354](#)

- [show hosts \(Deprecated\) on page 360](#)

delete initiator-nickname

Description

Deletes manually created initiators or the nicknames of discovered initiators.

Volume maps continue to apply to the initiators in the host that is deleted. If you delete the nickname of a discovered initiator, commands will show the initiator by its ID.

Minimum role

manage

Syntax

```
delete initiator-nickname  
initiator|all
```

Parameters

initiator|all

Specifies either:

- The nickname or ID of the initiator to delete. A value that includes a space must be enclosed in double quotes.
- `all`: Deletes all manually created initiators and nicknames of discovered initiators.

Examples

Delete the manually created initiator named `Init1`.

```
# delete initiator-nickname Init1
```

Delete the nickname of discovered initiator `Init2`.

```
# delete initiator-nickname Init2
```

Delete all manually created initiators and nicknames of discovered initiators.

```
# delete initiator-nickname all
```

See also

- [create host on page 64](#)
- [set initiator on page 242](#)
- [show hosts \(Deprecated\) on page 360](#)

delete master-volume (Deprecated)

Use [delete volumes on page 130](#).

delete peer-connection

Description

Deletes a peer connection between two storage systems.

You can run this command on either the local or remote system.

You cannot delete a peer connection if any replication sets are using it.

Minimum role

manage

Syntax

```
delete peer-connection  
  [local-only]  
  peer-connection-ID
```

Parameters

local-only

Optional. Only use this parameter if you need to remove a peer connection when no network connection is available between the systems and you do not expect to be able to reconnect them. Do not use this parameter in normal operating conditions.

Run the command with this parameter on both systems. If you want to reconnect your peer connection with new addresses, use the `set peer-connection` command.

peer-connection-ID

Specifies the name or serial number of the peer connection to delete.

Examples

```
Delete the peer connection Peer1.  
# delete peer-connection Peer1
```

See also

- [create peer-connection on page 69](#)
- [query peer-connection on page 151](#)
- [set peer-connection on page 253](#)
- [show peer-connections on page 376](#)

delete pools

Description

Deletes specified pools.

 **Caution:** Deleting a pool will delete all the data it contains.

For linear storage, a pool and a disk group are logically equivalent. For a linear pool, if the pool contains volumes, the command will prompt for confirmation to delete the volumes. If the reply is yes, the command will unmap and delete all volumes in the pool, delete the pool and corresponding disk group, and make all the disks available. If the reply is no, the command will be canceled. You cannot delete a disk group if it contains a snap pool that is associated with a master volume in another disk group.

For virtual storage, a pool can contain multiple disk groups. For a virtual pool, if the pool contains volumes, the command will prompt for confirmation to delete the volumes. If the reply is yes, the command will unmap and delete all volumes in the pool, and then delete each disk group in the pool and make all the disks available. If the reply is no, the command will be canceled.

-
- i Note:** You cannot remove the only pool from a system that is used in a peer connection, or a pool that contains a volume that is used in a replication set.
-
- i Note:** If you delete a quarantined disk group and its missing disks are later found, the group will reappear as quarantined or offline and you must delete it again (to clear those disks).

Minimum role

manage

Syntax

```
delete pools  
[prompt yes|no]  
pools
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

pools

A comma-separated list of the names or serial numbers of the pools to delete. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete pool dg1.  
# delete pools dg1
```

See also

- [delete vdisks on page 127](#)
- [remove disk-groups on page 157](#)
- [show master-volumes on page 371](#)
- [show pools on page 378](#)

- [show vdisks on page 449](#)

delete remote-system

Description

Deletes the persistent association with a remote system. This command applies to linear storage only.

After establishing replication to a remote system, if you choose to delete the remote system you can safely do so without affecting replications. However, because the remote system's name and IP address will no longer appear in user interfaces, record this information before deleting the remote system so that you can access it at a later time, such as to delete old replication images or for disaster recovery.

Minimum role

manage

Syntax

```
delete remote-system  
system
```

Parameters

system

The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete remote system System2.  
# delete remote-system System2
```

See also

- [create remote-system on page 71](#)
- [remote on page 156](#)

- [set remote-system on page 261](#)
- [show remote-systems on page 401](#)

delete replication-set

Description

Deletes a replication set. This command applies to linear storage only.

For linear storage, this command must be run on the replication set's primary system. The replication volumes associated with the replication set are converted to master volumes and any replication snapshots associated with the replication volumes are converted to standard snapshots. Snapshots are converted regardless of the number of snapshots allowed by the system's license.

For virtual storage, you can run this command on the replication set's primary or secondary system.

When you delete a virtual replication set, the internal snapshots created by the system are also deleted. However, no user data is deleted. The primary and secondary volumes can be used like any other base volumes.

On the primary system, you cannot delete a virtual replication set if it has a replication in progress. If you want to delete a replication set that has a replication in progress, you must first suspend and then abort replication for that replication set. To view replication activity, use the [show replication-sets on page 405](#) command. To suspend replication, use the [suspend replication-set](#) command. To abort replication, use the [abort replication on page 31](#) command.

Minimum role

manage

Syntax

```
delete replication-set  
[local-only]  
replication-set-ID
```

Parameters

local-only

Optional. Only use this parameter if you need to remove a replication set from a primary or secondary system when no network connection is available to the peer system and you do not expect to be able to reconnect them. Do not use this parameter in normal operating conditions.

Run the command with this parameter on both the primary system and the secondary system to completely remove the replication relationship between the primary and secondary volumes.

replication-set-ID

The name or serial number of either the replication set or its primary volume. A name that includes a space must be enclosed in double quotes.

Examples

Delete replication set RS1.

```
# delete replication-set RS1
```

Delete the replication set with primary volume MV1.

```
# delete replication-set MV1
```

See also

- [abort replication on page 31](#)
- [create replication-set on page 72](#)
- [resume replication-set on page 189](#)
- [set replication-set on page 266](#)
- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)
- [suspend replication-set](#)

delete schedule

Description

Deletes a task schedule. If you no longer want a scheduled task to occur, you can delete the schedule. When a volume or snapshot is deleted, its schedules and tasks are also deleted.

If the schedule uses a task that is not used by any other schedule, a confirmation prompt will ask whether you want to delete the schedule and the task. Reply yes to delete both, or no to delete only the schedule.

Minimum role

manage

Syntax

```
delete schedule  
[prompt yes|no]  
schedule
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

schedule

The name of the schedule to delete.

Examples

```
Delete schedule Sched1.  
# delete schedule Sched1
```

See also

- [create schedule on page 79](#)
- [set schedule on page 269](#)
- [show schedules on page 416](#)

delete snap-pool

Description

Deletes a snap pool. This command applies to linear storage only.

Note: You must disassociate all master volumes from the snap pool before you can delete it.

Minimum role

manage

Syntax

```
delete snap-pool  
snap-pool
```

Parameters

snap-pool

The name or serial number of the snap pool to delete. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete snap pool SP1.  
# delete snap-pool SP1
```

See also

- [show master-volumes on page 371](#)
- [show snap-pools on page 421](#)
- [show volumes on page 467](#)

delete snapshot

Description

Deletes specified snapshots. All data uniquely associated with the snapshot is deleted and associated space in the snap pool is freed for use. The snapshot's schedules are also deleted.

 **Caution:** When a snapshot is deleted, all data in the snapshot will be lost.

delete snapshot

Minimum role

manage

Syntax

```
delete snapshot
[cleanup]
[delete-priority standard-snapshot|volume-copy-snapshot|replication-snapshot
|replicating-snapshot|common-sync-point-snapshot|only-sync-point-snapshot
|queued-snapshot]
[force]
snapshots
```

Parameters

cleanup

Optional. When a master volume's last snapshot is deleted, automatically convert the master volume to a standard volume and delete the snap pool.

```
delete-priority standard-snapshot|volume-copy-snapshot
|replication-snapshot|replicating-snapshot|common-sync-point-snapshot
|only-sync-point-snapshot|queued-snapshot
```

Optional. Priority of snapshots that can be deleted. If the specified priority is less than the snapshot's priority, deletion is prevented. This is intended to protect against accidentally deleting high-priority snapshots. You must specify this parameter or the `force` parameter, but not both.

force

Optional. Overrides priority protection and forces the specified snapshot to be deleted. You must specify this parameter or the `delete-priority` parameter, but not both.

snapshots

A comma-separated list of the names or serial numbers of the snapshots to delete. A name that includes a space must be enclosed in double quotes.

Examples

Delete standard snapshots `s1`, `s2`, and `s3`.

```
# delete snapshot s1,s2,s3
```

Delete snapshot `SS1`, which is being used in a replication operation.

```
# delete snapshot delete-priority replicating-snapshot SS1
```

Force deletion of snapshot `SS2`.

```
# delete snapshot force SS2
```

See also

- [delete all-snapshots on page 108](#)
- [delete snapshot-write-data below](#)
- [set syslog-parameters on page 278](#)
- [show snapshots on page 425](#)

delete snapshot-write-data

Description

Deletes data written to a standard snapshot after it was created. This command applies to linear storage only.

Deleting this modified data reverts the snapshot to the state when it was first taken. This command is not allowed for a replication snapshot. Unmount/unpresent/unmap the snapshot before deleting the snapshot write data to avoid conflicts with the host operating system.

 **Caution:** All data written to the snapshot after it was created will be deleted.

Minimum role

manage

Syntax

```
delete snapshot-write-data  
snapshot
```

Parameters

snapshot

The name or serial number of the snapshot from which to delete modified data. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete only modified data from snapshot SS1.  
# delete snapshot-write-data SS1
```

See also

- [delete snapshot on page 122](#)
- [show snapshots on page 425](#)

delete task

Description

Deletes a task. If the task is scheduled, a confirmation prompt will ask whether you want to delete the task and its schedules. Reply yes to delete both, or no to cancel the command.

Minimum role

manage

Syntax

```
delete task  
[prompt yes|no]  
task
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

task

The name of the task to delete.

Examples

```
Delete task Task1.  
# delete task Task1
```

See also

- [create task on page 83](#)
- [delete schedule on page 120](#)
- [show schedules on page 416](#)
- [show task-details \(Deprecated\) on page 435](#)

delete user

Description

Deletes a user account. Except for the user you are logged in as, you can delete any user, including the default users. However, the system requires at least one CLI user with the manage role to exist. When a user is deleted, any sessions associated with that user name are terminated.

Minimum role

manage

Syntax

```
delete user  
[noprompt]  
name
```

Parameters

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

name

The user to delete. Names are case sensitive.

Examples

```
Delete user jsmith.  
# delete user jsmith
```

See also

- [create user on page 88](#)
- [show users on page 447](#)


delete vdisks


Description

Deletes specified vdisks. This command applies to linear storage only.

This unmaps and deletes all volumes and snapshots in the vdisks and makes all the disks available.

 **Caution:** Deleting a vdisk will delete all data it contains.

 **Note:** You cannot delete a vdisk if it contains a snap pool that is associated with a master volume in another vdisk.

 **Note:** If you delete a quarantined vdisk and its missing disks are later found, the vdisk will reappear as quarantined or offline and you must delete it again (to clear those disks).

Minimum role

manage

Syntax

```
delete vdisks
```

```
[prompt yes|no]  
vdisks
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

vdisks

A comma-separated list of the names or serial numbers of the vdisks to delete. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete vdisks VD1 and VD2.  
# delete vdisks VD1,VD2
```

See also

- [create vdisk on page 92](#)
- [show master-volumes on page 371](#)
- [show vdisks on page 449](#)

delete vdisk-spare (Deprecated)

Use [remove spares on page 163](#).

delete volume-groups

Description

Deletes specified volume groups and optionally all volumes in those groups.

Before using the option to delete all the volumes in the groups, ensure that the volumes are unmapped. If any volume is mapped, the command will fail and no changes will be made.

i Note: For virtual storage, before you can delete a volume group that is in a replication set you must delete the replication set.

Minimum role

manage

Syntax

```
delete volume-groups  
[delete-volumes]  
volume-groups | all
```

Parameters

`delete-volumes`

Optional. Specifies to delete all volumes in the groups. If this parameter is omitted, the volume groups will be deleted but their volumes will not be deleted.

`volume-groups | all`

Specifies either:

- A comma-separated list of the names of volume groups to delete. A name that includes a space must be enclosed in double quotes.
- `all`: Deletes all volume groups.

Examples

Delete volume groups VGroup1 and VGroup2 but not the volumes in those groups.

```
# delete volume-groups VGroup1,VGroup2
```

Delete all volume groups and the volumes in those groups.

```
# delete volume-groups delete-volumes all
```

See also


- [delete replication-set on page 119](#)
- [show volume-groups on page 461](#)

delete volumes

Description

Deletes specified volumes.

 **Caution:** Deleting a volume will delete all data it contains, and its schedules.

 **Note:** For virtual storage, you cannot delete a volume that is in a replication set.

Minimum role

manage

Syntax

```
delete volumes  
  volumes
```

Parameters

volumes

A comma-separated list of the names or serial numbers of the volumes to delete. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete volumes V1 and V2.  
# delete volumes V1,V2
```

See also

- [create volume on page 95](#)
- [show volumes on page 467](#)

dequarantine

Description

Removes a disk group from quarantine.

⚠ Caution: Carefully read this topic to determine whether to use the `dequarantine` command to manually remove a disk group from quarantine. The `dequarantine` command should only be used as part of the emergency procedure to attempt to recover data and is normally followed by use of the CLI [trust on page 485](#) command. If a disk group is manually dequarantined and does not have enough disks to continue operation, its status will change to OFFL and its data may or may not be recoverable through use of the [trust on page 485](#) command. It is recommended that you contact technical support for assistance in determining if the recovery procedure that makes use of the `dequarantine` and [trust on page 485](#) commands is applicable to your situation and for assistance in performing it. Also, see the help for the [trust on page 485](#) command.

To continue operation and not go to quarantined status, a RAID-3 or RAID-5 disk group can have only one inaccessible disk, a RAID-6 disk group can have only one or two inaccessible disks, and a RAID-10 or RAID-50 disk group can have only one inaccessible disk per subgroup. For example, a 16-disk RAID-10 disk group can remain online (critical) with 8 inaccessible disks if one disk per mirror is inaccessible.

The system will automatically quarantine a disk group having a fault-tolerant RAID level if one or more of its disks becomes inaccessible, or to prevent invalid (“stale”) data that may exist in the controller from being written to the disk group. Quarantine will not occur if a known-failed disk becomes inaccessible or if a disk becomes inaccessible after failover or recovery. The system will automatically quarantine an NRAID or RAID-0 disk group to prevent invalid data from being written to the disk group. If quarantine occurs because of an inaccessible disk, event 172 is logged. If quarantine occurs to prevent writing invalid data, event 485 is logged. For recommended actions for these events, see the Event Descriptions Reference Guide.

Examples of when quarantine can occur are:

- At system power-up, a disk group has fewer disks online than at the previous power-up. This may happen because a disk is slow to spin up or because an enclosure is not powered up. The disk group will

dequarantine

be automatically dequarantined if the inaccessible disks come online and the disk group status becomes FTOL (fault tolerant and online), or if after 60 seconds the disk group status is QTCR or QTDN.

- During system operation, a disk group loses redundancy plus one more disk. For example, three disks are inaccessible in a RAID-6 disk group or two disks are inaccessible for other fault-tolerant RAID levels. The disk group will be automatically dequarantined if after 60 seconds the disk group status is FTOL, FTDN, or CRIT.

Quarantine isolates the disk group from host access and prevents the system from changing the disk group status to OFFL (offline). The number of inaccessible disks determines the quarantine status. From least to most severe:

- QTDN (quarantined with a down disk): The RAID-6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.
- QTCR (quarantined critical): The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.
- QTOF (quarantined offline): The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 disk group.

When a disk group is quarantined, its disks become write-locked, its volumes become inaccessible, and it is not available to hosts until it is dequarantined. If there are interdependencies between the quarantined disk group's volumes and volumes in other disk groups, quarantine may temporarily impact operation of those other volumes. For example, if the quarantined disk group contains the snap pool used for snapshot or volume-copy or replication operations, quarantine may temporarily cause the associated master volume to go offline; a volume-copy or replication operation can also be disrupted if an associated volume (snap pool, source volume, or destination volume) goes offline.

Depending on the operation, the length of the outage, and the settings associated with the operation, the operation may automatically resume when the disk group is dequarantined or may require manual intervention. A disk group can remain quarantined indefinitely without risk of data loss.

A disk group is dequarantined when it is brought back online, which can occur in three ways:

- If the inaccessible disks come online, making the disk group FTOL, the disk group is automatically dequarantined.
- If after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined. The inaccessible disks are marked as failed and the disk group status changes to CRIT (critical) or FTDN (fault tolerant with a down disk). If the inaccessible disks later come online, they are marked as LEFTOVR (leftover).
- The `dequarantine` command is used to manually dequarantine the disk group. If the inaccessible disks later come online, they are marked as LEFTOVR (leftover). If event 172 was logged, do not use the `dequarantine` command. Instead follow the event's recommended-action text. If event 485 was logged, use the `dequarantine` command only as specified by the event's recommended-action text to avoid data corruption or loss.

When a disk group is dequarantined, event 173 is logged.

A quarantined disk group can be fully recovered if the inaccessible disks are restored. Make sure that all disks are properly seated, that no disks have been inadvertently removed, and that no cables have been

unplugged. Sometimes not all disks in the disk group power up. Check that all enclosures have restarted after a power failure. If these problems are found and then fixed, the disk group recovers and no data is lost.

If the inaccessible disks cannot be restored (for example, they failed), and the disk group's status is FTDN or CRIT, and compatible spares are available to replace the inaccessible disks, reconstruction will automatically begin.

If a replacement disk (reconstruct target) is inaccessible at power up, the disk group becomes quarantined. When the disk is found, the disk group is dequarantined and reconstruction starts. If reconstruction was in process, it continues where it left off.

i Note: The only commands allowed for a quarantined disk group are `dequarantine` and `delete vdisks` [on page 127](#) and `remove disk-groups` [on page 157](#). If you delete a quarantined disk group and its inaccessible disks later come online, the disk group will reappear as quarantined or offline and you must delete it again (to clear those disks).

Minimum role

manage

Syntax

```
dequarantine
disk-group disk-group
vdisk vdisk
```

Parameters

`disk-group disk-group`

The name or serial number of the disk group to remove from quarantine. A name that includes a space must be enclosed in double quotes.

`vdisk vdisk`

The name or serial number of the disk group to remove from quarantine. A name that includes a space must be enclosed in double quotes.

Examples

After determining that linear disk group VD1 is quarantined, remove it from quarantine and re-check its status.

```
# show vdisks
Name ... Status ...
-----
```


detach replication-volume

```

VD1 ... QTDN ... (RAID 6 quarantined with a down disk)
-----
# dequarantine vdisk VD1
Info: Disk group VD1 was dequarantined. (VD1)
...
# show vdisks
Name ... Status ...
-----
VD1 ... FTDN ... (RAID 6 fault tolerant with a down disk)
-----

After determining that virtual disk group DG1 is quarantined, remove it from quarantine and re-check its
status.
# show disk-groups
Name ... Status ...
-----
DG1 ... QTDN ... (RAID 6 quarantined with a down disk)
-----
# dequarantine disk-group DG1
Info: Disk group DG1 was dequarantined. (DG1)
...
# show disk-groups
Name ... Status ...
-----
DG1 ... FTDN ... (RAID 6 fault tolerant with a down disk)
-----

```

See also

- [show disk-groups on page 317](#)
- [show vdisks on page 449](#)
- [trust on page 485](#)

detach replication-volume

Description

Prepares a secondary volume to be physically removed from a system.

When using the replication feature, if you chose to create a replication set's primary and secondary volumes in the primary system, you can perform the initial replication and then physically move the secondary volume's vdisk into the secondary system.

The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

Detached volumes remain associated with their replication sets but are not updated with replication data or with replication control information. When a volume is detached its status is shown as Detached.

i Note: It is recommended that the vdisk that you are moving contains only secondary volumes and their snap pools. You are allowed to move other volumes along with secondary volumes and their snap pools, but be sure that you are doing so intentionally.

i Note: If you intend to move a vdisk's enclosure and you want to allow I/O to continue to the other enclosures, it is best if it is at the end of the chain of connected enclosures. If the enclosure is in the middle of the chain, the enclosures must be cabled with no single point of failure, so that removing the enclosure does not prevent communication between other enclosures.

Minimum role

manage

Syntax

```
detach replication-volume  
[set replication-set]  
replication-volume
```

Parameters

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the replication volume to detach. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Examples

```
Detach secondary volume rV1.  
# detach replication-volume rV1
```

See also

- [reattach replication-volume on page 153](#)
- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)
- [start vdisk on page 475](#)
- [stop vdisk on page 478](#)

exit

Description

Log off and exit the CLI session.

Minimum role

monitor

Syntax

```
exit
```

expand disk-group

Description

Adds disks to a disk group to expand its storage capacity. This command applies to linear storage only.

The new disks must be the same type as disks already in the group and should also have the same capacity.

i Note: If you upgraded from an earlier release that did not distinguish between enterprise and midline SAS disks, you might have groups that contain both types of disks. For those groups, you can designate either or both types of disks for expansion. If—through replacement of spares or failed disks—the group is changed to contain only one type of disk, you will only be able to add disks of that type to the group.

i Note: A disk group can contain a mix of 512-byte native sector size (512n) disks and 512-byte emulated sector size (512e) disks. For consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

The expansion capability for each supported RAID level is:

RAID level

Expansion capability

Maximum disks

Non-RAID

0, 3, 5, 6

1

10

50

Cannot expand.

Can add 1–4 disks at a time.

Cannot expand.

Can add 2 or 4 disks at a time.

Can expand the group one RAID-5 subgroup at a time. The added RAID-5 subgroup must contain the same number of disks as each original subgroup.

expand disk-group

1

16

2

16

32

⚠ Caution: Disk group expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors.

Before starting the expansion, ensure no other utilities are running on the group. If another operation is in progress, the expansion cannot start.

Minimum role

manage

Syntax

```
expand disk-group
disks disks
[prompt yes|no]
disk-group
```

Parameters

disks disks

The IDs of the disks to add. For disk syntax, see [Command Syntax on page 13](#).

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- **yes:** Allow the command to proceed.
- **no:** Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

disk-group

The name or serial number of the disk group to expand. A name that includes a space must be enclosed in double quotes.

Examples

Expand disk group VD1 to include disk 1.11.

```
# expand disk-group disks 1.11 VD1
```

Expand RAID-10 disk group R10 to include an additional mirror pair.

```
# expand disk-group disks 2.9-10 R10
```

Expand RAID-50 disk group R50, which has four 3-disk subgroups, to include an additional subgroup.

```
# expand disk-group disks 2.1-2,2.5 R50
```

See also

- [show disk-groups on page 317](#)
- [show disks on page 325](#)
- [show vdisks on page 449](#)

expand snap-pool

Description

Expands a snap pool. This command applies to linear storage only.

Expansion is restricted to the space available on the vdisk containing the snap pool. If insufficient space is available for expansion on the vdisk, first expand the vdisk by using [expand vdisk on the next page](#).

Minimum role

manage

Syntax

```
expand snap-pool  
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max  
snap-pool
```

Parameters

size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max
Specifies either:

- The amount of space to add to the snap pool. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.
- max: Expand the snap pool to fill all available space in its vdisk.

snap-pool

The name or serial number of the snap pool to expand. A name that includes a space must be enclosed in double quotes.

Examples

```
Expand snap pool SP1 by 100 GB.  
# expand snap-pool size 100GB SP1
```

See also

- [show snap-pools on page 421](#)
- [show vdisks on page 449](#)

expand vdisk

Description

Adds disks to a vdisk to expand its storage capacity. This command applies to linear storage only.

The new disks must be the same type as disks already in the vdisk and should also have the same capacity.

i Note: If you upgraded from an earlier release that did not distinguish between enterprise and midline SAS disks, you might have vdisks that contain both types of disks. For those vdisks, you can designate either or both types of disks for expansion. If—through replacement of spares or failed disks—the vdisk is changed to contain only one type of disk, you will only be able to add disks of that type to the vdisk.

i Note: A vdisk can contain a mix of 512-byte native sector size (512n) disks and 512-byte emulated sector size (512e) disks. For consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

The expansion capability for each supported RAID level is:

expand vdisk

RAID level

Expansion capability

Maximum disks

NRAID

0, 3, 5, 6

1

10

50

Cannot expand.

Can add 1–4 disks at a time.

Cannot expand.

Can add 2 or 4 disks at a time.

Can expand the vdisk one RAID-5 sub-vdisk at a time. The added RAID-5 sub-vdisk must contain the same number of disks as each original sub-vdisk.

1

16

2

16

32

⚠ Caution: Vdisk expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors.

Before starting the expansion, ensure no other vdisk utilities are running on the vdisk. If another operation is in progress, the expansion cannot start.

Minimum role

manage

Syntax

```
expand vdisk
disks disks
[prompt yes|no]
vdisk
```


Parameters

`disks disks`

The IDs of the disks to add. For disk syntax, see [Command Syntax on page 13](#).

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to the confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

`vdisk`

The name or serial number of the vdisk to expand. A name that includes a space must be enclosed in double quotes.

Examples

Expand vdisk VD1 to include disk 1.11.

```
# expand vdisk disks 1.11 VD1
```

Expand RAID-10 vdisk R10 to include an additional mirror pair.

```
# expand vdisk disks 2.9-10 R10
```

Expand RAID-50 vdisk R50, which has four 3-disk sub-vdisks, to include an additional 3-disk sub-vdisk.

```
# expand vdisk disks 2.1-2,2.5 R50
```

See also

- [show disks on page 325](#)
- [show vdisks on page 449](#)

expand volume

Description

Expands a standard or base volume.

Volume sizes are aligned to 4-MB boundaries. When a volume is created or expanded, if the resulting size would be less than 4 MB it will be increased to 4 MB; if the resulting size would be greater than 4 MB it will be decreased to the nearest 4-MB boundary.

expand volume

If overcommit is disabled, expansion is restricted to the space available in the pool that contains the volume. If overcommit is enabled, the volume size can exceed the physical capacity of the pool. The maximum volume size is 140 TB (128 TiB). To see whether overcommit is enabled, use the [show pools on page 378](#) command.

If insufficient space is available for expansion on the vdisk, first expand the vdisk by using [expand vdisk on page 140](#).

You cannot expand a replication set's secondary volume. However, for virtual storage you can expand a replication set's primary volume, which will automatically expand its secondary volume—even if replication is in progress. For linear storage, you cannot expand a volume that is the parent of snapshot.

To expand a master volume:

1. Delete all of its snapshots by using [delete all-snapshots on page 108](#).
2. Convert it to a standard volume by using [convert master-to-std on page 57](#).
3. Expand the standard volume by using [expand volume on the previous page](#).
4. Convert the expanded volume to a master volume by using [convert std-to-master on page 58](#).

Minimum role

manage

Syntax

```
expand volume
size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max
volume
```

Parameters

size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] | max

Specifies either:

- The amount of space to add to the volume. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.
- max: For linear storage, expand the volume to fill the available space in the disk group.

volume

The name or serial number of the volume to expand. A name that includes a space must be enclosed in double quotes.

Examples

```
Expand standard volume V1 by 100 GB.  
# expand volume size 100GB V1
```

See also

- [expand disk-group on page 137](#)
- [expand snap-pool on page 139](#)
- [expand vdisk on page 140](#)
- [show volumes on page 467](#)

export snapshot

Description

Exports a replication snapshot in the local system to a new standard snapshot. This command applies to linear storage only.

The standard snapshot will reside in the same snap pool, take a snapshot license, and be independent of the replication snapshot. The standard snapshot can be used like any other standard snapshot, and changes to it will not affect the replication snapshot.

The standard snapshot is subject to the snap pool's deletion policies. If the snap pool reaches its critical threshold, the snapshot may be deleted, even if it is mapped. If you want to preserve the snapshot's data, you can create a standard volume from the snapshot, as described in help for the [versions \(Deprecated\) on page 499](#) command.

The export command will not succeed if the replication snapshot is in a remote system or if the resulting snapshot would exceed license limits.

Minimum role

manage

Syntax

```
export snapshot
```

```
name standard-snapshot  
[set replication-set]  
replication-snapshot
```

Parameters

`name standard-snapshot`

A name for the resulting snapshot. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-snapshot`

The name or serial number of the replication snapshot to export. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the set parameter.

Examples

```
Export local replication snapshot RepSnap1 to standard snapshot Snap1.  
# export snapshot name Snap1 RepSnap1
```

See also

- [show replication-sets on page 405](#)
- [show snapshots on page 425](#)

fail

Description

Forces the partner controller module to crash for a non-maskable interrupt. The command causes the crash by issuing an internal kill command to the Storage Controller in the partner controller module. This might be

help

helpful to gather debug information that is only available via a crash dump.

⚠ Caution: Do not use this command in a production system. Use only for testing. This command will interfere with the operation of volumes in disk groups owned by the failed controller, potentially causing data loss.

Minimum role

manage

Syntax

```
fail  
controller a|b
```

Parameters

controller a|b

Specifies whether to kill controller A or B. You cannot kill the controller on which the command is issued.

Examples

```
From controller A, fail controller B.  
# fail controller b
```

See also

- [unfail controller on page 491](#)

help

See [View Help on page 17](#)

load license

Description

Used by the Disk Management Utility to install a license file to control use of licensed features.

See also

- [show license on page 365](#)


map volume

Description


Maps specified volumes using settings that override the volumes' default mapping.

When a volume is created, if no mapping settings are specified the volume is not mapped. Otherwise, those settings become its default mapping, which specifies the controller host ports and access level that all connected initiators have to the volume, and the LUN presented to all initiators to identify the volume. The default mapping's LUN is known as the volume's *default LUN*.

The `map volume` command creates mappings with different settings for different initiators. Optionally, you can specify the LUN, ports, and access level for a mapping. A mapping can make a volume accessible to initiators, or inaccessible to initiators (known as *masking*). For example, assume a volume's default mapping allows read-only access using LUN 5. You can give one initiator read-write access using LUN 6, and you can give a second initiator no access to the volume.

 **Caution:** Using a default mapping for a volume will allow multiple hosts to access the volume. To avoid multiple hosts mounting the volume and causing corruption, the hosts must be cooperatively managed, such as by using cluster software.

 **Note:** You cannot map a replication set's secondary volume.

 **Note:** When mapping a volume to an initiator using the Linux ext3 file system, specify read-write access. Otherwise, the file system will be unable to mount/present/map the volume and will report an error such as "unknown partition table."

Minimum role

manage

Syntax

```
map volume  
[access read-write|rw|read-only|ro|no-access]  
[host hosts]  
initiator initiators|hosts|host-groups  
[lun LUN]  
[ports ports]  
volumes|volume-groups
```

Parameters

access read-write|rw|read-only|ro|no-access

Optional. The access permission to use for the mapping: read-write (rw), read-only (ro), or no-access. If the access parameter is specified as read-write or read-only, the lun parameter must be specified. For an explicit mapping, no-access causes the volume to be masked from specified initiators. If the access parameter is omitted, access is set to read-write.

host hosts

Deprecated—use the initiator parameter instead.

initiator initiators|hosts|host-groups

Optional. A comma-separated list of initiators, hosts, or host groups to which to map the volumes. For initiator, host, and host-group syntax, see [Command Syntax on page 13](#). If the initiator parameter is specified, the lun and ports parameters must be specified. If the initiator parameter is omitted, the mapping applies to all initiators that are not explicitly mapped.

lun LUN

Optional. The LUN to use for the mapping. If a single volume and multiple initiators are specified, the same LUN is used for each initiator. If multiple volumes and a single initiator are specified, the LUN will increment for the second and subsequent volumes. If multiple volumes and initiators are specified, each initiator will have the same LUN for the first volume, the next LUN for the second volume, and so on. The lun parameter is ignored if access is set to no-access. If the lun parameter is omitted, the default LUN is presented.

ports ports

Optional. The controller host ports to use for the mapping. Any unspecified ports become unmapped. All specified ports must be the same type (FC, for example). For port syntax, see [Command Syntax on page 13](#). If the ports parameter is specified, the lun parameter must also be specified. The ports parameter is ignored if access is set to no-access. If the ports parameter is omitted, all ports are mapped.

volumes|volume-groups

A comma-separated list of the names or serial numbers of the volumes or volume groups to map. For volume and volume-group syntax, see [Command Syntax on page 13](#).

Examples

Map volume v2 with read-only access to initiator Init1, using port A1 and LUN 100.

```
# map volume access ro ports a1 lun 100 initiator Init1 v2
```

Map volumes v2 and v3 with read-write access for Init2, using ports A1 and B1 and LUN 101.

```
# map volume access rw ports a1,b1 lun 101 initiator Init2 v2,v3
```

Mask volume v4 from Init1 and Init3.

```
# map volume v4 access no-access initiator Init1,Init3
```

Map volumes v1 and v2 to initiators Init1 and Init2, using ports A1 and B1 starting with LUN 6, and view the results.

```
# map volume ports a1,b1 lun 6 initiator Init1,Init2 v1,v2
```

Map volume group volGroupA to host group hostGroupA, starting with LUN 1 on ports A0 and B0.

```
# map volume volGroupA.* initiator hostGroupA.*.* lun 1 port A0,B0
```

See also

- [show host-groups on page 354](#)
- [show hosts \(Deprecated\) on page 360](#)
- [show maps on page 368](#)
- [show ports on page 386](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)
- [unmap volume on page 492](#)

meta

Description

In XML API format only, shows all property metadata for objects. This includes data not shown in brief mode.

Minimum role

monitor

Syntax

```
meta basetypes
```

Parameters

basetypes

A basetype or a list of basetypes separated by commas (with no spaces) to specify the objects for which to show metadata. For names and descriptions of supported basetypes, see [XML API Basetype Properties on page 508](#).

Examples

```
Show all metadata for objects returned by the show disks on page 325 command:  
# meta drives
```

See also

- [set cli-parameters on page 212](#)

ping

Description

Tests communication with a remote host. The remote host is specified by IP address. Ping sends ICMP echo response packets and waits for replies.

Minimum role

monitor

Syntax

```
ping
```

```
host-address  
[count count]
```

Parameters

host-address

The remote host's IP address in dotted decimal form.

count count

Optional. The number of packets to send. The default is 4 packets. Use a small count because the command cannot be interrupted. The default is 4 packets.

Examples

```
Send two packets to the remote computer at 10.134.50.6.  
# ping 10.134.50.6 count 2
```

query peer-connection

Description

Queries a storage system to potentially use in a peer connection and shows information about the storage system via the in-band query. The system uses this information to determine how to set up the peer connection.

You can use this command to view information about systems you might use in a peer connection before creating the peer connection or to view information about systems currently in a peer connection before modifying the peer connection.

For example, to create a peer connection you must specify a port address on the remote system. You can specify any port address that this command shows as having `Reachable` `Local` `Links` values.

Minimum role

monitor

Syntax

```
query peer-connection  
    remote-port-address
```

Parameters

remote-port-address

Specifies the iSCSI IP address of the system to query.

Output

System information:

System Name: The name of the system. The default is Uninitialized Name.

System Contact: The name of the person who administers the system. The default is Uninitialized Contact.

System Location: The location of the system. The default is Uninitialized Location.

System Information: A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.

Midplane Serial Number: The serial number of the controller enclosure midplane.

Vendor Name: The vendor name.

Product ID: The product model identifier.

License information: Shows output of [show license on page 365](#).

Peer controllers information:

Controller:

- A: Controller A.
- B: Controller B.

Storage Controller Code Version: Storage Controller firmware version and loader version.

Management Controller Code Version: Management Controller firmware version and loader version.

IP Address: Controller network port IP address.

Port: The port ID in the local system.

Type:

- iSCSI: iSCSI port.
- Unknown: Port type is unknown.

Port Health:

- Up
- Down
- Degraded

reattach replication-volume

- SFP Issue
- Unknown

Port Address: iSCSI: Assigned port IP address.

Reachable Local Links: The IDs of ports in the local system linked to ports in the remote system.

Examples

```
Query the system with an IP address of 192.168.200.22.  
# query peer-connection 192.168.200.22
```

Basetypes

- [peer-connection-info on page 627](#)
- [status on page 689](#)

See also

- [create peer-connection on page 69](#)
- [delete peer-connection on page 115](#)
- [set peer-connection on page 253](#)
- [show peer-connections on page 376](#)

reattach replication-volume

Description

Reattaches a secondary volume to its replication set.

Reattaching a secondary volume is the last part of the process for moving a secondary volume from a primary system into a secondary system. The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.

reattach replication-volume

- e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

If the reattach operation succeeds, the secondary volume's status changes to `Establishing proxy` while it is establishing the connection to the remote (primary) system in preparation for replication. Then the status changes to `Online`. The replication set is ready to resume replication operations.

If the reattach operation fails and says it is unable to get the primary volume's link type, the vdisk that contains the secondary volume may not have completed its startup activities. Wait approximately one minute for these activities to complete, then retry the operation. If this message continues to occur, check the event log to better understand the condition and for an indication of how to correct it.

i Note: If the secondary system does not support the link type that the replication set is configured to use, a message will say the reattach operation failed because it could not determine the secondary address. To fix this, repeat process steps 1 and 2 above to move the secondary volume into a system that supports the required link type.

Minimum role

manage

Syntax

```
reattach replication-volume
[remote-address ip=IPs | wwnn=WWNNs | wwpn=WWPNs ]
[set replication-set]
replication-volume
```

Parameters

`remote-address ip=IPs | wwnn=WWNNs | wwpn=WWPNs`

Optional. Specifies host ports on the system where the secondary volume resides, by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.2.1:3260. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

release volume

replication-volume

The name or serial number of the replication volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the set parameter.

Examples

```
Reattach secondary volume rV1.  
# reattach replication-volume rV1
```


See also

- [detach replication-volume on page 134](#)
- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)
- [start vdisk on page 475](#)
- [stop vdisk on page 478](#)

release volume

Description

Clears initiator registrations and releases persistent reservations for all or specified volumes. Normally, reservations placed on volumes by initiators accessing those volumes can be released by host software. This command should be used only when the system is in an abnormal state, perhaps due to a configuration problem, and you need to remove all reservations for specified volumes and return them to a “clean” state.

 **Caution:** Releasing reservations for volumes may allow unintended access to those volumes by other initiators, which may result in data corruption. Before issuing this command, quiesce all initiators that have visibility to the volumes whose reservations will be released.

Minimum role

manage

Syntax

```
release volume  
all|volumes
```

Parameters

all|volumes

Specifies all volumes, or a comma-separated list of the names or serial numbers of specific volumes. A name that includes a space must be enclosed in double quotes.

Examples

```
Release reservations for a specific volume.  
# release volume vd04_v0002
```

See also

- [show volume-reservations on page 465](#)
- [show volumes on page 467](#)

remote

Description

Runs a command on a remote system that is associated with the local system. This command applies to linear storage only. This command is not applicable to a system with SAS controller modules.

If the command cannot connect to remote controller A, it tries to connect to remote controller B. If it is unsuccessful, the remote command is not run. Output is displayed in console or XML API format depending on the local system's setting.

This command will not display prompts to confirm remote actions. Use caution when issuing remote commands to avoid risk of data loss or unavailability.

Minimum role

manage

Syntax

```
remote  
remote-system  
command
```

Parameters

`remote-system`

The name or network-port IP address of the remote system. A name that includes a space must be enclosed in double quotes.

`command`

The full name of any CLI command that is valid for the remote user's role.

Examples

```
Run the show system command on remote system System2.  
# remote System2 show system
```


See also


- [show remote-systems on page 401](#)

remove disk-groups

Description

Removes specified disk groups.

 **Caution:** If your system gets into a state where a virtual disk group is quarantined or offline or does not have a corresponding pool, contact technical support.

 **Caution:** Deleting a linear disk group will delete all data it contains.

If a specified disk group has a job running, such as media scrub, the command will prompt for confirmation to stop the job.

remove disk-groups

For a linear disk group, if the group contains volumes, the command will prompt for confirmation to delete the volumes. If the reply is yes, the command will unmap and delete all volumes in the group, delete the group and corresponding pool, and make all the disks available. If the reply is no, the command will be canceled. You cannot delete a disk group if it contains a snap pool that is associated with a master volume in another disk group.

For a virtual disk group, if the group contains no volume data, the group will be removed. If the group contains volume data, the command will initiate removal and try to drain (move) all volume data to another group in the same pool. While data is being drained, the group's status will be VDRAIN. If there are no other disk groups in the pool or if no other disk group in the pool has enough space to contain the volume data, the command will immediately fail with an error. If draining begins and is successful, an event will be logged and the group will be removed. If draining begins but hosts continue to write new data to the volumes and cause an out-of-space condition, the command will fail and an event will be logged.

Also, if you remove the last disk group in a virtual pool, the command will prompt for confirmation to remove the pool, too. If the reply is yes, the pool will be removed. If the reply is no, the disk group and the pool will remain.

In one command you can delete linear and virtual disk groups, and disk groups from more than one pool.

i Note: You cannot remove the last disk group from the only pool in a system that is used in a peer connection, or a disk group that contains a volume that is used in a replication set.

i Note: If you delete a quarantined disk group and its missing disks are later found, the group will reappear as quarantined or offline and you must delete it again (to clear those disks).

Minimum role

manage

Syntax

```
remove disk-groups
[prompt yes|no]
disk-groups
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

disk-groups

A comma-separated list of the names or serial numbers of the disk groups to delete. A name that includes a space must be enclosed in double quotes.

Examples

```
Remove disk groups dg1 and dg2.  
# remove disk-groups dg1,dg2
```

See also

- [delete pools on page 116](#)
- [delete vdisks on page 127](#)
- [show disk-groups on page 317](#)
- [show vdisks on page 449](#)

remove host-group-members

Description

Removes specified hosts from a host group. You cannot remove all hosts from a group. At least one host must remain. The hosts are ungrouped but not deleted.

Minimum role

manage

Syntax

```
remove host-group-members  
hosts hosts  
host-group
```

Parameters

hosts hosts

A comma-separated list of the names of hosts to remove from the host group. A name that includes a space must be enclosed in double quotes.

host-group

The name of the host group. A name that includes a space must be enclosed in double quotes.

Examples

Remove two hosts from a group that contains three hosts.

```
# remove host-group-members hosts Host2,Host3 HostGroup1
```

See also

- [delete host-groups on page 111](#)
- [show host-groups on page 354](#)
- [show hosts \(Deprecated\) on page 360](#)

remove host-members

Description

Removes specified initiators from a host. You cannot remove all initiators from a host. At least one initiator must remain. The initiators are ungrouped but not deleted.

Minimum role

manage

Syntax

```
remove host-members  
initiators initiators  
host-name
```

Parameters

`initiators initiators`

A comma-separated list of the names of initiators to remove from the host. A name that includes a space must be enclosed in double quotes.

`host-name`

The name of the host. A name that includes a space must be enclosed in double quotes.

Examples

Remove two initiators from a group that contains three initiators.

```
# remove host-members initiators FC-init2,FC-init3 FC-host11
```

See also

- [delete hosts on page 113](#)
- [show hosts \(Deprecated\) on page 360](#)

remove replication-volume

Description

Removes a secondary volume from a replication set. This command applies to linear storage only.

The secondary volume is converted to a master volume. Any replication snapshots associated with that volume are converted to standard snapshots, regardless of the number of snapshots allowed by the system's license.

You must run this command on the primary system. You cannot remove the primary volume.

Minimum role

manage

Syntax

```
remove replication-volume
```

remove replication-volume

```
[nowait]
[primary-volume volume]
[set replication-set]
replication-volume
```

Parameters

`nowait`

Optional. Removing a volume from a replication set can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands.

`primary-volume volume`

Optional. Use only if the replication set has a primary-volume conflict. The name or serial number of the primary volume. A name that includes a space must be enclosed in double quotes.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the secondary volume to remove. A name that includes a space must be enclosed in double quotes. If the name is not unique within the replication set, the volume that is not the primary volume is removed. If the name is not unique across replication sets, specify the `set` parameter.

Examples

Remove secondary volume `rData` from a replication set.

```
# remove replication-volume rData
```

See also

- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

remove spares

Description

Removes specified spares. You can remove global spares and dedicated spares (linear storage only) in the same command.

Minimum role

manage

Syntax

```
remove spares  
disks
```

Parameters

disks

The IDs of the spares to remove. For disk syntax, see [Command Syntax on page 13](#).

Examples

```
Remove dedicated spare 1.21 and global spare 1.22.  
# remove spares 1.21-22  
  
Remove global spare 1.22.  
# remove spares 1.22
```

See also

- [add spares on page 45](#)
- [show disks on page 325](#)

remove volume-group-members

Description

Removes volumes from a volume group. You cannot remove all volumes from a group. At least one volume must remain. The volumes are ungrouped but not deleted.

i Note: For virtual storage, you cannot add a volume to a volume group that is in a replication set.

Minimum role

manage

Syntax

```
remove volume-group-members  
volumes volume-IDs  
volume-group
```

Parameters

volumes volume-IDs

A comma-separated list of the names or serial numbers of volumes to remove from the volume group. A name that includes a space must be enclosed in double quotes.

volume-group

The name of the volume group. A name that includes a space must be enclosed in double quotes.

Examples

```
Remove volumes Vol0002 and Vol0003 from volume group VolumeGroup1.  
# remove volume-group-members volumes Vol0002,Vol0003 VolumeGroup1
```

See also

- [delete vdisk-spare \(Deprecated\) on page 128](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)

replicate

Description

Initiates replication of volumes in a replication set.

This command must be run on the replication set's primary system.

The initial replication may take a long time because it is a copy of the allocated pages of the primary volume to the secondary volume. Subsequent replications are generally faster because those replications only copy changes made since the last successful replication.

If a replication fails, the system suspends the replication set. The replication operation will attempt to resume if it has been more than 10 minutes since the replication set was suspended. If the operation has not succeeded after six attempts using the 10-minute interval, it will switch to trying to resume if it has been over an hour and the peer connection is healthy.

Minimum role

manage

Syntax

```
replicate  
  replication-set-ID
```

Parameters

replication-set-ID

The name or serial number of the replication set to replicate.

Examples

```
Remove the volumes in replication set RS1.  
# replicate RS1
```

See also

- [abort replication on page 31](#)

replicate snapshot

Description

Initiates a replication operation using an existing snapshot as the data source. This command applies to linear storage only. This command is not applicable to a system with SAS controller modules.

This command replicates the specified external standard snapshot. If the specified snapshot has not already been replicated on the replication volume, the replication volume in the replication set is requested to replicate the snapshot data. Only snapshot preserved data is replicated. Snapshot modified data is not replicated.

If you instead want to create and replicate a snapshot as a single task, use the [replicate volume on the next page](#) command.

Minimum role

manage

Syntax

```
replicate snapshot  
[name replication-snapshot]  
[set replication-set]  
external-snapshot
```

Parameters

name *replication-snapshot*

Optional. A name for the resulting replication snapshot. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

set *replication-set*

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

external-snapshot

The name or serial number of the external snapshot to use as the data source. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the **set** parameter.

Examples

```
Replicate external snapshot Snap1 and name the resulting replication snapshot RepSnap1.  
# replicate snapshot name RepSnap1 Snap1
```

See also

- [show replication-sets on page 405](#)
- [show snapshots on page 425](#)

replicate volume

Description

Creates a replication snapshot of the specified volume and initiates a replication operation. This command applies to linear storage only. This command is not applicable to a system with SAS controller modules.

This command can follow a [create replication-set on page 72](#) command that did not specify to initiate replication.

If the snapshot you want to replicate already exists, use the [replicate snapshot on the previous page](#) command instead.

Minimum role

manage

Syntax

```
replicate volume  
[preserve-snapshot external-snapshot]  
[set replication-set]  
snapshot replication-snapshot  
volume
```

Parameters

`preserve-snapshot external-snapshot`

Optional. The name of the external snapshot to use as the source for this replication. This preserves the snapshot that is being used to replicate the volume as an external snapshot. Otherwise, the snapshot is converted to a replication snapshot. A name that includes a space must be enclosed in double quotes.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`snapshot replication-snapshot`

The name for the new replication snapshot. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`volume`

The name or serial number of the primary volume to replicate. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Examples

Replicate volume MV1 and name the replication snapshot RepSnap1.

```
# replicate volume snapshot RepSnap1 MV1
```

See also

- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

rescan

Description

This command forces rediscovery of disks and enclosures in the storage system.

 **Caution:** Performing a rescan will temporarily pause all I/O processes.

If both Storage Controllers are online and able to communicate with both expansion modules in each connected enclosure, this command rebuilds the internal SAS layout information, reassigns enclosure IDs based on controller A's enclosure cabling order, and ensures that the enclosures are displayed in the proper order. A manual rescan temporarily pauses all I/O processes, then resumes normal operation. It can take up to two minutes for the enclosure IDs to be corrected.

A manual rescan may be needed after system power-up to display enclosures in the proper order. Whenever you replace a drive chassis or controller chassis, perform a manual rescan to force fresh discovery of all drive enclosures connected to the controller enclosure.

A manual rescan is not needed after inserting or removing disks because the controllers automatically detect these changes. When disks are inserted they are detected after a short delay, which allows the disks to spin up

Minimum role

manage

Syntax

```
rescan
```

Examples

```
Scan for device changes and re-evaluate enclosure IDs.  
# rescan
```

reset all-statistics

Description

Resets performance statistics for both controllers. You can specify either to reset all live statistics to zero, or to reset (clear) all historical performance statistics for all disks. If you reset historical statistics, an event will be logged and new data samples will continue to be stored every quarter hour.

Minimum role

manage

Syntax

```
reset all-statistics  
[historical]  
[prompt yes|no]
```

Parameters

historical

Optional. Specifies to reset historical statistics instead of live statistics. If this parameter is omitted, the command will reset live statistics instead of historical statistics.

prompt yes|no

Optional. For scripting, this specifies an automatic reply to the confirmation prompt that will appear if the historical parameter is specified:

- yes: Allow the command to proceed.
- no: Cancel the command.

If the `historical` parameter is specified and the `prompt` parameter is omitted, you must manually reply to the prompt. If the `historical` parameter is omitted, the `prompt` parameter has no effect. There is no confirmation prompt for live statistics.

Examples

```
Reset all live statistics for both controllers.
```

```
# reset all-statistics
```

```
Reset all historical disk-performance statistics for both controllers.
```

```
# reset all-statistics historical
```

See also

- [reset controller-statistics on the next page](#)
- [reset disk-error-statistics on page 172](#)
- [reset disk-group-statistics on page 173](#)
- [reset disk-statistics on page 175](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)

- [show controller-statistics on page 313](#)

reset controller-statistics

Description

Resets performance statistics for controllers.

This command resets all controller statistics except Power On Time. To reset this, restart or power cycle a controller.

Minimum role

manage

Syntax

```
reset controller-statistics  
[a|b|both]
```

Parameters

a|b|both

Optional. Specifies whether to reset statistics for controller A, B, or both. If this parameter is omitted, statistics are reset for both controllers.

Examples

```
Reset statistics for both controllers.  
# reset controller-statistics
```

See also

- [reset all-statistics on page 169](#)
- [reset disk-error-statistics on the next page](#)
- [reset disk-group-statistics on page 173](#)

- [reset disk-statistics on page 175](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)
- [show controller-statistics on page 313](#)

reset disk-error-statistics

Description

Resets error statistics for all or specified disks. Statistics that are reset include:

- Number of SMART events recorded
- Number of I/O timeouts accessing the disk
- Number of times the disk did not respond
- Number of attempts by the controllers to spin up the disk
- Number of media errors (errors generated by the disk as specified by its manufacturer)
- Number of non-media errors (errors generated by the controllers or by the disk and not categorized as media errors)
- Number of block reassignments
- Number of bad blocks found

To reset other disk statistics, use the [reset disk-statistics on page 175](#) command.

Minimum role

manage

Syntax

```
reset disk-error-statistics  
[disks]
```

Parameters

disks

Optional. The IDs of the disks for which to reset statistics. For disk syntax, see [Command Syntax on page 13](#). If this parameter is omitted, statistics are reset for all disks.

Examples

```
Reset error statistics for disks 1.1 and 2.1.  
# reset disk-error-statistics 1.1,2.1
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)
- [reset disk-group-statistics below](#)
- [reset disk-statistics on page 175](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)
- [show disk-statistics on page 332](#)
- [show disks on page 325](#)

reset disk-group-statistics

Description

Clears resettable performance statistics for linear disk groups only, and resets timestamps for those statistics. This command behaves the same as the [reset vdisk-statistics on page 182](#) command.

Minimum role

manage

Syntax

```
reset disk-group-statistics  
disk-groups
```

Parameters

disk-groups

Optional. A comma-separated list of the names or serial numbers of the disk groups for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all disk groups.

Examples

```
Reset statistics for linear disk group dg1.  
# reset disk-group-statistics dg1
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)
- [reset disk-error-statistics on page 172](#)
- [reset disk-statistics on the next page](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)
- [show disk-group-statistics on page 321](#)
- [show disk-groups on page 317](#)

reset disk-statistics

Description

Resets performance statistics for disks.

This command resets basic disk statistics but not disk error statistics. To reset these, use the [reset disk-error-statistics on page 172](#) command.

Lifetime statistics are not resettable.

Minimum role

manage

Syntax

```
reset disk-statistics
```

Examples

```
Reset statistics for all disks.  
# reset disk-statistics
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)
- [reset disk-error-statistics on page 172](#)
- [reset disk-group-statistics on page 173](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)
- [show disk-statistics on page 332](#)

reset host-link

Description

Resets specified controller host ports (channels).

⚠ Caution: Resetting host links may cause lost connection to hosts.

For FC, you can reset a single port. For an FC host port configured to use FC-AL (loop) topology, a reset issues a loop initialization primitive (LIP).

For iSCSI, you can reset a port pair (either the first and second ports or the third and fourth ports).

For SAS, you can reset a port pair (either the first and second ports or the third and fourth ports). Resetting a host port issues a COMINIT/COMRESET sequence and might reset other ports.

Minimum role

manage

Syntax

```
reset host-link  
ports ports
```

Parameters

ports ports

A controller host port ID, a comma-separated list of IDs, a hyphenated range of IDs, or a combination of these. A port ID is a controller ID and port number, and is not case sensitive. Do not mix controller IDs in a range.

Examples

```
Reset the host link on port A1.  
# reset host-link ports A1
```

See also

- [show ports on page 386](#)

reset host-port-statistics

Description

Resets performance statistics for controller host ports.

Minimum role

manage

Syntax

```
reset host-port-statistics  
[ports ports]
```

Parameters

ports ports

Optional. The controller ID and port number of ports for which to reset statistics. For port syntax, see [Command Syntax on page 13](#). If this parameter is omitted, statistics are reset for all controller host ports.

Examples

```
Reset statistics for all controller host ports.  
# reset host-port-statistics
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)
- [reset disk-error-statistics on page 172](#)
- [reset disk-group-statistics on page 173](#)
- [reset disk-statistics on page 175](#)
- [reset pool-statistics on the next page](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)

- [show host-port-statistics on page 358](#)
- [show ports on page 386](#)

reset pool-statistics

Description

Clears resettable performance statistics for virtual pools, and resets timestamps for those statistics.

Minimum role

manage

Syntax

```
reset pool-statistics  
[pool]
```

Parameters

pool

Optional. The name or serial number of the virtual pool for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for both pools A and B.

Examples

```
Reset statistics for pool A.  
# reset pool-statistics A
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)
- [reset disk-error-statistics on page 172](#)

- [reset disk-group-statistics on page 173](#)
- [reset disk-statistics on page 175](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on the previous page](#)
- [reset vdisk-statistics on page 182](#)
- [reset volume-statistics on page 183](#)
- [show pool-statistics on page 381](#)
- [show pools on page 378](#)

reset smis-configuration

Description

Resets the SMI-S configuration files. For use by or with direction from a service technician.

This command will reset the configuration of the SMI-S service to default settings. After running this command, any hosts registered via SMI-S will need to be registered again.

Messages are displayed when the SMI-S configuration is reset and SMI-S is restarted.

Minimum role

manage

Syntax

```
reset smis-configuration  
[a|b|both]  
[prompt yes|no]  
[noprompt]
```

Parameters

a|b|both

Optional. The controller module containing the controller to restart. If this parameter is omitted, the command affects the controller being accessed.

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

reset snapshot

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must reply to prompts.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

Output

Messages are displayed when the SMI-S configuration is reset and SMI-S is restarted.

Examples

Reset the SMI-S configuration on controller A, to which you are logged in.

```
# reset smis-configuration a
```

From controller A, reset the SMI-S configuration on controller B.

```
# reset smis-configuration b
```

Reset the SMI-S configuration on both Storage Controllers.

```
# reset smis-configuration both
```

See also

- [restore defaults on page 187](#)

reset snapshot

Description

Replaces the data in a standard snapshot with the current data from its parent volume. The snapshot's volume characteristics are not changed.

Any snapshot in a snapshot tree can be reset, but the data source can only be the snapshot's immediate parent. For example, in the following snapshot tree:

```
Vol1
```


```
| - Vol1Snap
```

```
| - Vol1SnapSnap
```

you can reset Vol1Snap to Vol1, or reset Vol1SnapSnap to Vol1Snap.

The command will prompt you to unmount the snapshot from all hosts before starting the reset operation to avoid data loss.

This command is not allowed for a replication snapshot.

 **Caution:** All data represented by the snapshot as it exists prior to issuing this command will be lost.

Minimum role

manage

Syntax

```
reset snapshot  
[prompt yes|no]  
snapshot
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

snapshot

The name or serial number of the snapshot to reset. A name that includes a space must be enclosed in double quotes.

Examples

```
Reset snapshot Vol1Snap.  
# reset snapshot Vol1Snap
```

See also

- [show snapshots on page 425](#)

reset vdisk-statistics

Description

Resets performance statistics for all or specified vdisks. This command applies to linear storage only.

Minimum role

manage

Syntax

```
reset vdisk-statistics  
[vdisks]
```

Parameters

vdisks

Optional. A comma-separated list of the names or serial numbers of the vdisks for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all vdisks.

Examples

```
Reset statistics for vdisks VD1 and MyVdisk.  
# reset vdisk-statistics VD1,MyVdisk
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)
- [reset disk-error-statistics on page 172](#)
- [reset disk-group-statistics on page 173](#)
- [reset disk-statistics on page 175](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)

- [reset volume-statistics below](#)
- [show vdisk-statistics on page 453](#)
- [show vdisks on page 449](#)

reset volume-statistics

Description

Resets performance statistics for all or specified volumes.

Minimum role

manage

Syntax

```
reset volume-statistics  
[volumes]
```

Parameters

volumes

Optional. A comma-separated list of the names or serial numbers of the volumes for which to reset statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics are reset for all volumes.

Examples

```
Reset statistics for volume vd1_v0001.  
# reset volume-statistics vd1_v0001
```

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)

- [reset disk-error-statistics on page 172](#)
- [reset disk-group-statistics on page 173](#)
- [reset disk-statistics on page 175](#)
- [reset host-port-statistics on page 177](#)
- [reset pool-statistics on page 178](#)
- [reset vdisk-statistics on page 182](#)
- [show volume-statistics on page 471](#)
- [show volumes on page 467](#)

restart mc

Description

Restarts the Management Controller in a controller module.

When you restart a Management Controller, communication with it is lost until it successfully restarts. If the restart fails, the partner Management Controller remains active with full ownership of operations and configuration information.

Minimum role

manage

Syntax

```
restart mc  
[a|b|both]  
[noprompt]
```

Parameters

a|b|both

Optional. The controller module containing the controller to restart. If this parameter is omitted, the command affects the controller being accessed.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

Output

Messages are displayed when the controller shut down, when failover is initiated, and when the controller has restarted.

Examples

Restart the Management Controller in controller A, to which you are logged in.

```
# restart mc a
```

See also

- [restart sc below](#)
- [shutdown on page 473](#)

restart sc

Description

Restarts the Storage Controller in a controller module.

When you restart a Storage Controller, it attempts to shut down with a proper failover sequence, which includes stopping all I/O operations and flushing the write cache to disk, and then the Storage Controller restarts. Restarting a Storage Controller restarts the corresponding Management Controller.



Caution:

- Depending on the mapping configuration, restarting one Storage Controller may cause loss of access to data.
- If you restart both Storage Controllers, all hosts will lose access to the system and its data until the restart is complete. Additionally, both Management Controllers will be restarted and all users' sessions will need to be restarted.



Note: When a Storage Controller is restarted, live performance statistics that it recorded will be reset. Historical performance statistics are not affected. In a dual-controller system, disk statistics may be reduced but will not be reset to zero, because disk statistics are summed between the two controllers. For more information, see help for commands that show statistics.

Minimum role

manage

Syntax

```
restart sc  
[a|b|both]  
[noprompt]
```

Parameters

a|b|both

Optional. The controller module containing the controller to restart. If this parameter is omitted, the command affects the controller being accessed.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

Output

Messages are displayed when the controller shut down, when failover is initiated, and when the controller has restarted.

Examples

From controller A, restart the Storage Controller in controller B.

```
# restart sc b
```

Restart both Storage Controllers.

```
# restart sc both
```

See also


- [restart mc on page 184](#)
- [shutdown on page 473](#)

restore defaults

Description

Restores the default configuration to the controllers. For use by or with direction from a service technician.

For details about which settings are restored see [Settings Changed By Restore Defaults on page 743](#). If the system contains only one controller module when the command is issued, the system's redundancy mode will be set to `Single Controller` mode.

 **Caution:** This command will restore default settings to the controllers and then restart each Management Controller. Changes to host interface settings may cause loss of data availability and require some reconfiguration to restore host access to volumes.

Minimum role

manage

Syntax

```
restore defaults  
[noprompt]  
[prompt yes|no]
```

Parameters

`noprompt`

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

Examples

```
Restore the controllers' default configuration.
```

```
# restore defaults
```

See also

- [reset smis-configuration on page 179](#)
- [restart mc on page 184](#)
- [restart sc on page 185](#)

resume replication

Description

Resumes a suspended replication operation for the specified secondary volume. This command applies to linear storage only.

This command must be issued on the system that owns the secondary volume.

Minimum role

manage

Syntax

```
resume replication  
[set replication-set]  
replication-volume
```

Parameters

set replication-set

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

replication-volume

The name or serial number of the secondary volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the set parameter.

Examples

```
Resume replication of primary volume V1 to secondary volume rV1.  
# resume replication rV1
```

See also

- [abort replication on page 31](#)
- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

resume replication-set

Description

Resumes the replication operations for the specified replication set.

You can run this command on the primary system.

When a replication set is suspended, all replications in progress are paused and no new replications are allowed to start.

When you run this command to resume replications, all paused replications are resumed and new replications are allowed to occur. If you aborted a replication while the replication set was suspended, the aborted replication does not resume.

Minimum role

manage

Syntax

```
resume replication-set  
  [replication-set-ID]
```

Parameters

replication-set-ID

Optional. The name or serial number of the replication set for which to suspend replication.

Examples

```
Resume replication in replication set RS1.  
# resume replication-set RS1
```

See also

- [create replication-set on page 72](#)
- [delete replication-set on page 119](#)
- [set replication-set on page 266](#)
- [show replication-sets on page 405](#)
- [suspend replication-set](#)

rollback master-volume (Deprecated)

Use [rollback volume below](#).

rollback volume

Description

Replaces the data in a parent volume with the data from one of its snapshots. This reverts the volume data to its state at an earlier point in time. The volume's characteristics are not changed.

Any parent volume in a snapshot tree can be rolled back, but the data source must be a direct child snapshot. For example, in the following snapshot tree:

```
Vol1
```

```
| - Vol1Snap
```

```
| - Vol1SnapSnap
```

you can roll back Vol1 from Vol1Snap, or roll back Vol1Snap from Vol1SnapSnap.

The command will prompt you to unmount the volume and the snapshot from all initiators before starting the rollback operation to avoid data loss.

⚠ Caution: All data that differs between the parent volume and the snapshot will be lost. Create a snapshot of the parent volume as it currently exists before performing a rollback.

i Note: For virtual storage, you cannot exclude modified write data in a snapshot from being used in a rollback. If you will want to do that, plan ahead and take a snapshot of the original snapshot before writing to it. Make the child snapshot read-only and use it for the rollback.

i Note: For virtual storage, you cannot roll back a secondary volume that is in a replication set.

Minimum role

manage

Syntax

```
rollback volume  
[modifiedsnapshot yes|no]  
[prompt yes|no]  
snapshot snapshot  
  
voLume
```

Parameters

`modifiedsnapshot yes|no`

Optional. Linear storage only. Specifies whether to include or exclude modified write data from the snapshot in the rollback.

- `yes`: Include modified snapshot.
- `no`: Exclude modified snapshot data.

If this parameter is omitted, modified snapshot data is excluded.

`prompt yes|no`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must reply to prompts.

`snapshot snapshot`

The name or serial number of the snapshot containing the data to roll back to. A name that includes a space must be enclosed in double quotes.

rollback volume

volume

The name or serial number of the volume to roll back. A name that includes a space must be enclosed in double quotes.

Examples

```
Roll back volume Vol1 from snapshot Vol1Snap.  
# rollback volume snapshot Vol1Snap Vol1
```

See also

- [show snapshots on page 425](#)
- [show volumes on page 467](#)



Chapter 6: Alphabetical List of Commands (S)

This chapter contains the following topics:

Alphabetical List of Commands	198
scrub disk-groups	199
scrub vdisk	200
scrub volume	201
set advanced-settings	202
set auto-write-through-trigger (Deprecated)	208
set awt (Deprecated)	208
set cache-parameters	208
set chap-record	210
set cli-parameters	212
set controller-date	215
set debug-log-parameters	217
set disk (QXS-4 and QXS-6 Series)	219
set disk-group	220
set disk-parameters	222
set email-parameters	223

set enclosure	225
set expander-fault-isolation	227
set expander-phy	228
set fde-import-key (QXS-4 and QXS-6 Series)	230
set fde-lock-key (QXS-4 and QXS-6 Series)	232
set fde-state (QXS-4 and QXS-6 Series)	233
set global-spare (Deprecated)	234
set host	234
set host-group	236
set host-name (Deprecated)	237
set host-parameters	237
set host-port-mode (QXS-4 and QXS-6 Series)	241
set initiator	242
set iscsi-parameters	243
set job-parameters (Deprecated)	245
set led	245
set network-parameters	247
set ntp-parameters	251
set password	252
set peer-connection	253
set pool	255
set priorities	256
set prompt	258
set protocols	259
set remote-system	261
set replication-primary-volume	263
set replication-set	266
set replication-volume-parameters	267
set schedule	269

set snap-pool-policy	271
set snap-pool-threshold	273
set snapshot-space	274
set snmp-parameters	276
set spares (Deprecated)	278
set syslog-parameters	278
set system	280
set task	281
set user	283
set vdisk	287
set vdisk-spare (Deprecated)	289
set volume	289
set volume-group	292
show advanced-settings	293
show auto-write-through-trigger (Deprecated)	298
show awt (Deprecated)	298
show cache-parameters	299
show certificate	301
show channels (Deprecated)	303
show chap-records	303
show cli-parameters	304
show configuration	307
show controller-date	308
show controllers	309
show controller-statistics	313
show degraded-disk-thresholds	314
show disk-groups	317
show disk-group-statistics	321
show disk-parameters	323

show disks	325
show disk-statistics	332
show email-parameters	337
show enclosures	338
show events	341
show expander-status	344
show fans	346
show fde-state (QXS-4 and QXS-6 Series)	348
show fenced-data	350
show frus	352
show host-groups	354
show host-maps (Deprecated)	356
show host-parameters (Deprecated)	357
show host-phy-statistics	357
show host-port-statistics	358
show hosts (Deprecated)	360
show initiators	360
show inquiry	362
show iscsi-parameters	363
show job-parameters (Deprecated)	365
show license	365
show maps	368
show master-volumes	371
show network-parameters	373
show ntp-status	375
show peer-connections	376
show pools	378
show pool-statistics	381
show ports	386

show power-supplies	390
show priorities	391
show protocols	393
show provisioning	395
show redundancy-mode	398
show refresh-counters	400
show remote-systems	401
show replication-images	403
show replication-sets	405
show replication-volumes	411
show sas-link-health	415
show schedule-details (Deprecated)	416
show schedules	416
show sensor-status	418
show shutdown-status	420
show snap-pools	421
show snapshot-space	424
show snapshots	425
show snmp-parameters	428
show syslog-parameters	430
show system	431
show system-parameters	433
show task-details (Deprecated)	435
show tasks	435
show tiers (QXS-4 and QXS-6 Series Only)	442
show tier-statistics (QXS-4 and QXS-6 Series Only)	443
show unwritable-cache	446
show users	447
show vdisks	449

show vdisk-statistics	453
show versions	457
show volumecopy-status	458
show volume-copies	460
show volume-groups	461
show volume-maps (Deprecated)	463
show volume-names	463
show volume-reservations	465
show volumes	467
show volume-statistics	471
shutdown	473
start drawer	474
start vdisk	475
stop drawer	477
stop vdisk	478
suspend replication	480

Alphabetical List of Commands

This chapter is organized to help you find a command by name. Each command topic includes one or more of the following sections:

Description	The command's purpose and notes about its usage
Minimum role	The minimum user role required to use the command
Syntax	The command's syntax
Parameters	Descriptions of the command's parameters
Output	Descriptions of fields shown in console format
Examples	One or more examples of the command's usage in console format
Basetypes	References to descriptions of basetype properties shown in XML API format

See also References to commands that are used with the command

scrub disk-groups

Description

Analyzes specified disk groups to find and fix disk errors.

For linear storage, this command acts on disks in a disk group but not dedicated spares or leftover disks. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

For virtual storage, this command acts on disks in a disk group but not leftover disks. This command will fix parity mismatches for RAID 5 and 6, and mirror mismatches for RAID 1 and 10.

Disk-group scrub can last over an hour, depending on disk-group size, utility priority, and amount of I/O activity. However, a “foreground” scrub performed with this command is typically faster than a background scrub enabled with the [set advanced-settings on page 202](#) command. You can use a disk group while it is being scrubbed. To check the progress of a disk-group scrub (DRSC) job, use the `show disk-groups` command.

When a disk-group scrub job starts, event 206 is logged. When a scrub job ends, event 207 is logged and specifies whether errors were found and whether user action is required.

Minimum role

manage

Syntax

```
scrub disk-groups  
disk-groups
```

Parameters

`disk-groups`

A comma-separated list of the names or serial numbers of the disk groups to scrub. A name that includes a space must be enclosed in double quotes.

Examples

```
Start scrubbing disk group dg1.  
# scrub disk-groups dg1
```

See also

- [abort scrub on page 33](#) (with the disk-group parameter)
- [set advanced-settings on page 202](#)
- [show disk-groups on page 317](#)

scrub vdisk

Description

Analyzes specified vdisks to find and fix disk errors.

This command acts on disks in a vdisk but not dedicated spares or leftover disks. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

Vdisk scrub can last over an hour, depending on vdisk size, utility priority, and amount of I/O activity. However, a “foreground” scrub performed with this command is typically faster than a background scrub enabled with the [set advanced-settings on page 202](#) command. You can use a vdisk while it is being scrubbed. To check the progress of a vdisk scrub (VRSC) job, use the [show vdisks on page 449](#) command.

When a vdisk scrub operation starts, event 206 is logged. When a vdisk scrub operation ends, event 207 is logged and specifies whether errors were found and whether user action is required.

Minimum role

manage

Syntax

```
scrub vdisk  
    vdisks
```

Parameters

vdisks

A comma-separated list of the names or serial numbers of the vdisks to scrub. A name that includes a space must be enclosed in double quotes.

Examples

```
Start scrubbing vdisk vd1.  
# scrub vdisk vd1
```

See also

- [abort scrub on page 33](#) (with the `vdisk` parameter)
- [set advanced-settings on the next page](#)
- [show vdisks on page 449](#)

scrub volume

Description

Analyzes specified volumes to find and fix disk errors. This command applies to linear storage only.

This command acts on the disk portions spanned by each volume, but it does not act on dedicated spares or leftover disks. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

Volume scrub can last over an hour, depending on volume size, utility priority, and amount of I/O activity. You can use a volume while it is being scrubbed. To check the progress of a volume scrub job, use the [show volumes on page 467](#) command.

i Note: Only one scrub operation can be running on a vdisk at a time. If a manual scrub is started while a background scrub is in progress, the background scrub will terminate and will start over 24 hours after the manual scrub completes.

When a scrub is complete, event 207 is logged and specifies whether errors were found and whether user action is required.

Minimum role

manage

Syntax

```
scrub volume  
  volumes
```

Parameters

volumes

The names or serial numbers of the volumes to scrub. A name that includes a space must be enclosed in double quotes.

Examples

```
Start scrubbing volume vol1.  
# scrub volume vol1
```

See also

- [abort scrub on page 33](#) (with the `volume` parameter)
- [set advanced-settings below](#)
- [show volumes on page 467](#)

set advanced-settings

Description

Sets advanced system configuration parameters.

Minimum role

manage

Syntax

```
set advanced-settings
[auto-stall-recovery enabled|disabled|on|off]
[auto-write-back enabled|disabled|on|off]
[background-disk-scrub enabled|disabled|on|off]
[background-scrub enabled|disabled|on|off]
[background-scrub-interval interval]
[compact-flash-failure enabled|disabled|on|off]
[controller-failure enabled|disabled|on|off]
[dynamic-spare enabled|disabled|on|off]
[emp-poll-rate rate]
[fan-failure enabled|disabled|on|off]
[host-cache-control enabled|disabled|on|off]
[independent-cache enabled|disabled|on|off]
[large-pools enabled|disabled|on|off]
[managed-logs enabled|disabled|on|off]
[missing-lun-response notready|illegal]
[partner-firmware-upgrade enabled|disabled|on|off]
[partner-notify enabled|disabled|on|off]
[power-supply-failure enabled|disabled|on|off]
[restart-on-capi-fail enabled|disabled|on|off]
[single-controller]
[smart enabled|disabled|on|off|detect-only]
[spin-down enabled|disabled|on|off]
[spin-down-delay delay]
[super-cap-failure enabled|disabled|on|off]
[sync-cache-mode immediate|flush]
[temperature-exceeded enabled|disabled|on|off]
[utility-priority low|medium|high]
```

Parameters

`auto-stall-recovery` enabled|disabled|on|off

Optional. Detects situations where a controller stall is preventing I/O operations from completing, and recovers the system so that at least one controller is operational, thus avoiding data-unavailability situations. This feature focuses on failover/recovery stalls. When a stall is detected, event 531 is logged.

- `disabled` or `off`: Auto stall recovery is disabled. The system will constantly perform auto stall detection in the background but will not automatically perform recovery actions.
- `enabled` or `on`: Auto stall recovery is enabled. The system will constantly perform auto stall detection in the background and automatically perform recovery actions. This is the default.

`auto-write-back` `enabled|disabled|on|off`

Optional. Sets whether the cache mode will change from write-through to write-back when the trigger condition is cleared.

- `disabled` or `off`: Auto-write-back is disabled.
- `enabled` or `on`: Auto-write-back is enabled. This is the default.

`background-disk-scrub` `enabled|disabled|on|off`

Optional. Sets whether disks that are not in disk groups are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 72 hours. The first time you enable this parameter, background disk scrub will start with minimal delay. If you disable and then re-enable this parameter, background disk scrub will start 72 hours after the last background disk scrub completed.

- `disabled` or `off`: Background disk scrub is disabled. This is the default.
- `enabled` or `on`: Background disk scrub is enabled.

`background-scrub` `enabled|disabled|on|off`

Optional. Sets whether disks in disk groups are automatically checked for disk defects to ensure system health. The interval between background disk-group scrub finishing and starting again is specified by the `background-scrub-interval` parameter.

- `disabled` or `off`: Background disk-group scrub is disabled. This is the default.
- `enabled` or `on`: Background disk-group scrub is enabled.

`background-scrub-interval` `interval`

Optional. Sets the interval in hours between background disk-group scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.

`compact-flash-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation.

- `disabled` or `off`: The CompactFlash failure trigger is disabled.
- `enabled` or `on`: The CompactFlash failure trigger is enabled. This is the default.

`controller-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when a controller fails.

- `disabled` or `off`: The controller failure trigger is disabled. This is the default.
- `enabled` or `on`: The controller failure trigger is enabled.

`dynamic-spare` `enabled|disabled|on|off`

Optional. Sets whether the storage system will automatically designate an available compatible disk as a spare to replace a failed disk in a disk group. A compatible disk has enough capacity to replace the failed disk and is the same type.

- `disabled` or `off`: The dynamic spares feature is disabled. This is the default.
- `enabled` or `on`: The dynamic spares feature is enabled.

`emp-poll-rate rate`

Optional. Sets the interval at which the storage system will poll each enclosure's Enclosure Management Processor (EMP) for status changes, from 5 to 3600 seconds. The default is 5 seconds.

`fan-failure enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when a fan fails.

- `disabled` or `off`: The fan failure trigger is disabled. This is the default.
- `enabled` or `on`: The fan failure trigger is enabled.

`host-cache-control enabled|disabled|on|off`

Optional. Sets whether hosts are allowed to use the SCSI MODE SELECT command to change the storage system's write-back cache setting.

- `disabled` or `off`: Host control of caching is disabled. This is the default.
- `enabled` or `on`: Host control of caching is enabled.

`independent-cache enabled|disabled|on|off`

Optional. Sets the cache redundancy mode for a dual-controller storage system. For the change to take effect, you must restart both Storage Controllers. You cannot enable this parameter if the `partner-firmware-update` parameter or the `single-controller` parameter is enabled.

- `disabled` or `off`: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. This is the default.
- `enabled` or `on`: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.

`large-pools enabled|disabled|on|off`

Optional. Enables or disables the capability to create a virtual pool larger than 300 TiB on each controller by limiting the number of user-defined snapshots that can be created in snapshot trees.

- `enabled` or `on`: The maximum size for a virtual pool will be 512 TiB. The maximum number of volumes per snapshot tree will be 9 (base volume plus 8 snapshots). You can enable this setting only if no snapshot tree has more than 15 volumes.
- `disabled` or `off`: The maximum size for a virtual pool will be 300 TiB. The maximum number of volumes per snapshot tree will be 255 (base volume plus 254 snapshots). This is the default. You can disable this setting only if each pool is less than 300 TiB.

Changing this setting will automatically restart both controllers, during which time data will be unavailable.

`managed-logs enabled|disabled|on|off`

Optional. Enables or disables the managed logs feature, which allows log files to be transferred from the storage system to a log collection system to avoid losing diagnostic data.

- `disabled` or `off`: The managed logs feature is disabled. This is the default.
- `enabled` or `on`: The managed logs feature is enabled.

`missing-lun-response notready|illegal`

Optional. Sets whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.

set advanced-settings

- `notready`: Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is `sensekey = 2`, `code = 4`, `qualifier = 3`. This option is the default.
- `illegal`: Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is `sensekey = 5`, `code = 25h`, `qualifier = 0`. If the system is used in a VMware environment, use this option.

`partner-firmware-upgrade` `enabled|disabled|on|off`

Optional. Sets whether component firmware versions are monitored and will be automatically updated on the partner controller. You cannot enable this parameter if the `independent-cache` parameter is enabled.

- `disabled` or `off`: Partner firmware upgrade is disabled.
- `enabled` or `on`: Partner firmware upgrade is enabled. This is the default.

`partner-notify` `enabled|disabled|on|off`

Optional. Sets whether to notify the partner controller that a trigger condition occurred. Enable this option to have the partner also change to write-through mode for better data protection. Disable this option to allow the partner continue using its current caching mode for better performance. The default is `disabled`.

- `disabled` or `off`: Notification is disabled. This is the default.
- `enabled` or `on`: Notification is enabled.

`power-supply-failure` `enabled|disabled|on|off`

Optional. Sets whether the cache policy automatically changes to write-through when a power supply fails.

- `disabled` or `off`: The power-supply failure trigger is disabled. This is the default.
- `enabled` or `on`: The power-supply failure trigger is enabled.

`restart-on-capi-fail` `enabled|disabled|on|off`

Optional. Sets whether a Storage Controller that experiences a CAPI hang will be forced to restart. A CAPI hang is perceived as a management-interface hang. As part of the restart process, a dump file is created and event 107 is logged. To provide the dump file to technical support for debugging, use the Save Logs action in the SMC.

`single-controller`

Optional; for use by a service technician only. For a system that had two controller modules but now has only one and is intended to be used as a single-controller system, this parameter changes the operating/redundancy mode to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP. You cannot enable this parameter if the `independent-cache` parameter is enabled.

`smart` `enabled|disabled|on|off|detect-only`

Optional. Enables or disables SMART (Self-Monitoring Analysis and Reporting Technology) monitoring for all disks in the storage system.

- `disabled` or `off`: Disables SMART for all disks in the system and for all disks added to the system.
- `enabled` or `on`: Enables SMART for all disks in the system and for all disks added to the system. This is the default.
- `detect-only`: Detects but does not change the SMART setting of each disk in the system, and for each new disk added to the system.

`spin-down enabled|disabled|on|off`

Optional. Sets whether available disks and global spares will spin down after a period of inactivity shown by the `spin-down-delay` parameter.

- `disabled` or `off`: Drive spin down for available disks and global spares is disabled. This is the default. Disabling spin down will set the `spin-down-delay` to 0.
- `enabled` or `on`: Drive spin down for available disks and global spares is enabled. If the `spin-down-delay` parameter is not specified, the delay will be set to 15 minutes.

i Note: Drive spin down is not applicable to disks in virtual pools.

`spin-down-delay delay`

Optional. Sets the period of inactivity after which available disks and global spares will spin down. Setting the delay to 1–360 minutes will enable spin down. Setting the delay to 0 will disable spin down. The default is 15 minutes.

i Note: Drive spin down is not applicable to disks in virtual pools.

`super-cap-failure enabled|disabled|on|off`

Optional. Sets whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails.

- `disabled` or `off`: The supercapacitor failure trigger is disabled.
- `enabled` or `on`: The supercapacitor failure trigger is enabled. This is the default.

`sync-cache-mode immediate|flush`

Optional. Sets how the SCSI SYNCHRONIZE CACHE command is handled.

- `immediate`: Good status is returned immediately and cache content is unchanged. This option is the default.
- `flush`: Good status is returned only after all write-back data for the specified volume is flushed to disk.

`temperature-exceeded enabled|disabled|on|off`

Optional. Sets whether the system will shut down a controller when its temperature exceeds the critical operating range.

- `disabled` or `off`: The over-temperature trigger is disabled. This is the default.
- `enabled` or `on`: The over-temperature trigger is enabled.

`utility-priority low|medium|high`

Optional. Sets the priority at which data-redundancy utilities, such as `disk-group verify` and `reconstruct`, run with respect to I/O operations competing for the system's processors. (This does not affect `disk-group background scrub`, which always runs at “background” priority.)

- `high`: Utilities have higher priority than host I/O. Use when your highest priority is to return the system to a fully fault-tolerant state. This can cause heavy I/O to be slower than normal. This is the default.
- `medium`: Utility performance is balanced with host I/O performance.
- `low`: Utilities run at a slower rate with minimal effect on host I/O. Use when streaming data without interruption, such as for a web server, is more important than data redundancy.

Examples

Enable partner firmware upgrade.

```
# set advanced-settings partner-firmware-upgrade enabled
```

Enable managed logs.

```
# set advanced-settings managed-logs enabledDisable auto stall recovery.
```

```
# set advanced-settings auto-stall-recovery disabled
```

See also

- [add spares on page 45](#)
- [remove spares on page 163](#)
- [scrub disk-groups on page 199](#)
- [scrub vdisk on page 200](#)
- [show advanced-settings on page 293](#)

set auto-write-through-trigger (Deprecated)

Use [set advanced-settings on page 202](#).

set awt (Deprecated)

Use [set advanced-settings on page 202](#).

set cache-parameters

Description

Sets a volume's cache options.

Note: Only change the read-ahead cache settings if you fully understand how the host operating system, application, and adapter move data so that you can adjust the settings accordingly. Be prepared to monitor system performance and adjust read-ahead size until you find the optimal size for your application.

Caution: Changing the cache optimization setting while I/O is active can cause data corruption or loss. Before changing this setting, quiesce I/O from all initiators.

Minimum role

manage

Syntax

```
set cache-parameters  
[optimization standard|no-mirror|atomic-write]  
[read-ahead-size disabled|adaptive|stripe|512KB|1MB|2MB|4MB|8MB|16MB|32MB]  
[write-policy write-back|write-through|wb|wt]  
  
volume
```

Parameters

`optimization standard|no-mirror|atomic-write`

Optional. Sets the cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads. This is the default.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

`read-ahead-size disabled|adaptive|stripe|512KB|1MB|2MB|4MB|8MB|16MB|32MB`

Optional. Controls the use and size of read-ahead cache. You can optimize a volume for sequential reads or streaming data by changing the amount of data read in advance. Read ahead is triggered by sequential accesses to consecutive logical block address (LBA) ranges. Read ahead can be forward (increasing LBAs) or reverse (decreasing LBAs). Increasing the read-ahead size can greatly improve performance for multiple sequential read streams. However, increasing read-ahead size will likely decrease random read performance.

- `disabled`: Disables read ahead.
- `adaptive`: Enables adaptive read-ahead, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload. This is the default.
- `stripe`: Sets the read-ahead size to one stripe. The controllers treat NRAID and RAID-1 disk groups internally as if they have a stripe size of 512 KB, even though they are not striped.
- `512KB, 1MB, 2MB, 4MB, 8MB, 16MB, or 32MB`: Sets a specific read-ahead size.

`write-policy write-back|write-through|wb|wt`

Optional. Sets the cache write policy, which determines when cached data is written to the disks. The ability to hold data in cache while it is being written to disk can increase storage device speed during sequential reads.

- `write-back` or `wb`: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default.
- `write-through` or `wt`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

You can configure the write policy to automatically change from write-back to write-through when certain environmental events occur, such as a fan failure. For details, see help for the [set advanced-settings on page 202](#) command.

`volume`

The name or serial number of the volume to change. A name that includes a space must be enclosed in double quotes.

Examples

Set the cache policy, optimization mode, and read-ahead size for volume V1.

```
# set cache-parameters write-policy wb optimization standard read-ahead-size  
stripe V1
```

See also

- [show cache-parameters on page 299](#)
- [show volumes on page 467](#)

set chap-record

Description

For iSCSI, changes an originator's CHAP record. You can change the record's secret, mutual name, and mutual secret values. This command is permitted whether or not CHAP is enabled.

For a login request from an iSCSI initiator to a storage system, the initiator is the originator and the storage system is the recipient. Because CHAP works during login, to make CHAP changes take effect you must reset any active iSCSI host links.

Minimum role

manage

Syntax

```
set chap-record
name originator-name
[secret originator-secret]
[mutual-name recipient-name mutual-secret recipient-secret]
```

Parameters

`name originator-name`

The originator name, typically in IQN format.

`secret originator-secret`

The secret that the recipient uses to authenticate the originator. The secret is case sensitive and can include 12–16 bytes.

`mutual-name recipient-name`

Optional; for mutual CHAP only. The recipient name, typically in IQN format. The name is case sensitive and can have a maximum of 223 bytes, including 0–9, lowercase a–z, hyphen, colon, and period. To determine a storage system's IQN, use the `show ports` [on page 386](#) command to view an iSCSI port Target ID value. This parameter and `mutual-secret` must be set together.

`mutual-secret recipient-secret`

Optional; for mutual CHAP only. The secret that the originator uses to authenticate the recipient. The secret is case sensitive, can include 12–16 bytes, and must differ from the originator secret. A storage system's secret is shared by both controllers. This parameter and `mutual-name` must be set together.

Examples

For mutual CHAP, add a recipient name and secret to a CHAP record.

```
# set chap-record name iqn.1991-05.com.microsoft:myhost.domain mutual-name
iqn.1995-03.com.acme:01.storage.00c0ffd6000a mutual-secret ABCdef123456(2012-01-
21 11:54:33)
```

See also

- [create chap-record on page 63](#)
- [delete chap-records on page 110](#)
- [show channels \(Deprecated\) on page 303](#)

- [show iscsi-parameters on page 363](#)
- [show ports on page 386](#)

set cli-parameters

Description

Sets options that control CLI behavior. If you are accessing the CLI through the network port, settings apply to the current CLI session only. If you are accessing the CLI through the enclosure's CLI port, settings persist across sessions.

The base, locale, precision, temperature scale, timeout, and units settings are read from the user's account, and can be overridden by using this command.

Minimum role

manage

Syntax

```
set cli-parameters
[base 2|10]
[console|api|api-embed|ipa|json]
[brief enabled|disabled|on|off]
[locale Arabic|ar|Portuguese|br|English|en|Spanish|es|French|fr|German|de
|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Russian|ru|Chinese-simplified
|zh-s|Chinese-traditional|zh-t]
[management-mode v2|v3]
[pager enabled|disabled|on|off]
[precision #]
[storage-size-base 2|10]
[storage-size-precision #]
[storage-size-units auto|MB|GB|TB]
[temperature-scale celsius|c|fahrenheit|f]
[timeout #]
[units auto|MB|GB|TB]
```

Parameters

`base 2|10`

Optional. Sets the base for entry and display of storage-space sizes:

- `2`: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. In base 2 when you set a size, whether you specify a base-2 or base-10 size unit, the resulting size will be in base 2.
- `10`: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. In base 10 when you set a size, the resulting size will be in the specified size unit. This option is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

`console|api|api-embed|ipa|json`

Optional. Sets the output format:

- `console`: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. This is the default.
- `api`: Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by `COMP` elements.
- `api-embed`: Alternate form of XML output which displays “child” objects embedded (indented) under “parent” objects.
- `ipa`: Alternate form of XML output.
- `json`: Alternate data-interchange format.

`brief enabled|disabled|on|off`

Optional.

- `enabled` or `on`: In XML output, this setting shows a subset of attributes of object properties. The name and type attributes are always shown.
- `disabled` or `off`: In XML output, this setting shows all attributes of object properties. This is the default.

`locale Arabic|ar|Portuguese|brEnglish|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Russian|ru|Chinese-simplified|zh-s|Chinese-traditional|zh-t`

Optional. The display language. The default is English.

`management-mode v2|v3`

Optional. For the current CLI session only, this sets the terminology to use in command output and system messages. This setting does not affect access to commands.

- `v2`: Uses terminology that is oriented to managing linear storage. For example, *vdisk* for disk groups and *pools*.
- `v3`: Uses terminology that is oriented to managing virtual and linear storage. For example, *disk group* for disk groups and *pool* for pools.

`pager enabled|on|disabled|off`

Optional.

- `enabled` or `on`: Halts output after each full screen to wait for keyboard input. This is the default.

- `disabled` or `off`: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.

`precision #`

Optional. Sets the number of decimal places (1–10) for display of storage-space sizes. The default is 1.

`storage-size-base 2|10`

Optional. Alias for `base`.

`storage-size-precision #`

Optional. Alias for `precision`.

`storage-size-units auto|MB|GB|TB`

Optional. Alias for `units`.

`temperature-scale celsius|c|fahrenheit|f`

Optional. Sets the scale for display of temperature values:

- `fahrenheit` or `f`: Temperatures are shown in degrees Fahrenheit.
- `celsius` or `c`: Temperatures are shown in degrees Celsius. This is the default.

`timeout #`

Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

`units auto|MB|GB|TB`

Optional. Sets the unit for display of storage-space sizes:

- `auto`: Sizes are shown in units determined by the system. This is the default.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

Based on the `precision` setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `units` is set to `TB`, `precision` is set to 1, and `base` is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.

Examples

Set CLI parameters.

```
# set cli-parameters timeout 600 console pager off precision 2 units GB  
temperature-scale f
```

For scripting, display XML output in `api-embed` format and disable paging.

```
# set cli-parameters api-embed pager off
```

For scripting, display brief XML output in `api-embed` format and disable paging.

```
# set cli-parameters api-embed pager off brief on
```

Set the CLI to show output in console format.

```
# set cli-parameters console
Set the CLI to use the v3 management mode.
# set cli-parameters management-mode v3
```

See also

- [show cli-parameters on page 304](#)

set controller-date

Description

Sets the date and time parameters for the system. You can set the date and time manually or configure the system to communicate with a Network Time Protocol (NTP) server. Alternatively, you can configure NTP by using the [set ntp-parameters on page 251](#) command.

- i Note:** If you specify valid NTP parameters and manual date/time parameters in the same command, the NTP parameters will take precedence. If the NTP server cannot be contacted, the date and time will not be changed and no error message will be displayed. If you specify the `timestamp` parameter and other manual date/time parameters in the same command, the `timestamp` parameter will take precedence.

Minimum role

manage

Syntax

```
To set the date and time manually:
set controller-date
jan | feb | mar | apr | may | jun | jul | aug | sep | oct | nov | dec
day
hh:mm:ss
year

To set the date and time manually by specifying a timestamp:
set controller-date
```

```
timestamp timestamp
timezone +|-hh[:mm]

To configure use of NTP:
set controller-date
ntp enabled|disabled|on|off
ntpaddress IP-address
timezone +|-hh[:mm]
```

Parameters

jan|feb|mar|apr|may|jun|jul|aug|sep|oct|nov|dec
The month.

day
The day number (1–31).

hh:mm:ss
The hour (0–23), the minutes (0–59), and the seconds (0–59).

year
The year as a four-digit number.

ntp enabled|disabled|on|off
Enables or disables use of NTP. When NTP is enabled and the specified NTP server is available, each controller's time is synchronized with the server. This is disabled by default.

ntpaddress IP-address
The network address of an available NTP server.

timezone +|-hh[:mm]
The system's time zone as an offset in hours (-12 through +14) and optionally minutes (00–59) from Coordinated Universal Time (UTC). To specify a positive offset, the '+' is optional. To specify a negative offset, the '-' is required. The hour value can have one or two digits and can omit a leading zero. If the minutes value is specified it must have two digits. If it is omitted, the minutes value is set to 00.

timestamp timestamp
The date and time represented as the number of seconds (not counting leap seconds) that have elapsed since 1970-01-01 00:00:00 UTC. The resulting time will be in UTC, unless you also specify the `timezone` parameter.

Examples

Manually set the system time and date to 1:45 PM on September 22, 2011.

```
# set controller-date sep 22 13:45:0 2011
```

Manually set the system date and time to 4:30:50 PM on November 2, 2011 by specifying a timestamp and an offset for the Central Time zone.

```
# set controller-date timestamp 1320273050 timezone -6
Set the system to use NTP with an offset for the Mountain Time zone.
# set controller-date ntp enabled ntpaddress 69.10.36.3 timezone -7
Set the system to use NTP with an offset for the Bangalore, India, time zone.
# set controller-date ntp enabled ntpaddress 69.10.36.3 timezone +5:30
```

See also

- [set ntp-parameters on page 251](#)
- [show controller-date on page 308](#)
- [show ntp-status on page 375](#)

set debug-log-parameters

Description

Sets the types of debug messages to include in the Storage Controller debug log. For use by or with direction from technical support.

Minimum role

manage

Syntax

```
set debug-log-parameters
message-type+|- [...]
```

Parameters

message-type+|-

One of the following message types, followed by a plus (+) to enable or a minus (-) to disable inclusion in the log:

- **awt**: Auto-write-through cache triggers debug messages. Disabled by default.
- **bkc fg**: Internal configuration debug messages. Enabled by default.

- `cache`: Cache debug messages. Enabled by default.
- `capi`: Internal Configuration API debug messages. Enabled by default.
- `capi2`: Internal Configuration API tracing debug messages. Disabled by default.
- `disk`: Disk interface debug messages. Enabled by default.
- `dms`: Snapshot feature debug messages. Enabled by default. Not used.
- `emp`: Enclosure Management Processor debug messages. Enabled by default.
- `fo`: Failover and recovery debug messages. Enabled by default.
- `fruid`: FRU ID debug messages. Enabled by default.
- `hb`: Not used.
- `host`: Host interface debug messages. Enabled by default.
- `init`: Not used.
- `ioa`: I/O interface driver debug messages (standard). Enabled by default.
- `iob`: I/O interface driver debug messages (resource counts). Disabled by default.
- `ioc`: I/O interface driver debug messages (upper layer, verbose). Disabled by default.
- `iod`: I/O interface driver debug messages (lower layer, verbose). Disabled by default.
- `mem`: Internal memory debug messages. Disabled by default.
- `misc`: Internal debug messages. Enabled by default.
- `msg`: Inter-controller message debug messages. Enabled by default.
- `mui`: Internal service interface debug messages. Enabled by default.
- `ps`: Paged storage. Enabled by default. Not used.
- `raid`: RAID debug messages. Enabled by default.
- `rcm`: Removable-component manager debug messages. Disabled by default.
- `res2`: Internal debug messages. Disabled by default.
- `resmgr`: Reservation Manager debug messages. Disabled by default.

Examples

Include RAID and cache messages, exclude EMP messages, and leave other message types unchanged.

```
# set debug-log-parameters raid+ cache+ emp-
```

See also

- [show debug-log-parameters](#)

set disk (QXS-4 and QXS-6 Series)

Description

Performs a secure erase on a specified disk. This is called repurposing the disk, and only applies to a disk that is capable of Full Disk Encryption.

This command can only be run on disks whose status is AVAIL, or UNUSABLE due to having a foreign lock key. AVAIL disks have had all disk group information removed from them. Secure erasing such disks is an extra step to make all data on the disk irretrievable. Disks that are UNUSABLE due to having a foreign lock key can be imported by using the [set fde-import-key \(QXS-4 and QXS-6 Series\) on page 230](#) command.

i Note: If you want to repurpose more than one disk and the drive spin down (DSD) feature is enabled, disable DSD before repurposing the disks. You can re-enable it after the disks are repurposed. For information about disabling and enabling DSD for available disks, see information about the [set advanced-settings on page 202](#) command's spin-down parameter. Drive spin down is not applicable to disks in virtual pools.

Minimum role

manage

Syntax

```
set disk  
[noprompt]  
repurpose  
disk
```

Parameters

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

repurpose

Specifies to secure erase the specified disk.

disk

The ID of the disk to be repurposed. Only one disk may be repurposed at a time. For disk syntax, see [Command Syntax on page 13](#).

Examples

In a system whose FDE security status is Secured, Unlocked, perform a secure erase of all data on disk 1.2, whose status is AVAIL.

```
# set disk 1.2 repurpose
```

In a system whose FDE security status is Secured, Locked, perform a secure erase of all data on disk 1.2, whose status is UNUSABLE.

```
# set disk 1.2 repurpose
```

Disk 1.2 was used on another system, and its contents are unknown. The contents will be erased. Do you want to continue? (y/n)

See also

- [set fde-lock-key \(QXS-4 and QXS-6 Series\) on page 232](#)
- [set fde-state \(QXS-4 and QXS-6 Series\) on page 233](#)
- [show disks on page 325](#) (with the fde parameter)
- [show fde-state \(QXS-4 and QXS-6 Series\) on page 348](#)

set disk-group

Description

Changes parameters for a specified disk group.

Minimum role

manage

Syntax

```
set disk-group  
[name new-name]  
[owner a|b]  
[scrub-duration-goal hours]  
[spin-down-delay delay]
```

disk-group

Parameters

name new-name

Optional. A new name for the disk group. A name that includes a space must be enclosed in double quotes.

owner a|b

Optional for a linear disk group. Prohibited for a virtual disk group. Sets the new owner: controller A or B.

⚠ Caution: Before changing the owning controller for a linear disk group, you must stop host I/O to its volumes. Volume mappings are not affected.

⚠ Caution: Changing ownership of a disk group while any volumes in the disk group are mapped to live hosts is not supported and may cause data loss or unavailability. All volumes in the disk group must be unmapped or attached hosts must be shut down before the ownership of a disk group is changed.

spin-down-delay delay

Optional. Sets the period of inactivity after which the member disks and dedicated spares automatically spin down, from 1–360 minutes. Setting the delay to 1–360 minutes will enable spin down; setting the delay to 0 will disable spin down.

i Note: Drive spin down affects disk operations as follows:

- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

i Note: Drive spin down is not applicable to disks in virtual pools.

disk-group

Name or serial number of the disk group to change. A name that includes a space must be enclosed in double quotes.

Examples

```
Rename virtual disk group dgA01 to vdg.
```

```
# set disk-group name vdg dgA01
```

```
Rename linear disk group dg1 to dg2 and set its spin-down delay to 10 minutes.
```

```
# set disk-group name dg2 spin-down-delay 10 dg1
```

See also

- [show disk-groups on page 317](#)

set disk-parameters

Description

Sets parameters that affect disk operation. Two features controlled by these parameters are disk Self-Monitoring Analysis and Reporting Technology (SMART) and drive spin down.

- Disks equipped with SMART technology can alert the controller of impending disk failure. When SMART is enabled, the system checks for SMART events one minute after a restart and every five minutes thereafter. SMART events are recorded in the event log. Changes to the SMART setting take effect after a rescan or a controller restart.
- The drive spin down feature monitors disk activity within system enclosures and spins down inactive disks, based on user-specified settings. This command sets spin-down parameters for available disks and global spares. Spin-down settings do not affect leftover disks. To set spin-down parameters for a linear disk group, use the [set vdisk on page 287](#) command.

Drive spin down affects disk operations as follows:

- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

Minimum role

manage

Syntax

```
set disk-parameters  
[smart enabled|disabled|on|off|detect-only]  
[spin-down enabled|disabled|on|off]  
[spin-down-delay delay]
```

Parameters

`smart enabled|disabled|on|off|detect-only`

Optional. Sets whether SMART is enabled or disabled for disks:

- `disabled` or `off`: Disables SMART for all disks in the system and for all disks added to the system.
- `enabled` or `on`: Enables SMART for all disks in the system and for all disks added to the system. This is the default.
- `detect-only`: Detects but does not change the SMART setting of each disk in the system, and for each new disk added to the system.

spin-down enabled|disabled|on|off

Optional. Sets whether available disks and global spares will spin down after a period of inactivity shown by the spin-down-delay parameter.

- disabled or off: Drive spin down for available disks and global spares is disabled. This is the default. Disabling spin down will set the spin-down delay to 0.
- enabled or on: Drive spin down for available disks and global spares is enabled. If the spin-down-delay parameter is not specified, the delay will be set to 15 minutes.

i Note: Drive spin down is not applicable to disks in virtual pools.

spin-down-delay delay

Optional. Sets the period of inactivity after which available disks and global spares will spin down. Setting the delay to 1–360 minutes will enable spin down. Setting the delay to 0 will disable spin down. The default is 15 minutes.

i Note: Drive spin down is not applicable to disks in virtual pools.

Examples

```
Enable SMART and drive spin down, and set the spin-down delay to 10 minutes.  
# set disk-parameters smart on spin-down on spin-down-delay 10
```

See also

- [show disk-parameters on page 323](#)

set email-parameters

Description

Sets SMTP notification parameters for events and managed logs.

Minimum role

manage

Syntax

```
set email-parameters
domain domain
email-list email-addresses
[include-logs enabled|disabled|on|off]
notification-level crit|error|warn|info|none
sender sender
server server
```

Parameters

domain domain

The domain name that is joined with an @ symbol to the sender name to form the “from” address for remote notification. The domain name can have a maximum of 255 bytes. Because this name is used as part of an email address, do not include spaces. For example: MyDomain.com. If the domain name is not valid, some email servers will not process the mail.

email-list email-addresses

Enter up to four comma-separated email addresses for recipients of event notifications. Each email address can have a maximum of 320 bytes. The first three email addresses are used as destinations for events. If the managed logs feature is enabled, you can set the fourth email-address to the address of the log collection system. For example: IT-team@MyDomain.com,, ,LogCollector@MyDomain.com

include-logs enabled|disabled|on|off

Optional. When the managed logs feature is enabled, this option activates the “push” mode, automatically attaching system log files to managed-logs email notifications that are sent to the log collection system. This option is disabled by default.

notification-level crit|error|warn|info|none

The minimum severity for which the system should send notifications:

- **crit:** Sends notifications for Critical events only.
- **error:** Sends notifications for Error and Critical events.
- **warn:** Sends notifications for Warning, Error, and Critical events.
- **info:** Sends notifications for all events.
- **none:** Disables email notification. If this option is specified, no other parameters are required and their current values are not changed.

sender sender

The sender name that is joined with an @ symbol to the domain name to form the “from” address for remote notification. This name provides a way to identify the system that is sending the notification. The sender name can have a maximum of 64 bytes. The value cannot include a space or:

“, < > \

For example: Storage-1.

server server

The IP address of the SMTP mail server to use for the email messages.

Examples

Set the system to send an email from RAIDsystem@mydomain.com to both sysadmin@mydomain.com and JSmith@domain2.com when a non-Informational event occurs, and to send an email with attached logs to logcollector@mydomain.com when logs need to be transferred.

```
# set email-parameters server 10.1.1.10 sender RAIDsystem domain mydomain.com  
notification-level warn include-logs enabled email-list  
sysadmin@mydomain.com,JSmith@domain2.com,,logcollector@mydomain.com
```

See also

- [show email-parameters on page 337](#)
- [test on page 483](#) (with the email parameter)

set enclosure

Description

Sets an enclosure's name, location, rack number, and rack position. Set these parameters to values that help you identify and locate the enclosure. These values are used when user interfaces show enclosure-related data, such as in output of the [show enclosures on page 338](#) command and in event-log entries related to enclosures.

Minimum role

manage

Syntax

```
set enclosure  
[name new-name]  
[location location]  
[rack-number rack-number]  
[rack-position rack-position]  
enclosure-number
```

Parameters

name new-name

Optional. A new name for the enclosure. Input rules:

- The value is case sensitive.
- The value can have a maximum of 20 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

location location

The location of the enclosure. Input rules:

- The value is case sensitive.
- The value can have a maximum of 20 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

rack-number rack-number

The number of the rack containing the enclosure, from 0 to 255.

rack-position rack-position

The enclosure's position in the rack, from 0 to 255.

enclosure-number

The enclosure ID.

Examples

Set parameters for enclosure 1.

```
# set enclosure 1 name Storage-5 location Lab rack-number 9 rack-position 3
```

See also

- [show enclosures on page 338](#)

set expander-fault-isolation

Description

Temporarily disables PHY fault isolation for a specific Expander Controller. For use by or with direction from technical support.

By default, the Expander Controller in each I/O module performs fault-isolation analysis of SAS expander PHY statistics. When one or more error counters for a specific PHY exceed the built-in thresholds, the PHY is disabled to maintain storage system operation.

While troubleshooting a storage system problem, a service technician can use this command to temporarily disable fault isolation for a specific Expander Controller in a specific enclosure.

- Note:** If fault isolation is disabled, be sure to re-enable it before placing the system back into service. Serious problems can result if fault isolation is disabled and a PHY failure occurs.

Minimum role

manage

Syntax

```
set expander-fault-isolation
[controller a|b|both]
enabled|disabled|on|off
[enc1 enclosure-ID]
[wwn enclosure-wwn]
```

Parameters

controller a|b|both

Optional. The I/O module containing the Expander Controller whose setting you want to change: A, B, or both. If this parameter is omitted, the setting is changed in both I/O modules.

enabled|disabled|on|off

Specifies whether to enable or disable PHY fault isolation.

enc1 enclosure-ID

Optional. The enclosure ID of the enclosure containing the PHY. Specify either this parameter or the **wwn** parameter.

wwn enclosure-wwn

Optional. The WWN of the enclosure containing the PHY. Specify either this parameter or the **enc1** parameter.

Examples

```
Disable PHY fault isolation for Expander Controller A in enclosure 1.  
# set expander-fault-isolation encl 1 controller a disabled  
  
Re-enable PHY fault isolation for Expander Controller A in enclosure 1.  
# set expander-fault-isolation encl 1 controller a enabled
```


See also

- [set expander-phy below](#)
- [show enclosures on page 338](#)
- [show expander-status on page 344](#)

set expander-phy

Description

Disables or enables a specific PHY. For use by or with direction from technical support.

 **Caution:** Disabling PHYs can prevent access to system devices, which can cause data unavailability or data loss.

Minimum role

manage

Syntax

```
set expander-phy  
controller a|b|both  
enabled|disabled|on|off  
[encl enclosure-ID]  
phy phy-ID  
type drive|inter-exp|sc|sc-0|sc-1|sca-p|scb-p|sca-a|scb-a|ingress  
|expander-ingress-0|expander-ingress-1|egress|expander-egress-0
```

set expander-phy

```
| expander-egress-1 | drawer0-egress | drawer1-egress | drawer2-egress
| drawer0-ingress | drawer1-ingress | drawer2-ingress
[ wwn enclosure-WWN ]
```

Parameters

controller a|b|both

The I/O module containing the PHY to enable or disable: A, B, or both.

enabled|disabled|on|off

Whether to enable or disable the specified PHY.

enclenclosure-ID

Optional. The enclosure ID of the enclosure containing the PHY. Specify either this parameter or the wwn parameter.

phy phy-ID

The logical PHY number.

```
type drive|inter-exp|sc|sc-0|sc-1|sca-p|scb-p|sca-a|scb-a|ingress
|expander-ingress-0|expander-ingress-1|egress|expander-egress-0
|expander-egress-1|drawer0-egress|drawer1-egress|drawer2-egress
|drawer0-ingress|drawer1-ingress|drawer2-ingress
```

The PHY type:

- drive: Drive slot PHY.
- inter-exp: Inter-expander PHY.
- sc: Storage Controller PHY.
- sc-0: Storage Controller primary PHY.
- sc-1: Storage Controller alternate PHY.
- sca-p: Storage Controller A primary PHY.
- scb-p: Storage Controller B primary PHY.
- sca-a: Storage Controller A alternate PHY.
- scb-a: Storage Controller B alternate PHY.
- ingress: Expansion port ingress PHY.
- expander-ingress-0: Expansion port 0 ingress PHY.
- expander-ingress-1: Expansion port 1 ingress PHY.
- egress: Expansion port egress PHY.
- expander-egress-0: Expansion port 0 egress PHY.
- expander-egress-1: Expansion port 1 egress PHY.
- drawer0-egress: Drawer 0 egress PHY.
- drawer1-egress: Drawer 1 egress PHY.

- drawer2-egress: Drawer 2 egress PHY.
- drawer0-ingress: Drawer 0 ingress PHY.
- drawer1-ingress: Drawer 1 drawer ingress PHY.
- drawer2-ingress: Drawer 2 ingress PHY.

wwnenclosure-wwn

Optional. The WWN of the enclosure containing the PHY. Specify either this parameter or the enc1 parameter.

Examples

Disable the first egress PHY in controller A in enclosure 1.

```
# set expander-phy enc1 1 controller a type egress phy 0 disabled
```

Enable the PHY for disk 5 in controller B in enclosure 1.

```
# set expander-phy enc1 1 controller b type drive phy 5 enabled
```

See also

- [set expander-fault-isolation on page 227](#)
- [show enclosures on page 338](#)
- [show expander-status on page 344](#)

set fde-import-key (QXS-4 and QXS-6 Series)

Description

Sets or changes the import lock key for the use of Full Disk Encryption. The import lock key is derived from the passphrase and is used to unlock secured disks that are inserted into the system from a different secure system.

Minimum role

manage

Syntax

```
set fde-import-key  
[noprompt]  
passphrase value
```

Parameters

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

passphrase *value*

A customer-supplied password associated with securing the system. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: , < > \
(Any double-quote characters in the passphrase are automatically removed.)

Examples

Set an import lock key in order to import locked disks from another secure system:

```
# set fde-import-key passphrase "Customer lock--01/10/2014"
```

```
Please re-enter the import passphrase to confirm: "Customer lock--01/10/2014"
```

See also

- [clear fde-keys \(QXS-4 and QXS-6 Series Only\) on page 56](#)
- [set fde-lock-key \(QXS-4 and QXS-6 Series\) on the next page](#)
- [set fde-state \(QXS-4 and QXS-6 Series\) on page 233](#)
- [show fde-state \(QXS-4 and QXS-6 Series\) on page 348](#)

set fde-lock-key (QXS-4 and QXS-6 Series)

Description

Sets or changes the lock key for the use of Full Disk Encryption. The lock key is derived from the passphrase and stored within the system.

You must retain the value of the passphrase and the lock key ID that the command returns. If you lose the passphrase, you could be locked out of your data.

Minimum role

manage

Syntax

```
set fde-lock-key  
[current-passphrase value]  
[noprompt]  
passphrase value
```

Parameters

current-passphrase*value*

Optional. If the system is secured, the current passphrase can be provided when using the `noprompt` option. The command will prompt for this current passphrase if it is not supplied.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

passphrase *value*

A customer-supplied password associated with securing the system. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: , < > \ (Any double-quote characters in the passphrase are automatically removed.)
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

Examples

```
Set a lock key in preparation for securing the system using FDE.  
# set fde-lock-key passphrase "Customer lock--01/10/2014"
```

See also

- [clear fde-keys \(QXS-4 and QXS-6 Series Only\) on page 56](#)
- [set fde-import-key \(QXS-4 and QXS-6 Series\) on page 230](#)
- [set fde-state \(QXS-4 and QXS-6 Series\) below](#)
- [show fde-state \(QXS-4 and QXS-6 Series\) on page 348](#)

set fde-state (QXS-4 and QXS-6 Series)

Description

Changes the overall state of the system for the use of Full Disk Encryption. The system can be secured, where each disk becomes secured and not accessible outside the system. Alternatively, the system can be repurposed, where each disk is secure erased.

Minimum role

manage

Syntax

```
set fde-state  
[noprompt]  
[repurpose]  
[secure passphrase value]
```

Either the repurpose parameter or the secure parameter must be specified.

Parameters

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed

without user interaction.

repurpose

Optional. The system will be repurposed, which secure erases all disks. Before issuing the command, all data (such as volumes and disk groups) must be deleted from the disks.

secure passphrase value

Optional. The system and all its disks will become secured, using the specified FDE system passphrase, which must have been previously configured. A value that includes a space must be enclosed in double quotes. If the disks are not all FDE-capable the command will fail, and no changes will be made.

Examples

Secure the system using Full Disk Encryption.

```
# set fde-state secure passphrase "Customer lock--01/10/2014"
```

A lost passphrase will result in unrecoverable data loss. Please re-enter the passphrase to confirm: "Customer lock--01/10/2014"

See also

- [clear fde-keys \(QXS-4 and QXS-6 Series Only\) on page 56](#)
- [set fde-import-key \(QXS-4 and QXS-6 Series\) on page 230](#)
- [set fde-lock-key \(QXS-4 and QXS-6 Series\) on page 232](#)
- [show fde-state \(QXS-4 and QXS-6 Series\) on page 348](#)

set global-spare (Deprecated)

Use [add spares on page 45](#).

set host

Description

Sets the name of a host and optionally the profile of the host and the initiators it contains.

Minimum role

manage

Syntax

```
set host  
[name new-name]  
[profile standard|hp-ux]  
host-name
```

Parameters

name
new-name


Optional. Changes the host's nickname to the specified name. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1532 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , . < \
- A value that includes a space must be enclosed in double quotes

profile standard|hp-ux

Optional.

- standard: Default profile.
- hp-ux: The host uses Flat Space Addressing.

 **Caution:** Changing this parameter can disrupt access from connected hosts.

host-name

The current name of the host. A value that includes a space must be enclosed in double quotes.

Examples

```
Change the name of Host1 to MyHost and the profile to HP-UX.  
# set host name MyHost profile hp-ux Host1
```

See also

- [show hosts \(Deprecated\) on page 360](#)

set host-group

Description

Sets the name of a host group.

Minimum role

manage

Syntax

```
set host-group  
name new-name  
host-group
```

Parameters

name new-name

A new name for the host group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1532 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , . < \
- A value that includes a space must be enclosed in double quotes

host-group

The current name of the host group. A value that includes a space must be enclosed in double quotes.

Examples

```
Change the name of HostGroup1 to MyHostGroup.  
# set host-group name MyHostGroup HostGroup1
```

See also

- [show host-groups on page 354](#)

set host-name (Deprecated)

Use [set initiator](#) on page 242.

set host-parameters

Description

Sets controller host-port parameters for communication with attached hosts.

For a 4004 Series SAS controller, no parameters can be set.

For a 3004 Series SAS controller, host ports can be configured to use fan-out SAS cables or standard SAS cables.

Host ports can be configured as FC or iSCSI ports. FC ports support use of qualified 8-Gbit/s or 16-Gbit/s SFPs. You can set FC ports to auto-negotiate the link speed or to use a specific link speed. iSCSI ports support use of qualified 1-Gbit/s or 10-Gbit/s SFPs. iSCSI port speeds are auto-negotiated.

⚠ Caution: Parameter changes will immediately take effect and may affect access to data. The exception is that attempting to change FC loop IDs requires restarting the controllers.

Minimum role

manage

Syntax

```
To set FC port parameters:  
set host-parameters  
[controller a|b|both]  
[fibre-connection-mode loop|point-to-point|auto]  
[fibre-loop-id values]  
[noprompt]  
[ports ports|all]  
[prompt yes|no|expert]  
[speed 4g|8g|16g|auto]  
  
To set iSCSI port parameters:
```



```
set host-parameters
[controller a|b|both]
[default-router address]
[gateway address]
[ip address]
[iscsi-ip-version ipv4|ipv6]
[netmask address]
[noprompt]
[ports ports|all]
[prompt yes|no|expert]
```

To set 3004 Series SAS port parameters:

```
set host-parameters
[fan-out enabled|disabled|on|off]
[ports ports|all]
```

Parameters

`controller a|b|both`

Deprecated—use the `ports` parameter instead.

`fan-out enabled|disabled|on|off`

Optional. Specifies the cable type used to connect 3004 Series SAS controller modules to SAS hosts. All connected controller host ports must use the same cable type. This setting will persist through controller resets and power cycles.

- `enabled` or `on`: Fan-out cable. A fan-out SAS cable can connect one port on each of two SAS hosts to one controller host port, using two dedicated PHY lanes per port.
- `disabled` or `off`: Standard cable. A standard SAS cable can connect one port on a SAS host to one controller host port, using four PHY lanes per port. This is the default.



Caution:

- Changing the fan-out setting will change the logical numbering of controller host ports, which will cause port IDs in mappings between volumes and initiators to be incorrect. Therefore, before changing the fan-out setting, unmap all mappings that specify port IDs. After you have changed the fan-out setting and connected the appropriate cables, you can re-create the mappings.
- Using fan-out cables instead of standard cables will double the number of hosts that can be attached to a single system. Use of fan-out cables will halve the maximum bandwidth available to each host, but overall bandwidth available to all hosts is unchanged.

`fibre-connection-mode loop|point-to-point|auto`

Optional. For FC, sets the topology for the specified ports to:

- `loop`: Fibre Channel-Arbitrated Loop (public or private). Loop mode cannot be used with 16-Gbit/s link speed.
- `point-to-point`: Fibre Channel point-to-point. This is the default.
- `auto`: Automatically sets the mode based on the detected connection type.

You must also specify the `ports` parameter.

`fibre-loop-id` values

Optional. For FC, specifies comma-separated loop ID values to request for host ports when controllers arbitrate during a LIP. Use this option if you want ports to have specific addresses, if your system checks addresses in reverse order (lowest address first), or if an application requires that specific IDs be assigned to recognize the controller. If the loop ID is changed for one port, the same ID is used for other ports in the same controller. If the `ports` parameter is specified, loop IDs are set based on the controllers that the ports are in. You cannot specify the same value for ports on different controllers.

- `soft` or `255`: Soft target addressing enables the LIP to determine the loop ID. Use this setting if the loop ID is permitted to change after a LIP or power cycle.
- `0–125`: Specify a hard target address if you do not want the loop ID to change after a LIP or power cycle. If the port cannot acquire the specified ID, it is assigned a soft target address.

You must restart affected controllers to make loop ID changes take effect.

`default-router` address

Optional. For iSCSI IPv6 only, the default router for the port IP address. This parameter requires the `ports` parameter.

`gateway` address

Optional. For iSCSI, the port gateway address. This parameter requires the `ports` parameter.

`ip` address

Optional. For iSCSI, the port IP address. Ensure that each iSCSI host port in the storage system is assigned a different IP address. This parameter requires the `ports` parameter.

`iscsi-ip-version` `ipv4|ipv6`

Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing controller iSCSI ports. When you change this setting, iSCSI-port address values are converted to the new format.

- `ipv4`: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values without leading zeroes and the octets are separated by a period. For example, `10.132.2.205`. The first octet may not be zero, with the exception that `0.0.0.0` can be used to disable the interface (stop I/O). This option is the default.
- `ipv6`: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, `0000:0000:0000:0000:0000:0000:0A90:3442`.

`netmask` address

Optional. For iSCSI IPv4 only, the subnet mask for the port IP address. This parameter requires the `ports` parameter.

`noprompt`

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

`ports` `ports|all`

Optional. Specific host port numbers or all ports. For port syntax, see [Command Syntax on page 13](#).

`prompt` `yes|no|expert`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.

- no: Cancel the command.
- expert: Allow the command to proceed.

If this parameter is omitted, you must manually reply to prompts.

speed 4g|8g|16g|auto

Optional. For FC, sets a forced link speed in Gbit/s or lets the speed be auto-negotiated (auto). Because a speed mismatch prevents communication between the port and host, set a speed only if you need to force the port to use a known speed for testing, or you need to specify a mutually supported speed for more than two FC devices connected in an arbitrated loop. Loop mode cannot be used with 16-Gbit/s link speed. This parameter requires the ports parameter.

Examples

On a system with FC ports, set the link speed to 8 Gbit/s for ports A1 and B1.

```
# set host-parameters speed 8g ports a1,b1
```

On a system with FC ports, set the link speed to auto for ports A1 and B1 and suppress the confirmation prompt.

```
# set host-parameters speed auto ports a1,b1 noprompt
```

On a system with iSCSI ports using IPv4 addressing, change the IP address of port A3.

```
# set host-parameters ip 10.134.50.6 ports a3
```

On a system with iSCSI ports, specify to use IPv6 addressing and change the IP address and default router for port A1.

```
# set host-parameters ports A1 iscsi-ip-version ipv6 ip ::8576:246a default-router ::0a0a:1
```

On a 3004 Series SAS system, specify to use fan-out cables for all host ports on each controller.

```
# set host-parameters fan-out enabled
```

See also

- [restart mc on page 184](#)
- [restart sc on page 185](#)
- [set host-port-mode \(QXS-4 and QXS-6 Series\) on the next page](#)
- [set iscsi-parameters on page 243](#)
- [show ports on page 386](#)

set host-port-mode (QXS-4 and QXS-6 Series)

Description

Changes host-interface characteristics for host ports in aCNC controller module. For both controller modules, all ports can be set to FC, all ports can be set to iSCSI, or the first two ports in each controller module can be set to FC and the second two ports can be set to iSCSI. For both controller modules, all ports can be set to FC or all ports can be set to iSCSI.

This command will immediately change the host port configuration, stop I/O, restart both controllers, and log event 236. After the controllers have restarted, you can use the [set host-name \(Deprecated\) on page 237](#) command to configure the individual ports.

i Note: If you change the configuration of host ports used for replication peer connections, you will have to reconfigure the peer connections.

Minimum role

manage

Syntax

```
set host-port-mode  
[FC|iSCSI|FC-and-iSCSI]  
[noprompt]
```

Parameters

FC|iSCSI|FC-and-iSCSI

Sets the port mode for each controller.

- FC: Sets all ports to FC.
- iSCSI: Sets all ports to iSCSI.
- FC-and-iSCSI: Sets the first two ports to FC and the second two ports to iSCSI.

noprompt

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

Examples

For both controllers, set all ports to use iSCSI protocol.

```
# set host-port-mode iSCSI
```

For both controllers, set the first two ports to use FC protocol and the second two ports to use iSCSI protocol.

```
# set host-port-mode FC-and-iSCSI
```

See also

- [set host-name \(Deprecated\) on page 237](#)
- [show ports on page 386](#)

set initiator

Description

Sets the name of an initiator and optionally its profile.

Minimum role

manage

Syntax

```
set initiator  
[id initiator]  
[nickname name]  
[profile standard|hp-ux]
```

Parameters

id initiator

The ID of the initiator. For FC the ID is a WWPN. For SAS the ID is a WWPN. A WWPN can include a colon between each byte but the colons will be discarded. For iSCSI the ID is an IQN.

nickname name

Optional. Sets the name of the initiator to the specified name. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1532 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , . < \
- A value that includes a space must be enclosed in double quotes

profile standard|hp-ux
Optional.

- standard: Default profile.
- hp-ux: The host uses Flat Space Addressing.

 **Caution:** Changing this parameter can disrupt access from connected initiators.

Examples

```
For FC initiator 21000024ff3dfed1, set its name to FC-port1 and profile to HP-UX.  
# set initiator nickname FC-port1 profile hp-ux id 21000024ff3dfed1
```

See also

- [show hosts \(Deprecated\) on page 360](#)

set iscsi-parameters

Description

For iSCSI, changes system-wide iSCSI parameters.

 **Caution:** Applying new iSCSI parameters may disrupt access from connected hosts.

Minimum role

manage

Syntax

```
set iscsi-parameters
[chap enabled|disabled|on|off]
[iscsi-ip-version ipv4|ipv6]
[isns enabled|disabled|on|off]
[isns-alt-ip iSNS-IP]
[isns-ip iSNS-IP]
[jumbo-frame enabled|disabled|on|off]
[speed auto|1gbps]
```

Parameters

`chap enabled|disabled|on|off`

Optional. Enables or disables use of Challenge Handshake Authentication Protocol. Disabled by default.

`iscsi-ip-version ipv4|ipv6`

Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing controller iSCSI ports.

- `ipv4`: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values without leading zeroes and the octets are separated by a period. For example, 10.132.2.205. This option is the default.
- `ipv6`: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, 0000:0000:0000:0000:0000:0000:0A90:3442.

`isns enabled|disabled|on|off`

Optional. Enables or disables registration with a specified Internet Storage Name Service server, which provides name-to-IP-address mapping. Disabled by default.

`isns-alt-ip iSNS-IP`

Optional. Specifies the IP address of an alternate iSNS server, which can be on a different subnet. The default address is all zeroes.

`isns-ip iSNS-IP`

Optional. Specifies the IP address of an iSNS server. The default address is all zeroes.

`jumbo-frame enabled|disabled|on|off`

Optional. Enables or disables support for jumbo frames. A normal frame can contain 1400 bytes whereas a jumbo frame can contain a maximum of 8900 bytes for larger data transfers. Use of jumbo frames can succeed only if jumbo-frame support is enabled on all network components in the data path. Disabled by default.

`speed auto|1gbps`

Sets the host port link speed.

- auto: Auto-negotiates the proper speed. This is the default.
- 1gbs: Forces the speed to 1 Gbit/s, overriding a downshift that can occur during auto-negotiation with 1-Gbit/s HBAs. This setting does not apply to 10-Gbit/s HBAs.

Examples

For a storage system using IPv4 addressing whose host ports are connected to different subnets, enable CHAP, specify the IP address of the iSNS server on each subnet, and enable registration with either server.

```
# set iscsi-parameters chap enabled isns enabled isns-ip 10.10.10.93 isns-alt-ip 10.11.10.90
```

Specify that iSCSI ports will use IPv6 addressing.

```
# set iscsi-parameters iscsi-ip-version ipv6
```

See also

- [set host-name \(Deprecated\) on page 237](#)
- [show iscsi-parameters on page 363](#)

set job-parameters (Deprecated)

Use [set advanced-settings on page 202](#).

set led

Description

Changes the state of the identification LED on a specified device. LEDs are described in the Setup Guide.

Minimum role

manage

Syntax

To set a disk LED:

```
set led  
disk ID  
enable|disable|on|off
```

To set the LEDs for an enclosure and its I/O modules:

```
set led  
[controller a|b]  
enable|disable|on|off  
enclosure ID
```

To set a drawer LED:

```
set led  
drawer ID  
enable|disable|on|off
```

To set a fan module LED:

```
set led  
enable|disable|on|off  
fan ID
```

Parameters

controller a|b

Optional; for use with the enclosure parameter. Specifies the I/O module to locate. This affects the unit locator LED on the I/O module and on the enclosure's right ear.

disk ID

Specifies the disk to locate. For disk syntax, see [Command Syntax on page 13](#). This affects the fault LED.

drawer ID

Specifies the drawer to locate. This affects the drawer locator LED. For drawer syntax, see [Command Syntax on page 13](#).

enable|disable|on|off

Specifies to set or unset the LED.

enclosure ID

Specifies the enclosure to locate. This affects the unit locator LED on the enclosure's right ear and on each I/O module.

fan ID

Specifies the fan module to locate. This affects the module's locator LED. For fan module syntax, see [Command Syntax on page 13](#).

Examples

```
Identify disk 5 in enclosure 1.  
# set led disk 1.5 on  
  
Stop identifying enclosure 1.  
# set led enclosure 1 off  
  
Identify controller B in enclosure 1.  
# set led enclosure 1 controller b on  
  
Identify drawer 1 in enclosure 1.  
# set led drawer 1.1 on  
  
Identify fan 1 in enclosure 1.  
# set led fan 1.1 on
```

set network-parameters

Description

Sets parameters for controller module network ports.

You can manually set static IP values for each controller, or you can specify that IP values should be set automatically for both controllers through communication with a Dynamic Host Configuration Protocol (DHCP) server.

Each controller has the following factory-default IP settings:

- DHCP: disabled
- Controller A IP address: 10.0.0.2
- Controller B IP address: 10.0.0.3
- IP subnet mask: 255.255.255.0
- Gateway IP address: 10.0.0.1

When DHCP is enabled, the following initial values are set and remain set until the system is able to contact a DHCP server for new addresses.

- Controller IP addresses: 169.254.x.x (where the value of x . x is the lowest 16 bits of the controller serial number)
- IP subnet mask: 255.255.0.0
- Gateway IP address: 0.0.0.0

169.254.x.x addresses (including gateway 169.254.0.1) are on a private subnet that is reserved for unconfigured systems and the addresses are not routable. This prevents the DHCP server from reassigning the addresses and possibly causing a conflict where two controllers have the same IP address. As soon as possible, change these IP values to proper values for your network.

To switch a controller from DHCP addressing to static addressing, you must set the IP address, netmask, and gateway values.

i Note: The following IP addresses are reserved for internal use by the storage system: 192.168.200.253, 192.168.200.254, 172.22.255.253, 172.22.255.254, and 127.0.0.1.

You can also set link speed, auto-negotiation, and duplex-mode parameters to enable Ethernet switches to communicate with the storage system. These settings will persist if the Ethernet cable is disconnected and reconnected, but will revert to default values if the controller is removed from the enclosure. These settings affect only the network port of the controller on which this command is entered.

Minimum role

manage

Syntax

```
set network-parameters
[auto-negotiation enabled|disabled|on|off]
[controller a|b]
[dhcp]
[duplex-mode full|half]
[gateway gateway]
[ip address]
[ipv 4|6]
[link-speed 10mbps|100mbps]
[netmask netmask]
[noprompt]
[ping-broadcast enabled|disabled|on|off]
```

[prompt yes|no]

Parameters

auto-negotiation enabled|disabled|on|off

Optional. For an Ethernet switch this specifies whether to auto-negotiate the link speed.

- enabled or on: Enables auto-negotiation. If you enable auto-negotiation you must also specify the link-speed parameter to set the maximum supported speed for auto-negotiation. Because the controller will choose the proper duplex mode for the negotiated speed, you cannot specify the duplex-mode parameter.

set network-parameters

- `disabled` or `off`: Disables auto-negotiation. If you disable auto-negotiation and don't specify the `link-speed` and `duplex-mode` parameters, the controller will use the current settings of the network port.

If this command is specified and the `auto-negotiation` parameter is omitted, auto-negotiation will be enabled.

`controller a|b`

Optional. For IP-related parameters, this specifies whether to apply settings to controller A or B. If this parameter is omitted, settings are applied to the controller being accessed. This parameter does not apply to Ethernet switch-related parameters, whose settings are always applied to the controller being accessed.

`dhcp`

Optional. Specifies to use DHCP to set both controllers' IP values.

`duplex-mode full|half`

Optional. For an Ethernet switch this specifies the duplex mode.

- `full`: Sets the port to use full duplex. If this parameter is omitted and a port's duplex mode is not set, it will be set to full duplex.
- `half`: Sets the port to use half duplex.

`gateway gateway`

Optional. A gateway IP address for the port.

`ip address`

Optional. An IP address for the port.

`ipv 4|6`

Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing the network ports.

- `4`: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values and the octets are separated by a period; for example, `10.132.2.205`. The first octet may not be zero, with the exception that `0.0.0.0` can be used to disable the interface (stop I/O). This option is the default.
- `6`: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, `0000:0000:0000:0000:0000:0000:0A90:3442`. Not supported.

i Note: IPv6 for controller module network ports is not supported in this release.

`link-speed 10mbps|100mbps`

Optional. For an Ethernet switch this specifies the maximum link speed for auto-negotiation.

- `10mbps`: Sets the link speed to 10 Mb/s.
- `100mbps`: Sets the link speed to 100 Mb/s. If this parameter is omitted and a port's link speed is not set, it will be set to 100 Mb/s.

`netmask netmask`

Optional. An IP subnet mask for the port.

`noprompt`

Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

ping-broadcast enabled|disabled|on|off

Optional. Enables the storage system to respond when a ping to a broadcast address is issued on the system's subnet. The default is Disabled.

prompt yes|no

Optional. For scripting, this specifies an automatic response to the confirmation prompt that appears when an Ethernet switch parameter is changed:

- yes: Allow the command to proceed.
- no: Cancel the command.

If this parameter is omitted, you must manually reply to the prompt.

Examples

Use DHCP to set network port IP values.

```
# set network-parameters dhcp
```

Manually set network port IP values for controller A (disabling DHCP for both controllers, if it was enabled) using IPv4 addressing.

```
# set network-parameters ip 192.168.0.10 netmask 255.255.255.0 gateway  
192.168.0.1 controller a
```

For the controller you are accessing, set the network port to auto-negotiate with a maximum link speed of 100 Mb/s.

```
# set network-parameters auto-negotiation on link-speed 100mbps
```

WARNING: You are attempting to change the Ethernet settings for this Management Controller, which will affect the link speed and duplex mode settings. Are you sure?

For the controller you are accessing, for which auto-negotiation is disabled, set the network port to use a maximum link speed of 10 Mb/s and half-duplex mode.

```
# set network-parameters link-speed 10mbps duplex-mode half
```

WARNING: You are attempting to change the Ethernet settings for this controller, which will affect the link speed and duplex mode settings. Are you sure?

See also

- [show network-parameters on page 373](#)

set ntp-parameters

Description

Sets Network Time Protocol (NTP) parameters for the system. You can manually set system date and time parameters by using the `set controller-date` [on page 215](#) command. You must specify at least one of the optional parameters for the command to succeed.

Minimum role

manage

Syntax

```
set ntp-parameters
 [ntp enabled|disabled|on|off]
 [ntpaddress IP-address]
 [timezone +|-hh[:mm]]
```

Parameters

`ntp enabled|disabled|on|off`

Optional. Enables or disables use of NTP. When NTP is enabled and the specified NTP server is available, each controller's time is synchronized with the server. This is disabled by default.

`ntpaddress IP-address`

Optional. The network address of an available NTP server.

`timezone +|-hh[:mm]`

Optional. The system's time zone as an offset in hours (-12 through +14) and optionally minutes (00–59) from Coordinated Universal Time (UTC). To specify a positive offset, the '+' is optional. To specify a negative offset, the '-' is required. The hour value can have one or two digits and can omit a leading zero. If the minutes value is specified it must have two digits. If it is omitted, the minutes value is set to 00.

Examples

Set the system to use NTP with an offset for the Mountain Time zone.

```
# set ntp-parameters ntp enabled ntpaddress 69.10.36.3 timezone -7
```

Set the system to use NTP with an offset for the Bangalore, India, time zone.

```
# set ntp-parameters ntp enabled ntpaddress 69.10.36.3 timezone +5:30
```

See also

- [set controller-date on page 215](#)
- [show controller-date on page 308](#)
- [show ntp-status on page 375](#)

set password

Description

Sets a user's password for system interfaces (such as the CLI). A password can be entered as part of the command, or the command prompts you to enter and re-enter the new password.

Minimum role

manage

Syntax

```
set password  
[password password]  
[user]
```

Parameters

password password

Optional. Sets a new password for the user. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.

If this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed obscured for security reasons. For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password.

user

Optional. The user name for which to set the password. If this parameter is omitted, this command affects the logged-in user's password.

Examples

Change the password for the default user, manage.

```
# set password manage
Enter new password: *****
Re-enter new password: *****
```

Change the password for user JDoe.

```
# set password JDoe password Abcd%1234
```

See also

- [show users on page 447](#)

set peer-connection

Description

Modifies a peer connection between two systems.

You can use this command to change the name of a current peer connection or to change the port address of the remote system without changing the peer connection configurations. For example, you could configure a peer connection and then move one of the peers to a different network.

You can run this command on either the local system or the remote system.

If you only modify the peer connection name, the network connection is not affected so any running replications will not be interrupted. Otherwise, before modifying a peer connection, you must abort any running replications using that peer connection and then suspend replication sets using that peer connection to prevent any scheduled replications from starting during the operation. After you have modified the peer connection, you can resume the replication set.

Minimum role

manage

Syntax

```
set peer-connection  
  [name new-name]  
  [remote-port-address remote-port-address]  
  peer-connection-ID
```

Parameters

name *new-name*

Optional. A new name for the peer connection. If you specify this parameter you may not specify the remote-port-address parameter. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

remote-port-address *remote-port-address*

Optional. Specifies a new iSCSI IP address for the remote system. If you specify this parameter you may not specify the name parameter.

peer-connection-ID

Specifies the name or serial number of the peer connection to modify.

Examples

```
Connect the current peer connection Peer1 to the remote system's new IP address, 192.168.202.22.  
# set peer-connection remote-port-address 192.168.202.22 Peer1  
  
Rename Peer1 to PeerCon1.  
# set peer-connection name PeerCon1 Peer1
```

See also

- [create peer-connection on page 69](#)
- [delete peer-connection on page 115](#)
- [query peer-connection on page 151](#)
- [show peer-connections on page 376](#)

set pool

Description

Sets parameters for a virtual pool.

Each virtual pool has three thresholds for page allocation as a percentage of pool capacity. You can set the low and middle thresholds. The high threshold is automatically calculated based on the available capacity of the pool minus 200 GB of reserved space.

When the low or middle threshold is exceeded, event 462 is logged with Informational severity. If the high threshold is exceeded and the pool is not overcommitted, event 462 is logged with Informational severity. If the high threshold is exceeded and the pool is overcommitted, event 462 is logged with Warning severity. When pool usage falls back below any threshold, event 463 is logged with Informational severity.

i Note: If the pool size is small (approximately 500 GB) and/or the middle threshold is relatively high, the high threshold may not guarantee 200 GB of reserved space in the pool. The controller will not automatically adjust the low and middle thresholds in such cases.

You can also set `overcommit`, which controls whether the pool uses thin provisioning. If you try to disable `overcommit` and the total space allocated to thin-provisioned volumes exceeds the physical capacity of their pool, an error will state that there is insufficient free disk space to complete the operation and `overcommit` will remain enabled. If your system has a replication set, the pool might be unexpectedly overcommitted because of the size of the internal snapshots of the replication set. To check if the pool is overcommitted, view the `over-committed` and `over-committed-numeric` properties shown by the [show pools on page 378](#) command in XML API mode. You can also view the Pool Overcommitted value in the SMC, as described in help for the Pools topic.

Minimum role

manage

Syntax

```
set pool
 [low-threshold #%]
 [middle-threshold #%]
 [overcommit enabled|disabled|on|off]
 pool
```

Parameters

`low-threshold #%`

Optional. Sets the low threshold for page allocation as a percentage of pool capacity. This value must be

less than the middle-threshold value. The default low-threshold value is 25%.

`middle-threshold` `##`

Optional. Sets the middle threshold for page allocation as a percentage of pool capacity. This value must be between the low-threshold value and the high-threshold value. The default middle-threshold value is 50%.

`overcommit` `enabled|disabled|on|off`

Optional.

- `enabled` or `on`: The pool will use thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool. When stored data approaches the limit of physical capacity, the administrator can add more enclosures to the system. This is the default.
- `disabled` or `off`: The pool will use full provisioning, which means that the capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.

i Note: If you try to disable overcommit and the total space allocated to thin-provisioned volumes exceeds the physical capacity of their pool, an error will say that there is insufficient free disk space to complete the operation and overcommit will remain enabled.

`pool`

The name of the storage pool for which to change settings.

Examples

For pool A, set the low threshold to 30%.

```
# set pool low-threshold 30% A
```

For pool B, disable overcommit.

```
# set pool overcommit off B
```

See also

- [delete pools on page 116](#)
- [show pools on page 378](#)

set priorities

Description

Sets snapshot-retention priorities for a specified snap pool. This command applies to linear storage only.

Snap-pool priorities, in conjunction with snapshot priorities, determine which snapshots are retained if system resource limitations require some snapshots to be automatically deleted.

Lower-priority snapshots will be deleted before higher-priority snapshots. Priority values are 0x0001–0xffff (1–65535). You can enter either decimal or hexadecimal values. To use a default priority, specify the value 0.

Set a unique retention priority for each type of snapshot.

Minimum role

manage

Syntax

```
set priorities
[common-sync-point #]
[drm-snapshot #]
[only-sync-point #]
[queued #]
[replicating #]
[replication-snap #]
[standard-snap #]
[volume-copy #]
snap-pool
```

Parameters

common-sync-point #

Optional. The retention priority for the latest snapshot that is copy complete on all secondary volumes. It identifies a common point in time that is known by all destinations. The default is 0x8000 (32768).

drm-snapshot #

Optional. The retention priority for a temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM). The default is 0xB000 (45056).

only-sync-point #

Optional. The retention priority for the only sync point that is available on at least one secondary volume. If this snapshot is removed, then the next replication requires a full sync to be performed. The default is 0xe000 (57344).

queued #

Optional. The retention priority for a snapshot that was taken for remote replication but is queued waiting for the previous replications to complete. The default is 0x2000 (8192).

replicating #

Optional. The retention priority for a snapshot that is being replicated to a secondary volume. This snapshot is required in order to resume the replication. The attribute is temporary for the duration of the replication process. The default is 0xc000 (49152).

replication-snap #

Optional. The retention priority for a replication snapshot. The default is 0x4000 (16384).

standard-snap #

Optional. The retention priority for a standard snapshot. The default is 0x6000 (24576).

volume-copy #

Optional. The retention priority for a snapshot that is being used to copy data from a source volume to a destination volume. This attribute is temporary for the duration of the volume-copy process. The default is 0xa000 (40960).

snap-pool

The name or serial number of the snap pool.

Examples

Set attribute priorities for snap pool SP1, raising the priority for standard snapshots and leaving other priorities unchanged.

```
# set priorities only-sync-point 65535 SP1
```

See also

- [set syslog-parameters on page 278](#)
- [show snap-pools on page 421](#)

set prompt

Description

Sets the prompt for the current CLI session. This setting does not persist beyond the current session.

Minimum role

manage

Syntax

```
set prompt  
prompt
```

Parameters

prompt

The new prompt. Input rules:

- The value is case sensitive.
- The value can have a maximum of 16 characters.
- The value can include printable UTF-8 characters except: " < \
- A value that includes a space must be enclosed in double quotes.

Examples

Change the prompt from "# " to "CLI\$ " and start entering a show command.

```
# set prompt "CLI$ "
```

```
Success: Command completed successfully. (2014-07-17 16:44:25)
```

```
CLI$ show ...
```

set protocols

Description

Enables or disables management services and protocols. In console format, if you enable an unsecured protocol the command will prompt for confirmation.

Minimum role

manage

Syntax

```
set protocols  
[activity enabled|disabled|on|off]  
[debug enabled|disabled|on|off]  
[ftp enabled|disabled|on|off]  
[http enabled|disabled|on|off]  
[https enabled|disabled|on|off]
```

```
[management-mode v2|v3]
[ses enabled|disabled|on|off]
[smis enabled|disabled|on|off]
[snmp enabled|disabled|on|off]
[ssh enabled|disabled|on|off]
[telnet enabled|disabled|on|off]
[usmis enabled|disabled|on|off]
```

Parameters

`activity enabled|disabled|on|off`

Optional. Enables or disables access to the activity progress interface via HTTP port 8081. This mechanism reports whether a firmware update or partner firmware update operation is active and shows the progress through each step of the operation. In addition, when the update operation completes, status is presented indicating either the successful completion, or an error indication if the operation failed. This is disabled by default.

`debug enabled|disabled|on|off`

Optional. Enables or disables debug capabilities, including Telnet debug ports and privileged diagnostic user IDs. This is disabled by default.

`ftp enabled|disabled|on|off`

Optional. Enables or disables the expert interface for updating firmware. This is enabled by default.

`http enabled|disabled|on|off`

Optional. Enables or disables the standard Disk Management Utility web server. This is disabled by default.

`https enabled|disabled|on|off`

Optional. Enables or disables the secure Disk Management Utility web server. This is enabled by default.

`management-mode v2|v3`

Optional. Sets the default management mode for the system.

- `v2`: Specifies to use the legacy Disk Management Utility interface to manage linear storage, and to use terminology in CLI output and system messages that is oriented to managing a linear system, such as *vdisk* for disk groups and pools. This is the default for a system that has been upgraded from a previous release.
- `v3`: Specifies to use the new Disk Management Utility interface to manage virtual and linear storage, and to use terminology in CLI output and system messages that is oriented to managing a hybrid (linear and virtual) system, such as *disk group* for disk groups and *pool* for pools. This is the default for a new installation.

To change the management mode for the current CLI session only, use the `set cli-parameters` command.

`ses enabled|disabled|on|off`

Optional. Enables or disables the in-band SCSI Enclosure Management Services interface. This is enabled by default.

`smis enabled|disabled|on|off`

Optional. Enables or disables the secure Storage Management Initiative Specification interface (SMI-S)

interface. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTPS port 5989. HTTPS port 5989 and HTTP port 5988 cannot be enabled at the same time, so enabling this option will disable port 5988. This is enabled by default.

`snmp enabled|disabled|on|off`

Optional. Enables or disables the Simple Network Management Protocol interface. Disabling this option disables all SNMP requests to the MIB and disables SNMP traps. To configure SNMP traps use the [set snmp-parameters on page 276](#) command. This is enabled by default.

`ssh enabled|disabled|on|off`

Optional. Enables or disables the secure shell CLI. This is enabled by default.

`telnet enabled|disabled|on|off`

Optional. Enables or disables the standard CLI. This is enabled by default.

`usmis enabled|disabled|on|off`

Optional. Enables or disables the unsecure Storage Management Initiative Specification (SMI-S) interface. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988. HTTP port 5988 and HTTPS port 5989 cannot be enabled at the same time, so enabling this option will disable port 5989. This is disabled by default.

Examples

Disable unsecure HTTP connections and enable FTP.

```
# set protocols http disabled ftp enabled
```

Enable Telnet, which is an unsecured protocol.

```
# set protocols telnet enabled
```

Set the default management mode to v3.

```
# set protocols management-mode v3
```

See also

- [set cli-parameters on page 212](#)
- [show protocols on page 393](#)

set remote-system

Description

Changes remote-system credentials stored in the local system. This command applies to linear storage only.

Do this when the user name or password to access a remote system has been changed in that system.

Minimum role

manage

Syntax

```
set remote-system  
[password password]  
[username username]  
  
system
```

Parameters

password password

Optional. The new password to access the remote system. The value is displayed in clear text.

username username

Optional. The new user name to access the remote system.

system

The name or network-port IP address of the remote system.

Examples

```
Change the password that is stored to access a remote system.  
# set remote-system password Abc_123 System2
```

See also

- [create remote-system on page 71](#)
- [delete remote-system on page 118](#)
- [remote on page 156](#)
- [show remote-systems on page 401](#)

set replication-primary-volume

Description

Changes the primary volume for a replication set. This command applies to linear storage only.

You must issue this command to each volume in the replication set. If the volumes in a replication set have different primary-volume settings — for example, if the primary volume was changed while one volume was offline — this results in a primary-volume conflict. Change the primary volume on the secondary system, then, if possible, change the primary volume on the primary system.

As part of this command, you can initiate a rollback to a specified snapshot to synchronize the new primary volume with a known data image.

When the secondary volume becomes the primary volume, it only retains the replication images that the primary volume had and deletes any images that the primary volume did not have. Because the secondary volume may not have successfully replicated all the images associated with the primary volume, the secondary volume might have a subset of the primary volume's images.

Minimum role

manage

Syntax

```
set replication-primary-volume  
[nowait]  
primary-volume replication-volume  
[set replication-set]  
[snapshot snapshot]  
volume replication-volume
```

Parameters

nowait

Optional. Changing the primary volume can take the Storage Controller several minutes to complete. This parameter allows that processing to continue in the background so the Management Controller can process other commands.

primary-volume replication-volume

The name or serial number of the replication volume to designate as the new primary volume for the replication set. If the name is not unique, you must specify the serial number.

set replication-set

Optional. The name or serial number of the replication set.

set replication-primary-volume

snapshot snapshot

Optional. The name or serial number of a snapshot to roll the replication volume data back to.

volume replication-volume

The name or serial number of a volume in the replication set whose primary volume you want to change. If one of the volumes in the replication set is offline, this must specify the volume that remains online. If the name is not unique across replication sets, specify the set parameter.

Examples

For this example, assume that:

- Replication set RS has the primary volume Data and the secondary volume rData.
- Primary volume Data resides in the primary system, System1.
- Secondary volume rData resides in the secondary system, System2.

On System1, view the status of replication set RS.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local Data ... Online
rData ... Online ... Remote Data ... Online
```

On System1, unmap the primary volume from hosts.

On System2, set secondary volume rData to be the primary volume.

```
# set replication-primary-volume volume rData primary-volume rData
Info: Started setting the primary volume of the replication set. (RS)
Info: Setting the primary volume of the replication set. This may take a
couple of minutes... (RS)
Info: Successfully set primary volume: (rData)
Info: The primary volume of the replication set was changed. (RS)
Success: Command completed successfully. (2012-13-23 11:48:30)
```

On System2, view the set's status and notice that the primary volume has changed and that a primary-volume conflict exists.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Remote Data ... Conflict
rData ... Online ... Local rData ... Conflict
```

On System1, view the set's status and notice that it does not reflect the primary-volume change, thereby causing the conflict.

```
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local Data ... Conflict
rData ... Online ... Remote Data ... Conflict

On System1, as already done on System2, set rData to be the primary volume.
# set replication-primary-volume volume Data primary-volume rData
Info: Started setting the primary volume of the replication set. (RS)
Info: Setting the primary volume of the replication set. This may take a
couple of minutes... (RS)
Info: Successfully set primary volume: (rData)
Info: The primary volume of the replication set was changed. (RS)
Success: Command completed successfully. (2012-13-23 11:55:50)

On System1 (the new secondary system), view the set's status and notice that the system is set to use
the new primary volume and the conflict is resolved.
# show replication-sets RS
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local rData ... Online
rData ... Online ... Remote rData ... Online

Wait a couple of minutes for processing to complete. Then, on System2 (the new primary system), view
the set's status and notice that the system is set to use the new primary volume and that the conflict is
resolved:
# show replication-sets
Replication Set [Name (RS) Serial Number (SN) ] Primary Volume:
Name ... Status ... Location Primary-Volume ... Primary-Volume-Status
-----
Data ... Online ... Local rData ... Online
rData ... Online ... Remote rData ... Online

Map the new primary volume to hosts.
```

See also

- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)
- [show snapshots on page 425](#)
- [unmap volume on page 492](#)

set replication-set

Description

Changes the name of a replication set.

Though volume membership of a replication cannot change for the life of the replication set, you can change the name of the replication set.

You can run this command on either the primary or secondary system.

Minimum role

manage

Syntax

```
set replication-set
  name new-name
  current-replication-set-ID
```

Parameters

name *new-name*

Specifies a new name for the replication set. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

current-replication-set-ID

Specifies the current name or serial number of the replication set for which to change the name.

Examples

```
Rename the replication set Rep1 to RepSet1.
# set replication-set name RepSet1 Rep1
```

See also

- [create replication-set on page 72](#)
- [delete replication-set on page 119](#)
- [resume replication-set on page 189](#)
- [show replication-sets on page 405](#)
- [suspend replication-set](#)

set replication-volume-parameters

Description

Sets parameters for a specified replication volume. This command applies to linear storage only.

This command must be run separately on each system where the volume resides; changes to these parameters are not automatically synchronized across systems.

Minimum role

manage

Syntax

```
set replication-volume-parameters
[link-type FC|iSCSI]
[max-queue #]
[max-retry-time #]
[monitor-interval #]
[on-collision newest|oldest]
[on-error retry|suspend]
[priority low|medium|high]
[remote-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs]
[set replication-set]
replication-volume
```

Parameters

`link-type FC|iSCSI`

Optional. Specifies the type of ports being used for the inter-system link:

- `FC`: FC ports.
- `iSCSI`: iSCSI ports.

`max-queue #`

Optional. The number of replication images to consider when determining the next image to replicate: 1–64. Used only if the `on-collision` parameter is set to `oldest`.

`max-retry-time #`

Optional; valid only if the `on-error` parameter is set to `retry`. Maximum time in seconds to retry a single replication if an error occurs. Allowed values are 0–64000. A value of 0 means do not time out retries (retry forever). By default, a retry will occur 5 minutes after an error occurs. If another error occurs and the difference in time between when the error occurs and the initial retry time is greater than the `max-retry-time` value, the replication will be suspended. In order to prevent a replication set from suspending when multiple independent, discontinuous errors occur during a single replication, set `max-retry-time` for the secondary volume either to 0 (retry forever) or to 60 minutes for each 10GB of volume size. The default is 1800 (30 minutes).

`monitor-interval #`

Optional. The interval in seconds at which the primary volume should query the secondary volume. Values less than 300 (5 minutes) or greater than 1800 (30 minutes) are not recommended.

`on-collision newest|oldest`

Optional. The collision policy to use when the image queue depth is met:

- `newest`: Only the latest replication image should be considered for the next replication operation.
- `oldest`: Only the latest *N* replication images should be considered for the next replication operation, where *N* is defined by the `max-queue` parameter and the oldest of these images should be considered first.

`on-error retry|suspend`

Optional. The error policy to use when errors occur during the replication process:

- `retry`: Retry the operation for the time specified in the `max-retry-time` parameter.
- `suspend`: Suspend the replication operation.

`priority low|medium|high`

Optional. The priority of the replication process for the replication volume: low, medium, or high.

`remote-address ip=IPs|wwnn=WWNNs|wwpn=WWPNs`

Optional. The host port addresses associated with a replication volume. For the secondary system on which the command is run, you can specify host ports by IP address, World Wide Node Name, or World Wide Port Name. An IP address value can include a port number. For example, 10.134.11.10:3260. Multiple values must be separated by commas and no spaces. For example: `ip=10.134.2.1,10.134.2.2`.

`set replication-set`

Optional. The name or serial number of the replication set. A name that includes a space must be enclosed in double quotes.

`replication-volume`

The name or serial number of the replication volume. If the name is not unique within the replication set, the

local volume is assumed. If the name is not unique across replication sets, specify the set parameter. A name that includes a space must be enclosed in double quotes.

Examples

Set a new remote address and error policy for replication volume MV2 in replication set RS1.

```
# set replication-volume-parameters remote-address ip=10.1.66.55 on-error suspend  
set RS1 MV2
```

Assume you changed the addresses of host ports in secondary system Site2, which contains secondary volume rData. To update this address information for the replication set, run `set replication-volume-parameters` on the secondary system, specifying the secondary system's new addresses and the name of the secondary volume.

```
# set replication-volume-parameters remote-address  
ip=10.20.5.27,10.30.5.27,10.20.5.37,10.30.5.37 rData
```

See also

- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)

set schedule

Description

Changes parameters for a specified schedule. If you want to change the schedule name, create a new schedule to replace the existing one. You must specify at least one of the optional parameters for the command to succeed.

For linear storage, schedule no more than three volumes to start replicating at the same time, and for those replications to recur no less than 60 minutes apart. If you schedule more replications to start at the same time, or schedule replications to start more frequently, some scheduled replications may not have time to complete.

You can schedule a replication task on the primary system only.

Virtual replication tasks are not queued: if a replication task is running and the time comes for that replication task to start again, that task will be skipped, though it will be counted against the schedule's count constraint (if set).

Minimum role

manage

Syntax

```
set schedule  
[schedule-specification "specification"]  
[task-name task-name]  
  
schedule-name
```

Parameters

`schedule-specification` "*specification*"

Optional. Defines when the task will first run, and optionally when it will recur and expire. You can use a comma to separate optional conditions. Dates cannot be in the past. For times, if neither AM nor PM is specified, a 24-hour clock is used.

- `start yyyy-mm-ddhh:mm [AM|PM]`
Specifies a date and a time in the future to be the first instance when the scheduled task will run, and to be the starting point for any specified recurrence.
- `[every # minutes|hours|days|weeks|months|years]`
Specifies the interval at which the task will run.
For better performance when scheduling a TakeSnapshot task that will run under heavy I/O conditions or on more than three volumes, the retention count and the schedule interval should be set to similar values. For example if the retention count is 10, then the interval should be set to 10 minutes.
For a ReplicateVolume task, the minimum interval is 30 minutes.
- `[between hh:mm [AM|PM] and hh:mm [AM|PM]]`
Constrains the time range during which the task is permitted to run. Ensure that the start time is within the specified time range.
- `[only any|first|second|third|fourth|fifth|last|#st|#nd|#rd|#th weekday|weekendday|Sunday|Monday|Tuesday|Wednesday|Thursday|Friday|Saturday of year|month|January|February|March|April|May|June|July |August|September|October|November|December]`
Constrains the days or months when the task is permitted to run. Ensure that this constraint includes the start date.
- `[count #]`
Constrains the number of times the task is permitted to run.
- `[expires yyyy-mm-ddhh:mm [AM|PM]]`
Specifies when the schedule expires, after which the task will no longer run.

i Note: If tasks are scheduled close together, the end of one task may overlap the next task. If this happens, a task may not complete.

task-name *task-name*

Optional. The name of an existing task to run. A name that includes a space must be enclosed in double quotes.

schedule-name

The name of the schedule to change. A name that includes a space must be enclosed in double quotes.

Examples

Change parameters, including the associated task, for schedule Sched1.

```
# set schedule schedule-specification "start 2015-01-01 00:01 every 1 days  
expires 2015-12-31 00:01" task-name Task1 Sched1
```

See also

- [show schedules on page 416](#)
- [show task-details \(Deprecated\) on page 435](#)

set snap-pool-policy

Description

Sets the recovery policy that determines the action taken when a specified snap pool's error and critical threshold levels are reached. This command applies to linear storage only.

The policy for the warning threshold is preset to `notifyonly`.

- i Note:** The policies `deleteoldestsnapshot` and `deletesnapshots` do not apply business logic to the delete decision and may delete snapshots that are mounted/presented/mapped or modified. You may set retention priorities for a snap pool as a way of suggesting that some snapshots are more important than others, but these priorities do not ensure any specific snapshot is protected.

Minimum role

manage

Syntax

```
set snap-pool-policy  
[autoexpansionsize size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]]  
[critical deleteoldestsnapshot|deletesnapshots|haltwrites]  
[error autoexpand|deleteoldestsnapshot|deletesnapshots|haltwrites|notifyonly]  
snap-pool
```

Parameters

autoexpansionsize size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]

The amount by which the snap pool will be automatically expanded when the threshold level is reached. The unit is optional (B represents bytes). If base 2 is in use, whether you specify a base-2 or base-10 unit, the resulting size will be in base 2. If no unit is specified, the default is 512-byte blocks.

critical deleteoldestsnapshot|deletesnapshots|haltwrites

Optional. Specifies the policy to invoke when the critical threshold level of snap-pool usage is reached.

error autoexpand|deleteoldestsnapshot|deletesnapshots|haltwrites|notifyonly

Optional. The policy to invoke when the error threshold level of snap-pool usage is reached.

- **autoexpand**: Automatically expand the snap pool using the autoexpansionsize value. If the snap pool's space usage reaches the percentage specified by its error threshold, the system will log Warning event 230 and will try to automatically expand the snap pool by the snap pool's autoexpansionsize value (below).
 - If the snap pool is successfully expanded, the system will log Informational event 444.
 - If the snap pool cannot be expanded because there is not enough available space in its vdisk, the system will log Warning event 444 and will automatically delete the oldest snapshot that is not a current sync point.

Each time the snap-pool's error threshold is reached and the system cannot auto-expand the vdisk, the oldest remaining snapshot (that is not a current sync point) will be deleted. This behavior occurs for each snap pool independently, based on its space usage.

- **deleteoldestsnapshot**: Delete the oldest snapshot.
- **deletesnapshots**: Delete all snapshots.
- **haltwrites**: Halt writes to all master volumes and snapshots associated with the snap pool.
- **notifyonly**: Generates an event to notify the administrator.

snap-pool

The name or serial number of the snap pool for which to set the policy. A name that includes a space must be enclosed in double quotes.

Examples

```
Set snap pool SP1 to automatically expand by 10 GB when its error threshold is reached.  
# set snap-pool-policy error autoexpand autoexpansionsize 10GB SP1
```

See also

- [set priorities on page 256](#)
- [set snap-pool-threshold below](#)
- [show snap-pools on page 421](#)

set snap-pool-threshold

Description

Sets the percentages of snap-pool space used that trigger the warning and error threshold policies. This command applies to linear storage only.

Three thresholds are defined:

- **Warning:** The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator.
- **Error:** The snap pool is nearly full and unless corrective action is taken, snapshot data loss is probable. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.
- **Critical:** The snap pool is 98% full and data loss is imminent. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.

The recommended minimum size for a snap pool is 50 GB.

Minimum role

manage

Syntax

```
set snap-pool-threshold
```

```
[error #%]  
[warning #%]  
snap-pool
```

Parameters

error #%

The percent of snap-pool space used that triggers the error threshold policy. This value must be less than 98%. The default is 90%.

warning #%

The percent of snap-pool space used that triggers the warning threshold policy. This value must be less than the error threshold value. The default is 75%.

snap-pool

The name or serial number of the snap pool for which to set the threshold. A name that includes a space must be enclosed in double quotes.

Examples

```
Set the warning and error thresholds for snap pool SP1.  
# set snap-pool-threshold warning 60% error 85% SP1
```

See also

- [set snap-pool-policy on page 271](#)
- [show snap-pools on page 421](#)

set snapshot-space

Description

Sets the snapshot space usage as a percentage of the pool and thresholds for notification.

You can set the percent of the pool that can be used for snapshots (the snapshot space).

i Note: If the percentage of the pool used by snapshots is higher than the percentage specified in this command, the command will fail.

You can specify a limit policy to enact when the snapshot space reaches the percentage. You can set the policy to either notify you via the event log that the percentage has been reached (in which case the system continues to take snapshots, using the general pool space), or to notify you and trigger automatic deletion of snapshots. If automatic deletion is triggered, snapshots are deleted according to their configured retention priority. Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.

The system generates events when the percentage of snapshot space used crosses low, middle, or high thresholds. The event is generated when the percentage exceeds or drops below the threshold. You can set the percentages for the thresholds.

Minimum role

manage

Syntax

```
set snapshot-space
  [high-threshold percent-of-snap-space%]
  [limit percent-of-pool%]
  [limit-policy notify-only|delete]
  [low-threshold percent-of-snap-space%]
  [middle-threshold percent-of-snap-space%]
  pool A|B
```

Parameters

high-threshold percent-of-snap-space%

Optional. Specifies a percentage of the snapshot space for the high threshold. Enter a value from 1% to 100%. It must be greater than or equal to the middle threshold. The default is 99%. When this threshold is exceeded, event 571 is logged with Warning severity.

limit percent-of-pool%

Optional. Specifies the snapshot space. Enter a value from 1% to 100%. The default is 10%.

limit-policy notify-only|delete

Optional. Specifies the limit policy for when the percentage of the pool designated for snapshots is reached.

- **notify-only:** When the snapshot space is reached an event is generated and logged. This is the default.
- **delete:** When the snapshot space is reached an event is generated and logged and automatic deletion of snapshots occurs.

low-threshold percent-of-snap-space%

Optional. Specifies a percentage of the snapshot space for the low threshold. Enter a value from 1% to 100%. The default is 75%. When this threshold is exceeded, event 571 is logged with Informational severity.

middle-threshold percent-of-snap-space%

Optional. Specifies a percentage of the snapshot space for the middle threshold. Enter a value from 1% to 100%. It must be greater than or equal to the low threshold. The default is 90%. When this threshold is exceeded, event 571 is logged with Informational severity.

pool A|B

The pool for which to create the snapshot space usage.

Examples

For pool A, limit the maximum amount of pool space that can be occupied by snapshot data to 15%, set the middle-threshold warning event to be logged when 85% of that space has filled, and set a policy to automatically delete snapshots (per deletion rules) when the 15% limit is reached.

```
# set snapshot-space pool A limit 15% middle-threshold 85% limit-policy delete
```

See also

- [show snapshot-space on page 424](#)
- [show pools on page 378](#)

set snmp-parameters

Description

Sets SNMP parameters for event notification. To enable or disable SNMP requests to the MIB use the [set protocols on page 259](#) command.

Minimum role

manage

Syntax

```
set snmp-parameters  
[add-trap-host address]  
[del-trap-host address]  
[enable crit|error|warn|info|none]
```

```
[read-community string]
[trap-host-list trap-host-list]
[write-community string]
```

Parameters

`add-trap-host address`

Optional. Specifies the IP address of a destination host that will receive traps. Three trap hosts can be set.

`del-trap-host address`

Optional. Deletes a trap destination host.

`enable crit|error|warn|info|none`

Optional. Sets the level of trap notification:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: All events are excluded from trap notification and traps are disabled. This is the default. However, Critical events and managed-logs events 400–402 are sent regardless of the notification setting.

`read-community string`

Optional. Sets a community string for read-only access. This string must differ from the write-community string. Input rules:

- The value is case sensitive.
- The value can have a maximum of 31 bytes, where ASCII characters are 1 byte.
- The value can include any character except: " < >
- A value that includes a space must be enclosed in double quotes.

`trap-host-list trap-hosts`

Optional. Replaces the current list.

`write-community string`

Optional. Sets a community string for write access. This string must differ from the read-community string. Input rules:

- The value is case sensitive.
- The value can have a maximum of 31 bytes, where ASCII characters are 1 byte.
- The value can include any character except: " < >
- A value that includes a space must be enclosed in double quotes.

Examples

```
Enable Critical events only, specify a trap host, and set the community string for read-only access.  
# set snmp-parameters enable crit add-trap-host 172.22.4.171 read-community  
public
```

See also

- [set protocols on page 259](#)
- [show snmp-parameters on page 428](#)
- [test on page 483](#) (with the `snmp` parameter)

set spares (Deprecated)

Use [add spares on page 45](#) or [remove spares on page 163](#).

set syslog-parameters

Description

Sets remote syslog notification parameters for events and managed logs. This allows events to be logged by the syslog of a specified host computer. Syslog is a protocol for sending event messages across an IP network to a logging server.

Minimum role

manage

Syntax

```
set syslog-parameters  
[host-ip IP-address]
```

```
[host-port port-number]  
notification-level crit|error|warn|info|none
```

Parameters

host-ip IP-address

Optional. An IP address for the host. If **notification-level** is other than **none**, **host-ip** must be specified.

host-port port-number

Optional. A specific port number on the host.

notification-level crit|error|warn|info|none

The minimum severity for which the system should send notifications:

- **crit**: Sends notifications for Critical events only.
- **error**: Sends notifications for Error and Critical events.
- **warn**: Sends notifications for Warning, Error, and Critical events.
- **info**: Sends notifications for all events.
- **none**: Disables syslog notification.

If **notification-level** is other than **none**, **host-ip** must be specified.

Examples

Set the system to send an entry to the remote server at 10.1.1.10 on port 514 when a critical event occurs.

```
# set syslog-parameters notification-level crit host-ip 10.1.1.10 host-port 514
```

See also

- [show syslog-parameters on page 430](#)
- [test on page 483](#)

set system

Description

Sets the system's name, contact person, location, and description. The name, location, and contact are included in event messages. All four values are included in system debug logs for reference by service personnel. When using the Disk Management Utility, the system name appears in the browser title bar or tab.

Input rules for each value:

- The value is case sensitive.
- The value can have a maximum of 79 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " < > \
- A value that includes a space must be enclosed in double quotes.

Minimum role

manage

Syntax

```
set system  
[contact value]  
[info value]  
[location value]  
[name value]
```

Parameters

contact value

Optional. The name of the person who administers the system.

info value

Optional. A brief description of what the system is used for or how it is configured.

location value

Optional. The location of the system.

name value

Optional. A name to identify the system.

Examples

```
Set the system name to Test and the contact to J. Doe.  
# set system name Test contact "J. Doe"
```

See also

- [show system on page 431](#)

set task

Description

Changes parameters for a TakeSnapshot, ReplicateVolume, or VolumeCopy task. For these types of tasks, you can change parameters other than name, type, or associated volumes. If you change the parameters for a running task, the changes will take effect the next time the task runs.

If you want to change parameters for a ResetSnapshot task or the name, type, or associated volumes for another type of task, create a new task to replace the existing one.

Minimum role

manage

Syntax

```
set task  
[dest-prefix prefix]  
[dest-vdisk vdisk]  
[modified-snapshot yes|no]  
[replication-mode new-snapshot|last-snapshot]  
[retention-count #]  
[snapshot-prefix prefix]  
  
name
```

Parameters

`dest-prefix` *prefix*

Optional. A label to identify the volume copy created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1426 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`dest-vdisk` *vdisk*

Optional. The name or serial number of the destination `vdisk` for the volume copy. A name that includes a space must be enclosed in double quotes.

`modified-snapshot` *yes|no*

Optional. For a `VolumeCopy` task, specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot.

- `yes`: Include modified snapshot data.
- `no`: Exclude modified snapshot data.

If this parameter is omitted for a snapshot, modified snapshot data is excluded.

`replication-mode` *new-snapshot|last-snapshot*

Optional. Specifies whether to replicate a new snapshot of the volume to the remote system, or to replicate the last (most recent existing) snapshot of the volume to the remote system.

- `new-snapshot`: Replicate a new snapshot.
- `last-snapshot`: Replicate the most recent existing snapshot.

If this parameter is omitted, a new snapshot is replicated.

`retention-count` *#*

Optional. For a `TakeSnapshot` task this parameter specifies the number of snapshots created by this task to retain, from 1 to the licensed limit. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted. If you reduce the retention count for a task, excess snapshots will be removed the next time the task runs.

For a `ReplicateVolume` task this parameter specifies the number of replication images created by this task to retain, from 2 to 32. When a new image exceeds this limit, the oldest image with the same prefix is deleted. This parameter applies to the primary volume and the secondary volume.

`snapshot-prefix` *prefix*

Optional. A label to identify snapshots created by this task. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1426 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`name`

The name of the task to change. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Change parameters for a TakeSnapshot-type task named Snap.

```
# set task snapshot-prefix VD1v1 retention-count 2 Snap
```

Change parameters for a VolumeCopy-type task named Copy.

```
# set task dest-vdisk VD3 dest-prefix VD1v1 modified-snapshot no Copy
```

Change parameters for a ReplicateVolume-type task named Replicate:

```
# set task snapshot-prefix VD1v2 replication-mode last-snapshot Replicate
```

See also

- [create task on page 83](#)
- [delete task on page 125](#)
- [set schedule on page 269](#)
- [show schedules on page 416](#)
- [show task-details \(Deprecated\) on page 435](#)

set user

Description

Changes user preferences for the session or permanently. The system requires at least one CLI user with the manage role to exist.

A user with the manage role can change any parameter except name. A user with the monitor role can change any parameter for that user except name, roles, and interfaces.

i Note: User changes take effect when the user next logs in.

Minimum role

monitor

Syntax

```
set user
[authentication-type MD5|SHA|none]
[base 2|10]
[interfaces interfaces]
[locale Arabic|ar|Portuguese|br|English|en|Spanish|es|French|fr|German|de
|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Russian|ru|Chinese-simplified
|zh-s|Chinese-traditional|zh-t]
[password password]
[precision #]
[privacy-password encryption-password]
[privacy-type DES|AES|none]
[roles roles]
[session-preferences]
[storage-size-base 2|10]
[storage-size-precision #]
[storage-size-units auto|MB|GB|TB]
[temperature-scale celsius|c|fahrenheit|f]
[timeout #]
[trap-host IP-address]
[type novice|standard|advanced|diagnostic]
[units auto|MB|GB|TB]

name
```

Parameters

authentication-type MD5|SHA|none

Optional. For an SNMPv3 user, this specifies whether to use a security authentication protocol. This parameter requires the password parameter and, for the snmptarget interface, the trap-host parameter.

- MD5: MD5 authentication. This is the default.
- SHA: SHA (Secure Hash Algorithm) authentication.
- none: No authentication.

base 2|10

Optional. Sets the base for entry and display of storage-space sizes:

- 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. In base 2 when you set a size, whether you specify a base-2 or base-10 size unit, the resulting size will be in base 2.

set user

- 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. In base 10 when you set a size, the resulting size will be in the specified unit. This option is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

interfaces interfaces

Optional. Specifies the interfaces that the user can access. Multiple values must be separated by commas and no spaces. A command that specifies `snmpuser` or `snmptarget` cannot also specify a non-SNMP interface.

- `cli`: Command-line interface. This is enabled by default.
- `wbi`: Web-browser interface (the Disk Management Utility). This is enabled by default.
- `ftp`: FTP interface.
- `smis`: Storage Management Initiative Specification (SMI-S) interface.
- `snmpuser`: Allows an SNMPv3 user to view the SNMP MIB.
- `snmptarget`: Allows an SNMPv3 user to receive SNMP trap notifications. This option requires the `trap-host` parameter.
- `none`: No interfaces.

locale Arabic|ar|Portuguese|br|English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean|ko|Dutch|nl|Russian|ru|Chinese-simplified|zh-s|Chinese-traditional|zh-t

Optional. The display language. The default is English.

password password

Optional in console format; required for XML API format. Input rules:

- The value is case sensitive.
- The value can have 8–32 characters.
- The value can include printable UTF-8 characters except a space or: " , < > \
- A value that includes only printable ASCII characters must include at least one uppercase character, one lowercase character, and one non-alphabetic character.
- For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password.

precision #

Optional. Sets the number of decimal places (1–10) for display of storage-space sizes. The default is 1.

privacy-password *encryption-password*

Optional. For an SNMPv3 user whose `privacy-type` parameter is set to use encryption, this specifies the encryption password. The value is case sensitive and must contain 8–32 characters. A password cannot contain the following characters: angle brackets, backslash, comma, double quote, single quote, or space. If the password contains only printable ASCII characters then it must contain at least one uppercase character, one lowercase character, and one non-alphabetic character.

privacy-type DES|AES|none

Optional. For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the `privacy-password` parameter and the `authentication-type` parameter.

set user

- DES: Data Encryption Standard.
- AES: Advanced Encryption Standard.
- none: No encryption. This is the default.

roles *roles*

Optional. Specifies the user's roles as one or more of the following values:

- monitor: User can view but not change system settings. This is the default.
- manage: User can view and change system settings.
- diagnostic: User can view and change system settings.

Multiple values must be separated with a comma (with no spaces). If multiple values are specified, the user's access to commands will be determined by the highest role specified.

session-preferences

Optional. Specifies that the current CLI settings will become permanent settings for the user. This parameter cannot be combined with any other parameter.

storage-size-base 2|10

Optional. Alias for base.

storage-size-precision #

Optional. Alias for precision.

storage-size-units auto|MB|GB|TB

Optional. Alias for units.

temperature-scale celsius|c|fahrenheit|f

Optional. Sets the scale for display of temperature values:

- fahrenheit or f: Temperatures are shown in degrees Fahrenheit.
- celsius or c: Temperatures are shown in degrees Celsius. This is the default.

timeout #

Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

trap-host *IP-address*

Optional. For an SNMPv3 user whose `interface` parameter is set to `snmptarget`, this specifies the IP address of the host that will receive SNMP traps.

type novice|standard|advanced|diagnostic

Optional. Identifies the user's experience level. This parameter is informational only and does not affect access to commands. The default is `standard`.

units auto|MB|GB|TB

Optional. Sets the unit for display of storage-space sizes:

- auto: Sizes are shown in units determined by the system. This is the default.
- MB: Sizes are shown in megabytes.
- GB: Sizes are shown in gigabytes.
- TB: Sizes are shown in terabytes.

Based on the precision setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if units is set to TB, precision is set to 1, and base is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.

name

Specifies the user account to change. A name that includes a space must be enclosed in double quotes.

Examples

Change the temperature scale and accessible interfaces for user jsmith.

```
# set user jsmith temperature-scale f interfaces wbi,cli
```

Change the password for user JDoe.

```
# set user JDoe password Abcd%1234
```

Change the authentication type for SNMPv3 user Traps.

```
# set user Traps authentication-type MD5 password Snmp%Trap
```

See also

- [set password on page 252](#)
- [show users on page 447](#)

set vdisk

Description

Changes parameters for a specified vdisk. This command applies to linear storage only.

Minimum role

manage

Syntax

```
set vdisk  
[name new-name]
```

```
[owner a|b]
[scrub-duration-goal hours]
[spin-down-delay delay]

vdisk
```

Parameters

name new-name

Optional. A new name for the vdisk. A name that includes a space must be enclosed in double quotes.

owner a|b

Optional. The new owner: controller A or B.

⚠ Caution: Before changing the owning controller for a vdisk, you must stop host I/O to the vdisk's volumes. Volume mappings are not affected.

⚠ Caution: Changing ownership of a vdisk while any volumes in the vdisk are mapped to live hosts is not supported and may cause data loss or unavailability. All volumes in the vdisk must be unmapped or attached hosts must be shut down before the ownership of a vdisk is changed.

scrub-duration-goal hours

Optional. The requested duration of a vdisk scrub operation, in hours. A value of 0 indicates that the scrub duration is not intended to be controlled, and the scrub instead runs at the background priority. A value of 1 to 1080 hours (45 days) will cause the storage system to adjust the resources available to the scrub operation, which could affect other performance. There is no guarantee that this scrub duration goal is achievable, due to such considerations as vdisk size or abnormally high host activity.

spin-down-delay delay

Optional. Sets the period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1 to 360 minutes. Setting the delay to 1–360 minutes will enable spin down. Setting the delay to 0 will disable spin down.

Drive spin down affects disk operations as follows:

- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

i Note: Drive spin down is not applicable to disks in virtual pools.

vdisk

The name or serial number of the vdisk to change. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \

- A value that includes a space must be enclosed in double quotes.

Examples

```
Rename vdisk VD1 to VD2 and set its spin-down delay to 10 minutes.  
# set vdisk name VD2 spin-down-delay 10 VD1
```

See also

- [show vdisks on page 449](#)

set vdisk-spare (Deprecated)

Use [add spares on page 45](#).

set volume


Description

Changes parameters for a volume.

 **Caution:** Applying new volume parameters may disrupt access from connected hosts.

For virtual storage, you can set the retention priority for snapshots of the volume. If automatic deletion of snapshots is enabled, snapshots will be considered for automatic deletion first by priority and then by date, so the oldest low-priority snapshot will be deleted first. A snapshot is eligible for deletion if all the following are true:

- The snapshot has a retention priority other than never-delete.
- The snapshot has no child snapshots.
- The snapshot is not mapped to a host.

 **Note:** For virtual storage, changing the retention priority for a volume does not change the retention priority for existing child snapshots.

Minimum role

manage

Syntax

```
set volume
[access read-write|rw|read-only|ro]
[allowed-tiers tiers|all]
[identifying-information description]
[name new-name]
[snapshot-retention-priority never-delete|high|medium|low]
[tier-affinity no-affinity|archive|performance]
[preference archive|standard|performance]

volume
```

Parameters

`access read-write|rw|read-only|ro`

Deprecated—to change mapping settings, use the [map volume on page 147](#) command.

`allowed-tiers tiers|all`

Optional. Specifies either:

- A comma-separated list of the names of tiers that are allowed to contain the volume. Restricting a volume to specific tiers is called pinning the volume. Pinning a volume prevents it from being migrated to tiers that were not specified. You can specify one or more of the following tier names:
 - `performance`: The tier that uses SAS SSDs (high speed, low capacity) for hot data.
 - `standard`: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
 - `archive`: The tier that uses midline spinning SAS disks (<10k RPM, high capacity) for cold data.
- `all`: Allows any tier to contain the volume.

`identifying-information description`

Optional. A description of the volume to help a host-side user identify it. Input rules:

The value is case sensitive.

- The value can have a maximum of 127 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

`name new-name`

Optional. A new name for the volume. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.

set volume

- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

snapshot-retention-priority never-delete|high|medium|low

Optional. For virtual storage, this specifies the retention priority for snapshots of the volume.

- *never-delete*: Snapshots will never be deleted.
- *high*: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.
- *medium*: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.
- *low*: Snapshots may be deleted.

tier-affinity no-affinity|archive|performance

Optional. For virtual storage, this specifies how to tune the tier-migration algorithm for the volume:

- *no-affinity*: This setting uses the highest available performing tiers first and only uses the Archive tier when space is exhausted in the other tiers. Volume data will swap into higher performing tiers based on frequency of access and tier space availability. This is the default.
- *archive*: This setting prioritizes the volume data to the least performing tier available. Volume data can move to higher performing tiers based on frequency of access and available space in the tiers.
- *performance*: This setting prioritizes volume data to the higher performing tiers. If no space is available, lower performing tier space is used. Performance affinity volume data will swap into higher tiers based upon frequency of access or when space is made available.

The *tier-affinity* setting affects all members of a snapshot tree.

preference archive|standard|performance

Optional. Specifies how to tune the tier-migration algorithm for the volume:

- *archive*: This setting specifies never to move this volume to the SSD tier, regardless of how often the data is accessed.
- *standard*: This setting attempts to balance the frequency of data access, disk cost, and disk availability by moving the volume to the appropriate tier. This is the default.
- *performance*: This setting specifies to keep this volume in the SSD tier as much as possible.

volume

The name or serial number of the volume to change. A name that includes a space must be enclosed in double quotes.

Examples

```
Rename volume V1 to V2.
# set volume name V2 V1

Set identifying information for V3.
```

set volume-group

```
# set volume identifying-information "Project X data" V3
Set volume OldFiles to have read-only access and affinity for the Archive tier.
# set volume tier-affinity archive access ro OldFiles

Change the snapshot retention priority for Vol1 to low.
# set volume snapshot-retention-priority low Vol1
```

See also

- [show maps on page 368](#)
- [show volumes on page 467](#)

Set volume OldFiles to have read-only access and affinity for the Archive tier.

```
# set volume tier-affinity archive access ro OldFiles
```

set volume-group

Description

Sets the name of a volume group. Renaming a volume group will delete the volume group and then create one with the new name.

i Note: You cannot rename a volume group that is in a replication set.

Minimum role

manage

Syntax

```
set volume-group
name new-name

volume-group
```

Parameters

name new-name

A new name for the volume group. Input rules:

- The value is case sensitive.
- The value can have a maximum of 1532 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes

volume-group

The current name of the volume group. A value that includes a space must be enclosed in double quotes.

Examples

Change the name of VGroup1 to MyVGroup.

```
# set volume-group name MyVGroup VGroup1
```

See also

- [show volume-groups on page 461](#)

show advanced-settings

Description

Shows the settings for advanced system-configuration parameters.

Minimum role

monitor

Syntax

```
show advanced-settings
```

Output

Disk Group Background Scrub (v3)

Shows whether disks in disk groups are automatically checked for disk defects to ensure system health. The

show advanced-settings

interval between a scrub finishing and starting again is specified by the Disk Group Background Scrub Interval field.

- Disabled: Background disk-group scrub is disabled. This is the default.
- Enabled: Background disk-group scrub is enabled.

Vdisk Background Scrub (v2)

Shows whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the Vdisk Background Scrub Interval field.

- Disabled: Background vdisk scrub is disabled. This is the default.
- Enabled: Background vdisk scrub is enabled.

Disk Group Background Scrub Interval (v3)

Shows the interval between background disk-group scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.

Vdisk Background Scrub Interval (v2)

Shows the interval between background vdisk scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.

Partner Firmware Upgrade

Shows whether component firmware versions are monitored and will be automatically updated on the partner controller.

- Disabled: Partner firmware upgrade is disabled.
- Enabled: Partner firmware upgrade is enabled. This is the default.

Utility Priority

Priority at which data-redundancy utilities, such as disk-group verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect disk-group background scrub, which always runs at "background" priority.)

- High: Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.
- Medium: Utility performance is balanced with host I/O performance.
- Low: Utilities run at a slower rate with minimal effect on host I/O.

SMART

Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.

- Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system.
- Enabled: SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.
- Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

show advanced-settings

Dynamic Spare Configuration

Shows whether the storage system will automatically use a compatible disk as a spare to replace a failed disk in a disk group if no compatible spare is available.

- **Disabled:** The dynamic spares feature is disabled. This is the default.
- **Enabled:** The dynamic spares feature is enabled.

Enclosure Polling Rate

Shows the interval in seconds at which the storage system will poll each enclosure's Enclosure Management Processor (EMP) for status changes, from 5 to 3600 seconds. The default is 5 seconds.

Host Control of Caching

Shows whether hosts are allowed to use the SCSI `MODE SELECT` command to change the storage system's write-back cache setting.

- **Disabled:** Host control of caching is disabled. This is the default.
- **Enabled:** Host control of caching is enabled.

Sync Cache Mode

Shows how the SCSI `SYNCHRONIZE CACHE` command is handled:

- **Immediate:** Good status is returned immediately and cache content is unchanged. This is the default.
- **Flush To Disk:** Good status is returned only after all write-back data for the specified volume is flushed to disk.

Independent Cache Performance Mode

Shows the cache redundancy mode for a dual-controller storage system.

- **Disabled:** Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. This is the default.
- **Enabled:** The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.

Missing LUN Response

Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.

- **Not Ready:** Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is sensekey = 2, code = 4, qualifier = 3. This is the default.
- **Illegal Request:** Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is sensekey = 5, code = 25h, qualifier = 0.

Controller Failure

Shows whether the cache policy will change from write-back to write-through when a controller fails.

- **Disabled:** The controller failure trigger is disabled. This is the default.
- **Enabled:** The controller failure trigger is enabled.

Supercap Failure

Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails.

show advanced-settings

- Disabled: The supercapacitor failure trigger is disabled.
- Enabled: The supercapacitor failure trigger is enabled. This is the default.

CompactFlash Failure

Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation.

- Disabled: The CompactFlash failure trigger is disabled.
- Enabled: The CompactFlash failure trigger is enabled. This is the default.

Power Supply Failure

Shows whether the cache policy will change from write-back to write-through when a power supply fails.

- Disabled: The power-supply failure trigger is disabled. This is the default.
- Enabled: The power-supply failure trigger is enabled.

Fan Failure

Shows whether the cache policy will change from write-back to write-through when a fan fails.

- Disabled: The fan failure trigger is disabled. This is the default.
- Enabled: The fan failure trigger is enabled.

Temperature Exceeded

Shows whether the system will shut down a controller when its temperature exceeds the critical operating range.

- Disabled: The over-temperature failure trigger is disabled. This is the default.
- Enabled: The over-temperature failure trigger is enabled.

Partner Notify

Shows whether the partner controller will be notified when a trigger condition occurs.

- Disabled: Notification is disabled. The partner controller will continue using its current caching mode. This is the default.
- Enabled: Notification is enabled. The partner controller will change to write-through mode for better data protection.

Auto Write Back

Shows whether the cache mode will change from write-through to write-back when the trigger condition is cleared.

- Disabled: Auto-write-back is disabled.
- Enabled: Auto-write-back is enabled. This is the default.

Inactive Drive Spin Down

Shows whether available disks and global spares will spin down after a period of inactivity shown by the Inactive Drive Spin Down Delay field.

- Disabled: Drive spin down for available disks and global spares is disabled. This is the default.
- Enabled: Drive spin down for available disks and global spares is enabled.

show advanced-settings

Inactive Drive Spin Down Delay

Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.

Disk Background Scrub

Shows whether disks that are not in disk groups are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 72 hours.

- Disabled: Background disk scrub is disabled. This is the default.
- Enabled: Background disk scrub is enabled.

Managed Logs

Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log collection system to avoid losing diagnostic data as logs fill.

- Disabled: The managed logs feature is disabled. This is the default.
- Enabled: The managed logs feature is enabled.

Single Controller Mode

For a system that had two controller modules but now has only one and is intended to be used as a single-controller system, this property shows whether the operating/redundancy mode is set to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP.

- Enabled: Single Controller mode is enabled.
- Disabled: Single Controller mode is disabled.

Disk Protection Information

Shows whether the disk PI process of the E2E PI feature is enabled globally for disks and vdisks.

- Disabled: Disk PI is disabled. This is the default.
- Enabled: Disk PI is enabled.

Auto Stall Recovery

Shows whether the auto stall recovery feature is enabled, which detects situations where a controller stall is preventing I/O operations from completing, and recovers the system so that at least one controller is operational, thus avoiding data-unavailability situations. This feature focuses failover/recovery stalls. When a stall is detected, event 531 is logged.

- Disabled: Auto stall recovery is disabled. The system will constantly perform auto stall detection in the background but will not automatically perform recovery actions.
- Enabled: Auto stall recovery is enabled. The system will constantly perform auto stall detection in the background and automatically perform recovery actions. This is the default.

Restart on CAPI Fail

Shows whether a Storage Controller that experiences a CAPI hang will be forced to restart. A CAPI hang is perceived as a management-interface hang. As part of the restart process, a dump file is created and event 107 is logged. To provide the dump file to technical support for debugging, use the Save Logs action in the SMC.

Large Pools

Shows whether the large-pools feature is enabled. This option provides the capability to create a virtual pool larger than 300 TiB on each controller by limiting the number of user-defined snapshots that can be created in snapshot trees.

- `enabled` or `on`: The maximum size for a virtual pool will be 512 TiB. The maximum number of volumes per snapshot tree will be 9 (base volume plus 8 snapshots).
- `disabled` or `off`: The maximum size for a virtual pool will be 300 TiB. The maximum number of volumes per snapshot tree will be 255 (base volume plus 254 snapshots). This is the default.

Examples

```
Show advanced system-configuration settings.  
# show advanced-settings
```

Basetypes

- [advanced-settings-table on page 510](#)
- [status on page 689](#)

See also

- [set advanced-settings on page 202](#)

show auto-write-through-trigger (Deprecated)

Use [show advanced-settings on page 293](#).

show awt (Deprecated)

See [show auto-write-through-trigger \(Deprecated\) above](#).

show cache-parameters

Description

Shows cache settings and status for the system and optionally for a volume.

Minimum role

monitor

Syntax

```
show cache-parameters  
[volume]
```

Parameters

volume

Optional. Name or serial number of the volume for which to show settings. A name that includes a space must be enclosed in double quotes. If this parameter is not specified, only system-wide settings are shown.

Output

System cache parameters:

Operation Mode

Shows the system's operating mode, also called the cache redundancy mode:

- **Independent Cache Performance Mode:** For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- **Active-Active ULP:** Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- **Single Controller:** There is only a single controller in the enclosure.
- **Failed Over:** Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- **Down:** Both controllers are not operational.

Controller cache parameters:

Write Back Status

Shows the current, system-wide cache policy as determined by auto-write-through logic. This value is not

show cache-parameters

settable by users. If an auto-write-through trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume.

- Enabled: Write-back. This is the normal state.
- Disabled: Write-through.
- Not up: The controller is not up.

CompactFlash Status

- Not Installed: The CompactFlash card is not installed.
- Installed: The CompactFlash card is installed.

CompactFlash Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Cache Flush

- Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.
- Disabled: Cache flush is disabled.

Volume cache parameters:

Serial Number

If a volume is specified, its serial number.

Name

If a volume is specified, its name.

Cache Write Policy

If a volume is specified, its cache write policy:

- write-back: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default.
- write-through: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

Cache Optimization

If a volume is specified, its cache optimization mode:

- standard: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.
- no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

Read Ahead Size

If a volume is specified, its read-ahead cache setting:

- **Disabled:** Read-ahead is disabled.
- **Adaptive:** Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.
- **Stripe:** Read-ahead is set to one stripe. The controllers treat NRAID and RAID-1 disk groups internally as if they have a stripe size of 512 KB, even though they are not striped.
- **512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB:** Size selected by a user.

Examples

```
Show the cache parameters for the system and for volume V1.  
# show cache-parameters V1
```

Basetypes

- [cache-settings on page 520](#)
- [cache-parameter on page 518](#)
- [status on page 689](#)

See also

- [set awt \(Deprecated\) on page 208](#)
- [show volumes on page 467](#)

show certificate

Description

Shows the status of the system's security certificate.

Minimum role

manage

Syntax

```
show certificate  
[a|b|both]
```

Parameters

a|b|both

Optional. Specifies whether to show information for controller A, B, or both. If this parameter is omitted, information is shown for both controllers.

Output

Properties are described in alphabetical order.

Certificate Status

- Customer-supplied: The controller is using a certificate that you have uploaded.
- System-generated: The controller is using system-generated certificates.
- Unknown status: The controller's certificate cannot be read. This most often occurs when a controller is restarting or the certificate replacement process is still in process.

Certificate Text

The full text of the certificate.

Controller

- A: Controller A.
- B: Controller B.

Time Created

The date and time in the format year-month-day hour:minutes:seconds when the certificate was created.

Examples

```
Show certificate status for the system.  
# show certificate
```

Basetypes

- [certificate-status on page 521](#)
- [status on page 689](#)

See also

- [create certificate on page 61](#)

show channels (Deprecated)

Use [show ports on page 386](#).

show chap-records

Description

For iSCSI, shows all CHAP records or the record for a specific originator. This command is permitted whether or not CHAP is enabled.

Minimum role

monitor

Syntax

```
show chap-records  
[name originator-name]  
[show-secrets]
```

Parameters

name originator-name

Optional. The originator name, typically in IQN format. If this parameter is omitted, all CHAP records are shown.

show-secrets

Optional. Minimum role: manage. Shows Initiator Secret and Mutual CHAP Secret values in command output. If this parameter is omitted, secret values are not shown.

Output

Initiator Name
The originator name.

Initiator Secret
The secret that the recipient uses to authenticate the originator.

Mutual CHAP Name
For mutual CHAP, the recipient name.

Mutual CHAP Secret
For mutual CHAP, the secret that the originator uses to authenticate the recipient.

Examples

As a user with the monitor role, show the CHAP record for a specific host initiator.

```
# show chap-records name iqn.1991-05.com.microsoft:myhost.domain
```

As a user with the manage role, show the CHAP record for a specific host initiator.

```
# show chap-records name iqn.1991-05.com.microsoft:myhost.domain show-secrets
```

Basetypes

- [chap-records on page 522](#)
- [status on page 689](#)

See also

- [create chap-record on page 63](#)
- [delete chap-records on page 110](#)
- [set chap-record on page 210](#)
- [show iscsi-parameters on page 363](#)

show cli-parameters

Description

Shows the current CLI session preferences.

Minimum role

monitor

Syntax

```
show cli-parameters
```

Output

Timeout

The time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).

Output Format

- **Console:** Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. This is the default.
- **api:** Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by *COMP* elements.
- **api-embed:** Alternate form of XML output which displays “child” objects embedded (indented) under “parent” objects.
- **ipa:** Alternate form of XML output.
- **json:** Alternate data-interchange format.

Brief Mode

- **Enabled:** In XML output, shows a subset of attributes of object properties. The name and type attributes are always shown.
- **Disabled:** In XML output, shows all attributes of object properties. This is the default.

Base

The base for entry and display of storage-space sizes:

- **2:** Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.
- **10:** Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default.

Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.

Pager

- **Enabled:** Halts output after each full screen to wait for keyboard input. This is the default.
- **Disabled:** Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.

Locale

The display language. The default is English.

Precision

The number of decimal places (1–10) shown for display of storage-space sizes. The default is 1.

Units

The unit for display of storage-space sizes:

- **Auto:** Sizes are shown in units determined by the system. This is the default.
- **MB:** Sizes are shown in megabytes.
- **GB:** Sizes are shown in gigabytes.
- **TB:** Sizes are shown in terabytes.

Based on the precision setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if `Units` is set to `TB`, `Precision` is set to `1`, and `Base` is set to `10`, the size `0.11709 TB` is instead shown as `117.1 GB`.

Temperature Scale

- **Fahrenheit:** Temperatures are shown in degrees Fahrenheit.
- **Celsius:** Temperatures are shown in degrees Celsius. This is the default.

Management Mode

The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session. This setting does not affect access to commands.

- **v2:** Uses terminology that is oriented to managing linear storage. For example, *vdisk* for disk groups and pools.
- **v3:** Uses terminology that is oriented to managing virtual and linear storage. For example, *disk group* for disk groups and *pool* for pools.

To see the default management mode, use the [show protocols on page 393](#) command.

Examples

```
Show current CLI settings.  
# show cli-parameters
```

Basetypes

- [cli-parameters on page 523](#)
- [status on page 689](#)

See also

- [set cli-parameters on page 212](#)
- [show protocols on page 393](#)

show configuration

Description

Shows system configuration information.

- i Note:** Output for this command is lengthy. To control whether the output halts after each full screen to wait for keyboard input, enable or disable the pager parameter of the `set cli-parameters` command.

Minimum role

monitor

Syntax

```
show configuration
```

Output

- System information from [show system on page 431](#)
- Controller information from [show controllers on page 309](#)
- Controller firmware and hardware version information from [show versions on page 457](#) with the `detail` parameter
- Host and expansion port information from [show ports on page 386](#)
- Disk information from [show disks on page 325](#)
- Disk-slot information from [show disks on page 325](#) with the `enc1` parameter
- Vdisk information from [show vdisks on page 449](#)
- Disk-group information from [show disk-groups on page 317](#)
- Pool information from [show pools on page 378](#)
- Enclosure information from [show enclosures on page 338](#)
- Field-replaceable unit (FRU) information from [show frus on page 352](#)

Show information about the system configuration.

```
# show configuration
```

Basetypes

- [system on page 690](#)
- [controllers on page 530](#)
- [versions on page 714](#)
- [port on page 640](#)
- [drives on page 573](#)
- [enclosure-list on page 588](#)
- [virtual-disks on page 716](#)
- [disk-groups on page 549](#)
- [pools on page 634](#)
- [enclosures on page 590](#)
- [enclosure-fru on page 585](#)
- [status on page 689](#)

show controller-date

Description

Shows the system's current date and time.

Minimum role

monitor

Syntax

```
show controller-date
```

Output

Controller Date

Date and time in the format `year-month-day hour:minutes:seconds`.

Time-Zone Offset

The system's time zone as an offset in hours and minutes from Coordinated Universal Time (UTC). This is shown only if NTP is enabled.

Examples

```
Show the system date and time.  
# show controller-date
```

Basetypes

- [time-settings-table on page 705](#)
- [status on page 689](#)

See also

- [set controller-date on page 215](#)
- [set ntp-parameters on page 251](#)
- [show ntp-status on page 375](#)

show controllers

Description

Shows information about each controller module in the storage system.

Minimum role

monitor

Syntax

```
show controllers
```


Output

Controller ID

- A: Controller A.
- B: Controller B.

Serial Number

- Serial number of the controller module.
- Not Available: The controller module is down or not installed.

Hardware Version

Controller module hardware version.

CPLD Version

Complex Programmable Logic Device firmware version.

MAC Address

Controller network port MAC address.

WWNN

Storage system World Wide Node Name (WWNN).

IP Address

Controller network port IP address.

IP Subnet Mask

Controller network port IP subnet mask.

IP Gateway

Controller network port gateway IP address.

Disks

Number of disks in the storage system.

Virtual Pools

Number of virtual pools in the storage system.

Disk Groups (v3)

Number of disk groups in the storage system.

Vdisks (v2)

Number of vdisks in the storage system.

System Cache Memory (MB)

Controller module cache memory size, in MB, including CPU memory available to I/O.

Host Ports

Number of host ports in the controller module.

Disk Channels

Number of expansion ports in the controller enclosure.

Disk Bus Type

Type of interface between the controller module and disks:

- SAS

show controllers

Status

- Operational
- Down
- Not Installed
- Unknown

Failed Over to This Controller

Indicates whether the partner controller has failed over to this controller:

- No: The partner controller has not failed over to this controller.
- Yes: The partner controller has either failed or been shut down, and its responsibilities have been taken over by this controller. There will be a delay between the time that the value of `Status` becomes `Down` for one controller and the time that the value of `Failed Over to This Controller` becomes `Yes` for the other controller. This time period is the time that it takes for a controller to take over the responsibilities of its partner.

Fail Over Reason

If `Failed Over to This Controller` is `Yes`, a reason for the failover appears; otherwise, `Not applicable` appears.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

If `Health` is not `OK`, this field shows the reason for the health state.

Health Recommendation

If `Health` is not `OK`, this field shows recommended actions to take to resolve the health issue.

Position

Position of the controller in the enclosure:

- Left: The controller is in the left slot.
- Right: The controller is in the right slot.
- Top: The controller is in the top slot.
- Bottom: The controller is in the bottom slot.

Phy Isolation

Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller.

- Enabled: PHY fault isolation is enabled. This is the default.
- Disabled: PHY fault isolation is disabled.

Controller Redundancy Mode

Shows the system's operating mode, also called the cache redundancy mode:

- Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write

performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.

- **Active-Active ULP:** Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- **Single Controller:** The enclosure contains a single controller.
- **Failed Over:** Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- **Down:** Both controllers are not operational.

Controller Redundancy Status

- **Redundant with independent cache:** Both controllers are operational but are not mirroring their cache metadata to each other.
- **Redundant:** Both controllers are operational.
- **Operational but not redundant:** In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.
- **Down:** This controller is not operational.
- **Unknown:** Status information is not available.

Examples

```
Show controller information.  
# show controllers
```

Basetypes

- [controllers on page 530](#)
- [status on page 689](#)

See also

- [show configuration on page 307](#)
- [show frus on page 352](#)

show controller-statistics

Description

Shows live performance statistics for controller modules. For controller performance statistics, the system samples live data every 15 seconds.

Statistics shown only in XML API output are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

```
show controller-statistics  
[a|b|both]
```

Parameters

a|b|both

Optional. Specifies whether to show information for controller A, B, or both. If this parameter is omitted, information is shown for both controllers.

Output

Durable ID

The controller ID in the form controller_ID.

CPU Load

The percentage of time the CPU is busy, from 0 to 100.

Power On Time (Secs)

The number of seconds since the controller was restarted.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Num Forwarded Cmds

The current count of commands that are being forwarded or are queued to be forwarded to the partner controller for processing. This value will be zero if no commands are being forwarded or are queued to be forwarded.

Reset Time

The date and time, in the format year-month-day hour:minutes:seconds, when these statistics were last reset, either by a user or by a controller restart.

Total Power On Hours

The total amount of hours the controller has been powered on in its life time.

Examples

```
Show statistics for controller A.  
# show controller-statistics a
```

Basetypes

- [controller-statistics on page 536](#)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [reset controller-statistics on page 171](#)

show degraded-disk-thresholds

Description

Shows the configured criteria for the system to identify degraded disks. If no parameter is specified, the command shows information for all degraded disks.

Minimum role

monitor

Syntax

```
show degraded-disk-thresholds  
[name threshold-name]
```

Parameters

name threshold-name

Optional. Specifies one of the following values (which identifies the disk tier and RAID redundancy level) for which to show information:

- archive-single: Archive tier, single redundancy RAID.
- archive-dual: Archive tier, dual redundancy RAID.
- archive: Archive tier, any RAID level.
- standard-single: Standard tier, single redundancy RAID.
- standard-dual: Standard tier, dual redundancy RAID.
- standard: Standard tier, any RAID level.
- performance-single: Performance tier, single redundancy RAID.
- performance-dual: Performance tier, dual redundancy RAID.
- performance: Performance tier, any RAID level.
- all-single: All disks, single redundancy RAID.
- all-dual: All disks, dual redundancy RAID.
- all: All disks, any RAID level.

Disk tiers are defined as:

- archive: Disks with rotation speeds below 10K RPM. In this system, these are midline SAS disks.
- standard: Disks with rotation speeds greater than or equal to 10K RPM. In this system, these are enterprise SAS disks.
- performance: SAS SSDs.
- all: Disks are not differentiated by disk tier.

RAID redundancy levels are defined as:

- single: Disks used in a RAID type other than RAID 6.
- dual: Disks used in RAID 6.

Output

Name

The threshold name.

Target

- Recoverable Errors: Soft errors (sense key 1).
- Unrecoverable Errors: Medium errors (sense key 3).

ThresholdA, ThresholdB, ThresholdC

Configured criteria for how many errors of the target type must occur within a certain time period for a disk to be considered degraded. The format is `period.duration.threshold-value`, where:

- `period`: Hour, day, or week.
- `duration`: A numeric value for the duration of the period.
- `threshold-value`: A numeric value for the threshold count.
- `--`: Threshold is not set.

ThresholdLifetime

Configured criteria for how many errors of the target type must occur for a disk to be considered degraded.

- `threshold-value`: A numeric value for the threshold count.
- `--`: Threshold is not set.

Examples

```
Show information for all threshold names.
```

```
# show degraded-disk-thresholds
```

```
Show information for threshold name archive-single only.
```

```
# show degraded-disk-thresholds name archive-single
```

Basetypes

- [degraded-disk-thresholds](#)
- [status on page 689](#)

See also

- [set degraded-disk-policy](#)
- [set degraded-disk-threshold](#)
- [show degraded-disk-policy](#)

show disk-groups

Description

Shows information about disk groups. The command will show information for all disk groups by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show disk-groups  
[pool pool]  
[scrub-status]  
[disk-groups]
```

Parameters

pool pool

Optional. Specifies the name or serial number of the pool that contains the disk groups for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for disk groups in all pools.

scrub-status

Optional. Shows disk-group properties related to the scrub utility.

disk-groups

Optional. A comma-separated list of the names or serial numbers of the disk groups for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all disk groups.

Output

Properties are described in alphabetical order.

% of Pool

The percentage of pool capacity that the disk group occupies.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Chk

- For RAID levels except NRAID, RAID 1, and RAID 50, the chunk size of the disk group.

show disk-groups

- For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).
- For RAID 50, the disk-group chunk size calculated as: *configured-chunk-size* x (*subgroup-members* - 1). For a disk group configured to use 64-KB chunk size and 4-disk subgroups, the value would be 192k (64KB x 3).

Class

- Linear: The disk group acts as a linear pool.
- Virtual: The disk group is in a virtual pool.

Disks

The number of disks in the disk group.

Free

The amount of free space in the disk group, formatted to use the current base, precision, and units.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Job%

- 0%-99%: Percent complete of running job
- Blank if no job is running (job has completed)

Jobs

Shows whether a job is running and its percent complete.

- CPYBK: The disk group is being used in a copyback operation.
- DRSC: A disk is being scrubbed.
- EXPD: The disk group is being expanded.
- INIT: The disk group is initializing.
- RCON: The disk group is being reconstructed.
- VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.
- VPREP: The virtual disk group is being prepared for use in a virtual pool.
- VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.
- VREMV: The disk group and its data are being removed.
- VRFY: The disk group is being verified.
- VRSC: The disk group is being scrubbed.
- Blank if no job is running.

Name

The name of the disk group.

show disk-groups

Own

Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.

Pool

The name of the pool that contains the disk group.

Pref

Controller that owns the disk group and its volumes during normal operation.

RAID

The RAID level of the disk group.

Reason

If Health is not OK, this field shows the reason for the health state.

Scrub Duration Goal

The desired duration of a vdisk scrub operation, in hours. A value of 0 indicates that the scrub duration is not intended to be controlled. The storage system will adjust the resources available to the scrub operation, which could affect other performance. There is no guarantee that this scrub duration goal is achievable, due to vdisk size considerations. The maximum duration is 1080 hours (45 days).

SD Delay

For a linear disk group, the period of inactivity after which the disks and dedicated spares will automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.

SD Delay

Not applicable.

Sec Fmt

The sector format of disks in the disk group.

- 512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.
- 512e: All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.
- Mixed: The disk group contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

Serial Number

The serial number of the disk group.

Size

The capacity of the disk group, formatted to use the current base, precision, and units.

Spin Down

- Disabled: DSD is disabled for the disk group. This is the default.
- Enabled - all spinning: DSD is enabled for the disk group.
- Partial spin-down: DSD is enabled for the disk group and its disks are partially spun down to conserve power.
- Full spin-down: DSD is enabled for the disk group and its disks are fully spun down to conserve power.

show disk-groups

Spr

For a linear disk group, the number of spares assigned to the group.

Status

- CRIT: Critical. The disk group is online but isn't fault tolerant because some of its disks are down.
- DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.
- FTDN: Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down.
- FTOL: Fault tolerant and online.
- MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.
- OFFL: Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost.
- QTCR: Quarantined critical. The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.
- QTDN: Quarantined with a down disk. The RAID-6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.
- QTOF: Quarantined offline. The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 disk group.
- STOP: The disk group is stopped.
- UNKN: Unknown.
- UP: Up. The disk group is online and does not have fault-tolerant attributes.

Tier

- Performance: The disk group is in the highest storage tier, which uses SSDs (high speed, low capacity).
- Standard: The disk group is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
- Archive: The disk group is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).
- Read Cache: The disk is an SSD providing high-speed read cache for a storage pool.

Examples

Show information about all disk groups.

```
# show disk-groups pool A
```

```
Show information about disk group dg0002 in pool B.  
# show disk-groups pool B dg0002
```

Basetypes

- [disk-groups on page 549](#)
- [status on page 689](#)

See also

- [show disks on page 325](#)
- [show pools on page 378](#)

show disk-group-statistics

Description

Shows live performance statistics for disk groups. The command will show information for all disk groups by default, or you can use parameters to filter the output. For disk-group performance statistics, the system samples live data every 30 seconds.

Properties shown only in XML API format are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

```
show disk-group-statistics  
[disk-group disk-group]  
[type linear|virtual]
```

Parameters

disk-group disk-group

Optional. Specifies the disk group for which to show information. If this parameter is omitted, information will

be shown for all disk groups. A value that includes a space must be enclosed in double quotes.

type linear|virtual

Optional. Specifies whether to show information for linear disk groups or for virtual disk groups. If this parameter is omitted, information will be shown for both types.

Output

Name

The name of the disk group.

Time Since Reset

The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.

Reads

Number of read operations since these statistics were last reset or since the controller was restarted.

Writes

Number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

Amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

Amount of data written since these statistics were last reset or since the controller was restarted.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

I/O Resp Time

Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.

Read Resp Time

Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.

Write Resp Time

Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.

Pages Allocated per Min

Shown for a virtual disk group. The rate, in pages per minute, at which pages are allocated to volumes in the disk group because they need more space to store data.

Pages Deallocated per Min

Shown for a virtual disk group. The rate, in pages per minute, at which pages are deallocated from volumes in the disk group because they no longer need the space to store data.

Pages Reclaimed

Shown for a virtual disk group. The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).

Pages Unmapped per Minute

Shown for a virtual disk group. The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host.

Examples

Show live performance statistics for all disk groups.

```
# show disk-group-statistics
```

Show live performance statistics for disk group dg0001.

```
# show disk-group-statistics disk-group dg0001
```

Basetypes

- [disk-group-statistics on page 558](#)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [reset disk-group-statistics on page 173](#)
- [show disk-groups on page 317](#)
- [show disk-statistics on page 332](#)

show disk-parameters

Description

Shows disk settings.

Minimum role

monitor

Syntax

```
show disk-parameters
```

Output

SMART

Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.

- **Detect-Only:** Each disk in the system retains its individual SMART setting, as will new disks added to the system.
- **Enabled:** SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.
- **Disabled:** SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

Drive Write Back Cache

- **Disabled:** Disk write-back cache is disabled for all disks in the system and will be disabled for new disks added to the system. This parameter cannot be changed.

Timeout Retry Maximum

Maximum number of times a timed-out I/O operation can be retried before the operation is failed.

Attempt Timeout

Number of seconds before an I/O operation is aborted and possibly retried.

Overall Timeout

Total time in seconds before an I/O operation is failed regardless of the Attempt Timeout and Timeout Retry Maximum settings.

Inactive Drive Spin Down

Shows whether available disks and global spares will spin down after a period of inactivity shown by the Inactive Drive Spin Down Delay field.

- **Disabled:** Drive spin down for available disks and global spares is disabled. This is the default.
- **Enabled:** Drive spin down for available disks and global spares is enabled.

Inactive Drive Spin Down Delay-

Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.

Examples

```
Show disk settings.
```

```
# show disk-parameters
```

Basetypes

- [drive-parameters on page 571](#)
- [status on page 689](#)

See also

- [set disk-parameters on page 222](#)

show disks

Description

Shows information about all disks or disk slots in the storage system. If no parameter is specified, the command shows information for all installed disks.

i Note: In console format, to aid reading, disks are sorted to display in order by enclosure and disk number. In API formats, output is not sorted because it is expected to be manipulated by a host application.

Minimum role

monitor

Syntax

To show information about disks:

```
show disks  
[disk-group disk-group] [[vdisk vdisk]] [[disks]  
[detail]] [[fde]] [[perf]] [[protection-info]] [[temp]
```

To show information about all disk slots:

```
show disks encl
```


Parameters

detail

Optional. This parameter shows additional detail about the disk.

disk-group disk-group

Optional. The name or serial number of the disk group that contains the disks about which to show information. A value that includes a space must be enclosed in double quotes.

encl

Optional. Shows information about each disk slot, whether it contains a disk or not. If you specify this parameter with other parameters, they will be ignored.

fde (For QXS-4 and QXS-6 series)

Optional. For all or specified disks, this option shows Full Disk Encryption information. Information shown includes the FDE state and lock key ID.

perf

Optional. For all or specified disks, this parameter shows performance statistics from the latest historical sample for each disk. Statistics shown include total I/Os (reads and writes), total amount of data transferred, and average I/O response time.

protection-info

Optional. For all or specified disks, this option shows whether each disk is formatted for PI operation.

temp

Optional. Shows the temperature for all installed disks.

vdisk vdisk

Optional. Shows information about disks in the specified vdisk. A name that includes a space must be enclosed in double quotes.

disks

Optional. Either:

- A comma-separated list of the IDs or serial numbers of disks about which to show information. For disk syntax, see [Command Syntax on page 13](#).
- all: Shows information about all installed disks.
- free: Shows information about all disks that are available.

Output

Properties are described in alphabetical order.

Action

Shown by default or by the `fde` or `perf` parameter. If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Copyback State

Shown by the `detail` parameter. The state of the disk (source or destination) if it is involved in a copyback operation.

- From: This disk is being used as the source of a copyback operation.
- To: This disk is being used as the target of a copyback operation.

show disks

- N/A: This disk is not being used in a copyback operation.

Copyback State

Shown by the `detail` parameter.

- N/A: Not applicable.

Current Job

Shown by the `detail` parameter. See Jobs, below.

Data Transferred

Shown by the `perf` parameter. The total number of bytes transferred.

Description

Shown by default or by the `detail` or `fde` or `perf` parameter.

- SAS: Enterprise SAS
- SAS MDL: Midline SAS
- sSAS: SAS SSD

Disk Group (v3)

Shown by default or by the `detail` parameter. The name of the disk group that contains the disk.

Drive Spin Down Count

Shown by the `detail` parameter. The number of times the DSD feature has spun down this disk.

Enc1

Shown by the `enc1` parameter. The number of the enclosure where the disk is located.

FDE State

Shown by the `detail` or `fde` parameter. The FDE state of the disk:

- Unknown: The FDE state is unknown.
- Not FDE Capable: The disk is not FDE-capable.
- Not Secured: The disk is not secured.
- Secured, Unlocked: The system is secured and the disk is unlocked.
- Secured, Locked: The system is secured and the disk is locked to data access, preventing its use.
- FDE Protocol Failure: A temporary state that can occur while the system is securing the disk.

Health

Shown by default or by the `detail` or `fde` or `perf` parameter.

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

Shown by the `detail` parameter. See Reason, below.

Health Recommendation

Shown by the `detail` parameter. See Action, above.

show disks

I/O Resp Time

Shown by the `perf` parameter. The average time in microseconds to complete I/O.

Jobs

Shown by default.

- CPYBK: The disk is being used in a copyback operation.
- DRSC: The disk is being scrubbed.
- EXPD: The disk group is being expanded.
- INIT: The disk group is being initialized.
- RCON: The disk group is being reconstructed.
- VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.
- VPREP: The virtual disk group is being prepared for use in a virtual pool.
- VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.
- VREMV: The disk group and its data are being removed.
- VRFY: The disk group is being verified.
- VRSC: The disk group is being scrubbed.
- Blank if no job is running.

LED Status

Shown by the `detail` parameter. The disk LED status:

- Rebuild: The disk's disk group is being reconstructed.
- Fault: The disk has a fault.
- ID: The locator LED is illuminated to identify the disk.
- Remove: The disk is ready to be removed from the enclosure.
- Blank if the disk is not part of a disk group or is spun down.

Location

Shown by default and by any parameter except `enc1`. The disk location in the format `enclosure-ID.slot-number`.

Lock Key ID

Shown by the `fde` parameter. The current lock key ID.

Model

Shown by the `enc1` parameter. The model number of the disk.

PI-Formatted

Shown by the `detail` or `protection-info` parameter.

- Yes: Formatted for PI operation.
- No: Not formatted for PI operation.
- Unsupported: Cannot support PI operation.

Pool

Shown by default. The name of the pool that contains the disk.

show disks

Pool Name

Shown by the `detail` parameter. See `Pool`, above.

Power On Hours

Shown by the `detail` parameter. The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.

Recon State

Shown by the `detail` parameter. The state of the disk (source or destination) if it is involved in a reconstruct operation.

- `From`: This disk is being used as the source of a reconstruct operation.
- `To`: This disk is being used as the target of a reconstruct operation.
- `N/A`: This disk is not being used in a reconstruct operation.

Rev

Shown by default or by the `detail` or `fde` or `perf` parameter. The firmware revision number.

Revision

Shown by the `detail` parameter. See `Rev`, above.

Sec Fmt

Shown by default or by the `detail` or `perf` parameter. The disk sector format.

- `512n`: The disk uses 512-byte native sector size. Each logical block and physical block is 512 bytes.
- `512e`: The disk uses 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.

Serial Number

Shown by default and by any parameter except `temp`. The serial number of the disk.

Single Pathed

Shown by the `detail` parameter.

- `A` or `B`: A dual-ported disk is communicating through a single port to the connected controller. A failure is preventing communication through the second port to the other controller.
- `(blank)`: The disk is operating normally.

Size

Shown by default and by any parameter except `fde` or `temp`. The disk capacity, formatted to use the current base, precision, and units.

Slot

Shown by the `enc1` parameter. The slot number in the enclosure where the disk is located.

SMART

Shown by the `detail` parameter. Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.

- `Detect-Only`: Each disk in the system retains its individual SMART setting, as will new disks added to the system.
- `Enabled`: SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.

show disks

- **Disabled:** SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

Speed (kr/min)

Shown by default or by the `detail` or `fde` or `perf` parameter. The speed of a spinning disk, in thousands of revolutions per minute, as specified by the disk vendor. For an SSD, `0` is shown.

SSD Life Remaining%

Shown by the `detail` parameter.

- **100%–0%:** For an SSD, this field shows the percentage of disk life remaining. This value is polled every 5 minutes. When the value decreases to 20%, event 502 is logged with Informational severity. Event 502 is logged again with Warning severity when the value decreases to 5%, 2% or 1%, and 0%. If a disk crosses more than one percentage threshold during a polling period, only the lowest percentage will be reported.
- **N/A:** The disk is not an SSD.

Status

Shown by the `encl` parameter.

- **Up:** The disk is present and is properly communicating with the expander.
- **Spun Down:** The disk is present and has been spun down by the drive spin down feature.
- **Warning:** The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in Error status.
- **Error:** The disk is present but is not detected by the expander.
- **Unknown:** Initial status when the disk is first detected or powered on.
- **Not Present:** The disk slot indicates that no disk is present.
- **Unrecoverable:** The disk is present but has unrecoverable errors.
- **Unavailable:** The disk is present but cannot communicate with the expander.
- **Unsupported:** The disk is present but is an unsupported type.

Temperature

Shown by the `detail` or `temp` parameter. The temperature of the disk.

Temperature Status

Shown by the `temp` parameter.

- **OK:** The disk sensor is present and detects no error condition.
- **Warning:** The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds.
- **Critical:** The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold.
- **Unknown:** The disk sensor is present but status is not available.

Tier

Shown by default or by the `detail` parameter.

- **Performance:** The disk is in the highest storage tier, which uses SSDs (high speed, low capacity).

show disks

- **Standard:** The disk is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
- **Archive:** The disk is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).
- **Read Cache:** The disk is an SSD providing high-speed read cache for a storage pool.

Total I/Os

Shown by the `perf` parameter. The total number of I/O operations (reads and writes).

Transfer Rate

Shown by the `detail` parameter. The data transfer rate in Gbit/s. A footnote indicates that it is normal behavior for the rate to vary.

Some 6-Gbit/s disks might not consistently support a 6-Gbit/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3 Gbit/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.

Usage

Shown by default or by the `detail` or `protection-info` parameter

- **AVAIL:** Available
- **DEDICATED SP:** The disk is a spare assigned to a linear disk group.
- **FAILED:** The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.
- **GLOBAL SP:** The disk is a global spare.
- **LEFTOVR:** The disk is a leftover.
- **LINEAR POOL:** The disk is a member of a vdisk.
- **UNUSABLE:** The disk cannot be used in a disk group because the system is secured, or the disk is locked to data access, or the disk is from an unsupported vendor.
- **UNUSABLE:** The disk cannot be used because it is from an unsupported vendor.
- **VDISK:** The disk is a member of a vdisk.
- **VDISK SP:** The disk is a spare assigned to a vdisk.
- **VIRTUAL POOL:** The disk is a member of a disk group in a storage pool.

Vdisk (v2)

Shown by default or by the `detail` parameter. The name of the vdisk that contains the disk.

Vendor

Shown by default and by any parameter except `protection-info` or `temp`. The vendor of the disk.

Examples

```
Show disk information.  
# show disks  
  
Show disk-slot information.  
# show disks encl  
  
Show disk performance statistics.  
# show disks perf  
  
Show Full Disk Encryption information.  
# show disks fde  
  
Show disk temperature information.  
# show disks temp  
  
Show disk-protection information.  
# show disks protection-info  
  
Show detailed information for disk 1.1:  
# show disks 1.1 detail
```

Basetypes

- [drives on page 573](#)
- [enclosure-list on page 588](#)
- [status on page 689](#)

See also

- [show disk-groups on page 317](#)
- [show vdisks on page 449](#)

show disk-statistics

Description

Shows live or historical performance statistics for disks. For disk performance statistics, the system samples live data every 15 seconds and historical data every quarter hour, and retains historical data for 6 months.

The historical option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters. If both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

Statistics shown only in XML API output are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

To show live statistics:

```
show disk-statistics  
[disks]
```

To show historical statistics:

```
show disk-statistics  
[all]  
[count number-of-data-samples]  
historical  
[time-range "date/time-range"]  
disks
```

Parameters

`all`

Optional. Specifies to show the full set of performance metrics. If this parameter is omitted, the default set of performance metrics will be shown.

`count number-of-data-samples`

Optional. Specifies the number of data samples to display, from 1 to 100. Each sample will be shown as a separate row in the command output. If this parameter is omitted, 100 samples will be shown. If you specify this parameter, do not specify the `time-range` parameter.

`historical`
Optional. Specifies to show historical statistics. If this parameter is omitted, live statistics will be shown.

`time-range "date/time-range"`

Optional. Specifies the date/time range of historical statistics to show, in the format "`start yyyy-mm-dd hh:mm [AM|PM] end yyyy-mm-dd hh:mm [AM|PM]`". If the start date/time is specified but no end date/time is specified, the current date/time will be used as the end date/time. The system will return the oldest sample taken after the start time and the latest sample taken before the end time. If the specified start date/time is earlier than the oldest sample, that sample will be used as the start date/time. If you specify this parameter, do not specify the `count` parameter. If this parameter is omitted, the most recent 100 data samples will be displayed.

show disk-statistics

disks

Optional. Specifies a comma-separated list of disks for which to show information. If this parameter is omitted, information will be shown for all disks. For disk syntax, see [Command Syntax on page 13](#).

Output

Live

Location

The disk location in the format `disk_enclosure-ID.slot-number`.

Serial Number

The serial number of the disk.

Pwr Hrs

The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Lifetime Read

The amount of data read from the disk in its lifetime.

Lifetime Written

The amount of data written to the disk in its lifetime.

Reset Time

Date and time, in the format `year-month-day hour:minutes:seconds`, when these statistics were last reset, either by a user or by a controller restart.

Historical

Durable ID

The disk ID in the form `disk_enclosure-number.disk-number`.

Serial Number

The serial number of the disk.

Total I/Os

The total number of read and write operations since the last sampling time.

show disk-statistics

Reads

Shown by the `all` parameter. The number of read operations since the last sampling time.

Writes

Shown by the `all` parameter. The number of write operations since the last sampling time.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the `all` parameter. The amount of data read since the last sampling time.

Data Written

Shown by the `all` parameter. The amount of data written since the last sampling time.

Total IOPS

The total number of read and write operations per second since the last sampling time.

Read IOPS

Shown by the `all` parameter. The number of read operations per second since the last sampling time.

Write IOPS

Shown by the `all` parameter. The number of write operations per second since the last sampling time.

Total B/s

The total data transfer rate, in bytes per second, since the last sampling time.

Read B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for write operations since the last sampling time.

Queue Depth

Shown by the `all` parameter. The average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Average I/O Size

Shown by the `all` parameter. The average data size of read and write operations since the last sampling time.

Average Read I/O Size

Shown by the `all` parameter. The average data size of read operations since the last sampling time.

Average Write I/O Size

Shown by the `all` parameter. The average data size of write operations since the last sampling time.

show disk-statistics

Number of Disk Errors

Shown by the `all` parameter. The total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.

Sample Time

Date and time, in the format `year-month-day hour:minutes:seconds`, when the data sample was taken.

Examples

Show live statistics for disks 1.1 and 2.1.

```
# show disk-statistics 1.1,2.1
```

Show historical statistics from a specified date and time range for disk 1.5.

```
# show disk-statistics 1.5 historical time-range "start 2011-12-05 4:40 PM end 2011-12-05 5:00 PM"
```

Show all samples of historical statistics for disk 1.5.

```
# show disk-statistics 1.5 historical all
```

Basetypes

- [disk-statistics on page 563](#) (live)
- [drive-summary on page 572](#) (historical)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [reset disk-error-statistics on page 172](#)
- [reset disk-statistics on page 175](#)
- [show disk-group-statistics on page 321](#)
- [show disks on page 325](#)

show email-parameters

Description

Shows email (SMTP) notification parameters for events and managed logs.

Minimum role

monitor

Syntax

```
show email-parameters
```

Output

Email Notification

- **Disabled:** Email notification is disabled. This is the default.
- **Enabled:** Email notification is enabled.

Email Notify Filter

Shows the minimum severity for which the system should send event notifications:

- **crit:** Sends notifications for Critical events only.
- **error:** Sends notifications for Error and Critical events.
- **warn:** Sends notifications for Warning, Error, and Critical events.
- **info:** Sends notifications for all events.
- **none:** Disables email notification and clears the settings. This is the default.

This parameter does not apply to managed-logs notifications.

Email Address (1-3)

Shows up to three email addresses for recipients of event notifications.

Log Destination

Shows the email address for the log collection system used by the managed logs feature.

Email Server

The IP address of the SMTP mail server to use for the email messages.

Email Domain

The domain name that, with the sender name, forms the “from” address for remote notification.

Email Sender

The sender name that, with the domain name, forms the “from” address for remote notification.

Include Logs

Shows whether system log files will automatically be attached to email notification messages generated by the managed logs feature. This is the “push” mode for managed logs. This option is disabled by default.

Examples

```
Show settings for email notification.  
# show email-parameters
```

Basetypes

- [email-parameters on page 583](#)
- [status on page 689](#)

See also

- [set email-parameters on page 223](#)

show enclosures

Description

Shows information about the enclosures in the storage system. Full detail available in XML API output only.

Minimum role

monitor

Syntax

```
show enclosures
```

Output

Enc1
The enclosure ID.

show enclosures

Enc1 WWN

The enclosure WWN.

Name

The enclosure name.

Location

The enclosure location, or blank if not set.

Rack

The number of the rack that contains the enclosure.

Pos

The position of the enclosure in the rack

Vendor

The enclosure vendor.

Model

The enclosure model.

EMP controller-ID BUS:ID Rev

The channel ID and firmware revision of the Enclosure Management Processor in each controller's Expander Controller.

Midplane Type

- 4U56-6G: Midplane for 4U, 56-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U48-6G: Midplane for 2U, 48-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U24-6Gv2: Midplane for 2U, reduced-depth, 24-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U24-6G: Midplane for 2U, 24-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U12-6Gv2: Midplane for 2U, reduced-depth, 12-disk enclosure with 6-Gbit/s maximum data rate to disks
- 2U12-6G: Midplane for 2U, 12-disk enclosure with 6-Gbit/s maximum data rate to disks
- N/A: Other type of midplane

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Drawer information:

Drawer

The number of the drawer.

Drawer WWN
The WWN of the drawer.

Name
The name of the drawer.

EMP controller-ID CH:ID Rev
The channel ID and firmware revision of the drawer's Enclosure Management Processor for controller module A's Expander Controller.

Status
Status of the drawer.

- Up
- Warning
- Error
- Unknown
- Unavailable
- Not Present

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason
If Health is not OK, this field shows the reason for the health state.

Action
If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

```
Show information about all enclosures in the system.  
# show enclosures
```

Basetypes

- [enclosures on page 590](#)
- [status on page 689](#)

See also

- [set enclosure on page 225](#)
- [show sensor-status on page 418](#)

show events

Description

Shows events logged by each controller in the storage system. A separate set of event numbers is maintained for each controller. Each event number is prefixed with a letter identifying the controller that logged the event.

Events are listed from newest to oldest, based on a timestamp with one-second granularity. Therefore the event log sequence matches the actual event sequence within about one second.

For more information, see “Resources for diagnosing and resolving problems” in the Event Descriptions Reference Guide.

Minimum role

monitor

Syntax

```
show events
[a|b|both|error]
[detail]
[from timestamp]
[from-event event-ID]
[last #]
[logs yes|no]
[to timestamp]
[to-event event-ID]
```

Parameters

a|b|both|error

Optional. Specifies to filter the event listing:

- a: Shows events from controller A only. Do not use this parameter with the from-event parameter or the to-event parameter.
- b: Shows events from controller B only. Do not use this parameter with the from-event parameter or the to-event parameter.
- both: Shows events from both controllers. Do not use this parameter with the from-event parameter or the to-event parameter.
- error: Shows Warning, Error, and Critical events.

show events

detail

Optional. Shows additional information and recommended actions for displayed events. This information is also in the Event Descriptions Reference Guide.

from timestamp

Optional. Shows events that occurred on or after a timestamp specified with the format `MMDDYYhhmms`. For example, `043011235900` represents April 30 2011 at 11:59:00 p.m. This parameter can be used with the `to` parameter or the `to-event` parameter.

from-event event-ID

Optional. Shows events including and after the specified event ID. If this number is smaller than the ID of the oldest event, events are shown from the oldest available event. Events are shown only for the controller that the event ID specifies (A or B). This parameter can be used with the `to` parameter or the `to-event` parameter.

last

Optional. Shows the latest specified number of events. If this parameter is omitted, all events are shown.

logs yes|no

Optional.

- `no`: Lists events as described in the Output section, below. This is the default.
- `yes`: Shows events in tabular format, with columns for event ID, date and time, event code, severity, and message.

to timestamp

Optional. Shows events that occurred on or before a timestamp specified with the format `MMDDYYhhmms`. For example, `043011235900` represents April 30 2011 at 11:59:00 p.m. This parameter can be used with the `from` parameter or the `from-event` parameter.

to-event event-ID

Optional. Shows events before and including the specified event ID. If this number is larger than the ID of the oldest event, events are shown up to the latest event. Events are shown only for the controller that the event ID specifies (A or B). This parameter can be used with the `from` parameter or the `from-event` parameter.

Output

- Date and time when the event was logged
- Event code identifying the type of event to help diagnose problems. For example: `[181]`
- Event ID prefixed by A or B, indicating which controller logged the event. For example: `#A123`
- Model, serial number, and ID of the controller module that logged the event
- Severity:
 - **CRITICAL**: A failure occurred that may cause a controller to shut down. Correct the problem *immediately*.
 - **ERROR**: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
 - **WARNING**: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.

- INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
- RESOLVED: A condition that caused an event to be logged has been resolved.
- Event-specific message giving details about the event

Examples

Show the last two events.

```
# show events last 2
```

Show the last three non-Informational events.

```
# show events last 3 error
```

Show all events from April 30 2014 at 11:59:00 p.m. through May 2 2014 at 11:59:00 a.m.

```
# show events from 043014235900 to 050214115900
```

Show a range of events logged by controller A.

```
# show events from-event a100 to-event a123
```

Show detailed output for a specific event.

```
# show events from-event A2264 to-event A2264 detail
```

Basetypes

- [events on page 594](#)
- [eventsLogs on page 596](#)
- [status on page 689](#)

See also

- [clear events on page 54](#)
- [set snmp-parameters on page 276](#)
- [show snmp-parameters on page 428](#)

show expander-status

Description

Shows diagnostic information relating to SAS Expander Controller physical channels, known as PHY lanes. For use by or with direction from technical support.

For each enclosure, this command shows status information for PHYs in I/O module A and then I/O module B.

Minimum role

monitor

Syntax

```
show expander-status
```

Output

Enc1

The enclosure that contains the SAS expander.

Drawer

The number of the drawer.

Ctlr

The I/O module that contains the SAS expander.

Phy

Identifies a PHY's logical location within a group based on the PHY type. If the PHY's controller module or expansion module is not installed, this field shows "--".

Type

- Drawer0-Egress: Drawer 0 egress PHY.
- Drawer0-Ingress: Drawer 0 ingress PHY.
- Drawer1-Egress: Drawer 1 egress PHY.
- Drawer1-Ingress: Drawer 1 drawer ingress PHY.
- Drawer2-Egress: Drawer 2 egress PHY.
- Drawer2-Ingress: Drawer 2 ingress PHY.
- Drive: Drive slot PHY.
- Egress: Expansion port egress PHY.

show expander-status

- Expander-Egress-0: Expansion port 0 egress PHY.
- Expander-Egress-1: Expansion port 1 egress PHY.
- Expander-Ingress-0: Expansion port 0 ingress PHY.
- Expander-Ingress-1: Expansion port 1 ingress PHY.
- Ingress: Expansion port ingress PHY.
- Inter-Exp: Inter-expander PHY.
- SC: Storage Controller PHY.
- SC-0: Storage Controller primary PHY.
- SC-1: Storage Controller alternate PHY.
- SCA-A: Storage Controller A alternate PHY.
- SCA-P: Storage Controller A primary PHY.
- SCB-A: Storage Controller B alternate PHY.
- SCB-P: Storage Controller B primary PHY.

Status

- Enabled - Healthy: The PHY is enabled and healthy.
- Enabled - Degraded: The PHY is enabled but degraded.
- Disabled: The PHY has been disabled by a user or by the system.

Elem Status

A standard SES status for the element:

- Disabled: Critical condition is detected.
- Error: Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data.
- Non-critical: Non-critical condition is detected.
- Not Used: Element is not installed in enclosure.
- OK: Element is installed and no error conditions are known.
- Unknown: Either:
 - Sensor has failed or element status is not available. Appears only if an I/O module indicates it has fewer PHYs than the reporting I/O module, in which case all additional PHYs are reported as unknown.
 - Element is installed with no known errors, but the element has not been turned on or set into operation.

Disabled

- Enabled: PHY is enabled.
- Disabled: PHY is disabled.

Reason

- Blank if Elem Status is OK.
- Error count interrupts: PHY disabled because of error-count interrupts.
- Phy control: PHY disabled by a SES control page as a result of action by a Storage Controller or user.
- Not ready: PHY is enabled but not ready. Appears for SC-1 PHYs when the partner I/O module is not installed. Appears for Drive, SC-1, or Ingress PHYs when a connection problem exists such as a broken connector.
- Drive removed: PHY disabled because drive slot is empty.
- Unused - disabled by default: PHY is disabled by default because it is not used.
- Excessive Phy changes: PHY is disabled because of excessive PHY change counts.

Examples

```
Show expander status for each enclosure.  
# show expander-status
```

Basetypes

- [sas-status-controller-a on page 667](#)
- [sas-status-drawer on page 672](#)
- [status on page 689](#)

See also

- [clear expander-status on page 55](#)
- [set expander-fault-isolation on page 227](#)
- [set expander-phy on page 228](#)

show fans

Description

Shows information about each fan in the storage system.

Minimum role

monitor

Syntax

```
show fans
```

Output

Name

The fan name in the form Fan loc:position-PSU power-supply-ID. The position is as viewed from the back of the enclosure.

Location

The fan location in the form Enclosure enclosure-ID - position. The position is as viewed from the back of the enclosure.

Status

- Up
- Error
- Off
- Missing

Speed

The fan speed (revolutions per minute).

Position

The fan position, as viewed from the back of the enclosure:

- Left
- Right

Serial Number

- (blank): Not applicable.

Firmware Version

- (blank): Not applicable.
- The firmware revision of a fan FRU.

Hardware Version

- (blank): Not applicable.

Health

- OK
- Degraded
- Fault
- N/A

- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

```
Show about all fans in the system.  
# show fans
```

Basetypes

- [fan on page 599](#)
- [status on page 689](#)

See also

- [show power-supplies on page 390](#)

show fde-state (QXS-4 and QXS-6 Series)

Description

Shows Full Disk Encryption information for the storage system.

Minimum role

monitor

Syntax

```
show fde-state
```

Output

FDE Security Status

- Unsecured. The system has not been secured with a passphrase.
- Secured. The system has been secured with a passphrase.
- Secured, Lock Ready. The system has been secured and lock keys are clear. The system will become locked after the next power cycle.
- Secured, Locked. The system is secured and the disks are locked to data access, preventing their use.

Lock Key ID

The current lock ID is displayed.

Import Key ID

The previous or import lock ID is displayed.

FDE Configuration Time

If the system is secured, the time at which the current lock ID was set.

Examples

Show FDE information.

```
# show fde-state
```

Basetypes

- [fde-state \(QXS-4 and QXS-6 Series\) on page 602](#)
- [status on page 689](#)

See also

- [clear fde-keys \(QXS-4 and QXS-6 Series Only\) on page 56](#)
- [set fde-import-key \(QXS-4 and QXS-6 Series\) on page 230](#)
- [set fde-lock-key \(QXS-4 and QXS-6 Series\) on page 232](#)
- [set fde-state \(QXS-4 and QXS-6 Series\) on page 233](#)

show fenced-data

Description

Shows information about fenced data blocks in the storage system. The command will show information for all fenced blocks by default, or you can use parameters to filter the output.

Fenced data blocks are blocks of data on disk which, for either of the following reasons, cannot be recovered and have been lost:

- Typically, fenced data occurs when a disk in a non-fault-tolerant vdisk detects an unrecoverable media error.
- Fenced data can also occur if multiple unrecoverable blocks are detected which exceed the capacity of the RAID error-recovery algorithms.

Unrecoverable data blocks are “fenced” by marking them unreadable by the storage system. A data block remains fenced until the host writes the block, at which time it is again accessible.

For NRAID and RAID 0, fenced data is not tracked. Errors are returned directly during host reads.

For RAID 1 and 10, fenced blocks correspond with the data blocks where unrecoverable errors are detected, normally when a vdisk is not fault tolerant and the remaining good disk has a media error.

For RAID 3, 5, 6 and 50, a single unrecoverable error detected while not fault tolerant can result in two or more blocks being fenced. This is because each parity block protects multiple data blocks. Thus, for RAID 3, 5, and 50, if a block returns an unrecovered error during reconstruction, that block is lost (because it cannot be read). The block being reconstructed is also lost because there is not enough information to reconstruct the data for that block. RAID 6 will similarly mark multiple bad blocks if a combination of failed disks and media errors results in unrecoverable data.

When the controller module fences data, it logs events 542 and 543.

Minimum role

monitor

Syntax

```
show fenced-data  
[all]  
[disk-groups disk-groups]  
[vdisks vdisks]  
[volumes volumes]
```

Parameters

all

Optional. Shows information about all fenced data blocks.

disk-groups disk-groups

Optional. The names or serial numbers of disk groups for which to show fenced data block information. A name that includes a space must be enclosed in double quotes.

vdisks vdisks

Optional. The names or serial numbers of vdisks for which to show fenced data block information. A name that includes a space must be enclosed in double quotes.

volumes volumes

Optional. The names or serial numbers of linear volumes for which to show fenced data block information. A name that includes a space must be enclosed in double quotes.

Output

Volume Name

The volume name for which fenced data is reported.

Volume Serial Number

The volume serial number for which fenced data is reported.

Volume LBA

The LBA in the volume at which fenced data is reported.

Vdisk Name

The vdisk name for which fenced data is reported.

Vdisk Serial Number

The vdisk serial number for which fenced data is reported.

Vdisk LBA

The LBA in the vdisk at which fenced data is reported.

Examples

```
Show information about fenced data blocks for volume vd02_v001.  
# show fenced-data volume vd02_v001
```

Basetypes

- [fenced-data](#)
- [status on page 689](#)

See also

- [show events on page 341](#)
- [show vdisks on page 449](#)
- [show volumes on page 467](#)

show frus

Description

Shows FRU (field-replaceable unit) information for the storage system. Some information is for use by service technicians.

Minimum role

monitor

Syntax

```
show frus
```

Output

FRU fields:

Name

- CHASSIS_MIDPLANE: Chassis and midplane circuit board
- RAID_IOM: Controller module
- BOD_IOM: Expansion module
- POWER_SUPPLY: Power supply module
- DRAWER: Enclosure disk drawer
- FAN: Fan module
- MEMORY_CARD: CompactFlash card

Description

The FRU description.

show frus

Part Number

The FRU part number.

Serial Number

The FRU serial number.

Revision

The hardware revision level.

Dash Level

The FRU template revision number.

FRU Shortname

A short description of the FRU.

Manufacturing Date

The date and time in the format year-month-day hour:minutes:seconds when a PCBA was programmed or a power supply module was manufactured.

Manufacturing Location

The city, state/province, and country where the FRU was manufactured.

Manufacturing Vendor ID

The JEDEC ID (global manufacturing code) of the manufacturer.

FRU Location

The location of the FRU in the enclosure:

- MID-PLANE SLOT: Chassis midplane.
- UPPER IOM SLOT: Controller module or expansion module A.
- LOWER IOM SLOT: Controller module or expansion module B.
- LEFT IOM SLOT: Controller module or expansion module B, in the left slot as viewed from the back.
- RIGHT IOM SLOT: Controller module or expansion module A, in the right slot as viewed from the back.
- LEFT PSU SLOT: Power supply module on the left, as viewed from the back.
- RIGHT PSU SLOT: Power supply module on the right, as viewed from the back.
- LEFT DRAWER SLOT: Drawer on the left, as viewed from the front.
- MIDDLE DRAWER SLOT: Drawer in the middle, as viewed from the front.
- RIGHT DRAWER SLOT: Drawer on the right, as viewed from the front.
- LEFT FAN SLOT: Fan module on the left, as viewed from the back.
- RIGHT FAN SLOT: Fan module on the right, as viewed from the back.
- CONTROLLER A: Controller module A.
- CONTROLLER B: Controller module B.
- UPPER IOM MEMORY CARD SLOT: Memory card slot in controller module A.
- LOWER IOM MEMORY CARD SLOT: Memory card slot in controller module B.
- LEFT IOM MEMORY CARD SLOT: Memory card slot in controller module B.
- RIGHT IOM MEMORY CARD SLOT: Memory card slot in controller module A.

Configuration SN

The configuration serial number.

FRU Status

- **Absent:** The FRU is not present.
- **Fault:** The FRU's health is Degraded or Fault.
- **Invalid Data:** The FRU ID data is invalid. The FRU's EEPROM is improperly programmed.
- **OK:** The FRU is operating normally.
- **Power OFF:** The FRU is powered off.

Enclosure ID

The enclosure number.

Original SN

N/A For a power supply module, the original manufacturer serial number. Otherwise, .

Original PN

For a power supply module, the original manufacturer part number. Otherwise, N/A.

Original Rev

For a power supply module, the original manufacturer hardware revision. Otherwise, N/A.

Examples

```
Show information about all FRUs in the system.  
# show frus
```

Basetypes

- [enclosure-fru on page 585](#)
- [status on page 689](#)

show host-groups

Description

Shows information about host groups and hosts. The command will show information for all host groups (and hosts) by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show host-groups  
[hosts hosts]  
[groups host-groups]
```

Parameters

hosts hosts

Optional. A comma-separated list of the names of hosts for which to show host and initiator information. If this parameter is omitted, information is shown for all hosts. A value that includes a space must be enclosed in double quotes.

groups host-groups

Optional. A comma-separated list of the names of host groups for which to show host-group, host, and initiator information. If this parameter is omitted, information is shown for all host groups. A value that includes a space must be enclosed in double quotes.

Output

Host group information:

Name

The name of the host group.

Number of Members

The number of hosts in the host group.

Host information:

Name

The host name.

Number of Members

The number of initiators in the host.

Initiator information:

Nickname

The nickname of the initiator.

Discovered

- Yes: The initiator was discovered and its entry was automatically created.
- No: The initiator was manually created.

Mapped

Shows whether the initiator is explicitly mapped to any volumes:

- Yes: At least one volume is explicitly mapped to the initiator.
- No: No volumes are explicitly mapped to the initiator.

Profile

- Standard: Default profile.
- HP-UX: The host uses Flat Space Addressing.

ID

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

Examples

Show information about all host groups.

```
# show host-groups
```

Show information about host groups HGroup1 and HGroup3.

```
# show host-groups groups HGroup1,HGroup3
```

Basetypes

- [host-group on page 604](#)
- [status on page 689](#)

See also

- [create host-group on page 66](#)
- [delete host-groups on page 111](#)
- [set host-group on page 236](#)

show host-maps (Deprecated)

Use [show maps on page 368](#) with the initiator parameter.

show host-parameters (Deprecated)

Use [show ports on page 386](#).

show host-phy-statistics

Description

Shows diagnostic information relating to SAS controller physical channels, known as PHY lanes, for each host port.

This command shows PHY status information for each host port found in an enclosure. Each controller in an enclosure may have multiple host ports. A host port may have multiple PHYs. For each PHY, this command shows statistical information in the form of numerical values.

There is no mechanism to reset the statistics. All counts start from the time the controller started up. The counts stop at the maximum value for each statistic.

This command is only applicable to systems that have controllers with SAS host ports.

Minimum role

monitor

Syntax

```
show host-phy-statistics
```

Output

Ports

The controller ID and port number of the SAS host ports for which PHY statistics are displayed.

Phy

Identifies a PHY's logical location within a group based on the PHY type. Logical IDs are 0–3 for host port PHYs. Each SAS host will have multiple PHYs.

Disparity

The number of doublewords containing running disparity errors that have been received by the PHY, not including those received during Link Reset sequences. A running disparity error occurs when positive and negative values in a signal do not alternate.

Lost DWORD

The number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.

Invld DWORD

The number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.

ResErrCnt

The number of times the PHY Reset sequence has failed.

Examples

```
Show PHY statistics for controller host ports.  
# show host-phy-statistics
```

Basetypes

- [sas-host-phy-statistics on page 665](#)
- [status on page 689](#)

See also

- [show host-port-statistics below](#)

show host-port-statistics

Description

Shows live performance statistics for each controller host port. For each host port these statistics quantify I/O operations through the port between a host and a volume. For example, each time a host writes to a volume's cache, the host port's statistics are adjusted. For host-port performance statistics, the system samples live data every 15 seconds.

Statistics shown only in XML API output are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

```
show host-port-statistics  
[ports ports]
```

Parameters

ports ports

Optional. Specifies a comma-separated list of port IDs for which to show information. For port syntax, see [Command Syntax on page 13](#). If this parameter is omitted, information is shown for all host ports.

Output

Durable ID

The host port ID in the form `hostport_controller-ID-and-port-number`.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Queue Depth

The number of pending I/O operations being serviced.

I/O Resp Time

The average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.

Read Resp Time

The average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.

Write Resp Time

The average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.

Reset Time

The date and time, in the format year-month-day hour:minutes:seconds, when these statistics were last reset, either by a user or by a controller restart.

Examples

Show live performance statistics for all host ports.

```
# show host-port-statistics
```

Show live performance statistics for host port A1.

```
# show host-port-statistics ports a1
```

Basetypes

- [host-port-statistics on page 605](#)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [reset host-port-statistics on page 177](#)
- [show ports on page 386](#)

show hosts (Deprecated)

Use [show hosts \(Deprecated\) above](#).

show initiators

Description

Shows information about initiators. The command will show information about all initiators by default, or you can use parameters to filter the output.

show initiators

Initiator entries are automatically created for host initiators that have sent an `inquiry` command or a `report luns` command to the system. This typically happens when the physical host containing an initiator boots up or scans for devices. When the command is received, the system saves the host port information. However, the information is retained after a restart only if you have set a name for the initiator.

Minimum role

monitor

Syntax

```
show initiators
[hosts hosts]
[initiators]
```

Parameters

`hosts hosts`

Optional. A comma-separated list of the names of hosts containing initiators for which to show information. If this parameter is omitted, information is shown for all initiators.

`initiators`

Optional. A comma-separated list of the names of initiators for which to show information. If this parameter is omitted, information is shown for all initiators.

Output

Nickname

The name of the initiator.

Discovered

- Yes: The initiator was discovered and its entry was automatically created.
- No: The initiator was manually created.

Mapped

Shows whether the initiator is explicitly mapped to any volumes:

- Yes: At least one volume is explicitly mapped to the initiator.
- No: No volumes are explicitly mapped to the initiator.

Profile

- Standard: Default profile.
- HP-UX: The host uses Flat Space Addressing.

Host Type

The host-interface type: FC; iSCSI; SAS.

ID

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

Examples

Show information about all initiators.

```
# show initiators
```

Show information about initiators in host Host1 only.

```
# show initiators hosts Host1
```

Basetypes

- [initiator on page 609](#)
- [status on page 689](#)

See also

- [delete initiator-nickname on page 114](#)
- [set initiator on page 242](#)
- [show host-groups on page 354](#) (with the hosts parameter)

show inquiry

Description

Shows inquiry data for each controller module.

Minimum role

monitor

Syntax

```
show inquiry
```

Output

- Product vendor name, product ID, and vendor ID
- Management Controller firmware version and loader version
- Storage Controller firmware version and loader version
- Controller module serial number
- Media Access Control (MAC) address
- Network port IP address

Examples

```
Show inquiry data for controller modules in the system.  
# show inquiry
```

Basetypes

- [inquiry on page 611](#)
- [status on page 689](#)

See also

- [show versions on page 457](#)

show iscsi-parameters

Description

For iSCSI, shows system-wide iSCSI parameters.

Minimum role

monitor

Syntax

```
show iscsi-parameters
```

Output

CHAP

Shows whether Challenge-Handshake Authentication Protocol (CHAP) is enabled or disabled.

- Enabled: CHAP is enabled.
- Disabled: CHAP is disabled. This is the default.

Jumbo Frames

Shows whether support for jumbo frames is enabled or disabled.

- Enabled: Jumbo-frame support is enabled.
- Disabled: Jumbo-frame support is disabled. This is the default.

iSNS

Shows whether support for Internet Storage Name Service (iSNS) is enabled or disabled.

- Enabled: iSNS support is enabled.
- Disabled: iSNS support is disabled. This is the default.

iSNS IP

The address of the iSNS server. The default address is all zeroes.

iSNS Alt IP

The address of the alternate iSNS server. The default address is all zeroes.

iSCSI Speed

The iSCSI host port link speed.

- auto: The proper speed is auto-negotiated. This is the default.
- 1Gbps: The speed is forced to 1 Gbit/s, overriding a downshift that can occur during auto-negotiation with 1-Gbit/s HBAs. This setting does not apply to 10-Gbit/s HBAs.

iSCSI IP Version

- 4: iSCSI host port addresses use IPv4 format. This is the default.
- 6: iSCSI host port addresses use IPv6 format.

Examples

```
Show system-wide iSCSI parameters.  
# show iscsi-parameters
```

Basetypes

- [iscsi-parameters on page 614](#)
- [status on page 689](#)

See also

- [set iscsi-parameters on page 243](#)

show job-parameters (Deprecated)

Use [show advanced-settings on page 293](#).

show license

Description

Shows the status of licensed features in the storage system.

Minimum role

monitor

Syntax

```
show license
```


show license

Output

License Key

- The license key, if a license is installed and valid.
- not installed, if a license is invalid or is not installed.

Licensing Serial Number

The serial number to use when requesting a license.

Maximum Licensable Snapshots

Number of snapshots that the highest-level license allows.

Base Maximum Snapshots

Number of snapshots allowed without an installed license.

Licensed Snapshots

Number of snapshots allowed by the installed license.

In-Use Snapshots

Number of existing licensed snapshots.

Snapshots Expire

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.

Virtualization

Shows whether the capability to create and manage virtual pools is enabled or disabled.

Virtualization Expires

- Never. License is purchased and doesn't expire.

Performance Tier

Shows whether the capability to create a Performance tier comprised of SSDs is enabled or disabled.

Performance Tier Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.

Volume Copy

Shows whether Volume Copy functions are enabled or disabled.

Volume Copy Expires

- Never. License is purchased and doesn't expire.

Replication

Shows whether AssuredRemote functions are enabled or disabled.

Replication Expires

- Never. License is purchased and doesn't expire.

show license

- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.

VDS

Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled or disabled.

VDS Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.

VSS

Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is enabled or disabled.

VSS Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.
- Expired/Renewable. Temporary license has expired and can be renewed.
- N/A. No license installed.

SRA

Shows whether Storage Replication Adapter (SRA) support is enabled or disabled.

SRA Expires

- Never. License is purchased and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.

Examples

Show information about the installed license.

```
# show license
```

Basetypes

- [license on page 617](#)
- [status on page 689](#)

See also

- [create temp-license](#)

show maps

Description

Shows information about mappings between volumes and initiators. If no parameter is specified, this command shows explicit mappings (but not default mappings) for all volumes.

In a dual-controller system, if a mapping uses corresponding ports on both controllers, such as A1 and B1, the Ports field will simply show 1.

Minimum role

monitor

Syntax

```
show maps  
[all]  
[initiator]  
[IDs]
```

Parameters

all

Optional. Shows mappings of all access types: read-write, read-only, no-access, and not-mapped (default mappings). If this parameter is omitted, mappings of type not-mapped are not shown.

initiator

Optional. Shows mapping information by initiator. If this parameter is omitted, mapping information is shown by volume.

IDs

Optional. A comma-separated list of the names or serial numbers of host-type items (initiators, hosts, and host groups) or volume-type items (volumes and volume groups) for which to show mappings. If a volume is mapped to a host group, to see mappings you must specify the host group, not a host or initiator in the group. If a volume is mapped to a host, to see mappings you must specify the host, not an initiator in the group.

You can specify:

- A host by name in the format `host-name.*`, where `*` represents all initiators in the host. Example: `FC-Server.*`
- A host group by name in the format `host-group.*.*`, where the first `*` represents all hosts in the group and the second `*` represents all initiators in those hosts. Example: `TestLab.*.*`
- A volume group by name in the format `volume-group.*`, where `*` represents all volumes in the group. Example: `TestVolumes.*`

Do not include both host-type and volume-type items in a list. A name that includes a space must be enclosed in double quotes.

Output

Properties are described in alphabetical order.

Access

Type of host access to the volume:

- read-write: Read and write.
- read-only: Read only.
- no-access: No access (masked).
- not-mapped: Not mapped.

Group Name

For a volume group, its name in the format `volume-group.*`, where the `*` represents all volumes in the group.

ID

Shown by the `initiator` parameter.

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

Host-Port-Identifier (v2)

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).
- `all other initiators`: The volume's default mapping.

Identifier (v3)

See `Host-Port-Identifier`, above.

Initiator-Identifier

Shown for a volume group mapping.

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).
- `all other initiators`: The volume's default mapping.

LUN

- The LUN that identifies the volume to a host.
- For a volume group, `*` means multiple LUNs are represented in the group.

show maps

- Blank if not mapped or mapped as no-access.

Name

The name of a volume or initiator.

Nickname

- For a host, its name in the format `host-name.*`, where the `*` represents all initiators in the host.
- For a host group, its name in the format `host-group.*.*`, where the first `*` represents all hosts in the host group and the second `*` represents all initiators in those hosts.
- Blank if not set or for all other initiators.

Ports

- The controller host ports to which the mapping applies.
- Blank if not mapped or mapped as no-access.

Profile

- Standard: Default profile.
- HP-UX: The host uses Flat Space Addressing.

Serial Number

The serial number of the volume group or volume.

Volume

- For a volume, its name.
- For a volume group, its name in the format `volume-group.*`, where the `*` represents all volumes in the group.

Examples

```
Show mappings for all volumes.
```

```
# show maps
```

```
Show mapping information for all initiators.
```

```
# show maps initiator
```

```
Show mappings for volume group VGroup1 and ungrouped volume v2.
```

```
# show maps VGroup1.*,v2
```

Basetypes

- [initiator-view on page 610](#)
- [host-group-view on page 604](#)
- [host-view-mappings on page 609](#)
- [volume-group-view on page 725](#)

- [volume-group-view-mappings on page 726](#)
- [volume-view on page 740](#)
- [volume-view-mappings on page 741](#)
- [status on page 689](#)

See also

- [show host-groups on page 354](#)
- [show hosts \(Deprecated\) on page 360](#)
- [show volume-groups on page 461](#)
- [show volumes on page 467](#)

show master-volumes

Description

Shows information about master volumes. This command applies to linear storage only.

The command will show information for all master volumes by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show master-volumes  
[controller a|b|both]  
[pool pool]  
[snap-pool snap-pool]
```

Parameters

controller a|b|both

Optional. Shows master volumes owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, master volumes owned by either controller are shown.

show master-volumes

pool pool

Optional. Shows master volumes in the specified pool only. You can specify pool by name or serial number. A name that includes a space must be enclosed in double quotes.

snap-pool snap-pool

Optional. Shows master volumes associated with the specified snap pool only. You can specify the snap pool by name or serial number. A name that includes a space must be enclosed in double quotes

Output

Vdisk

The name of the vdisk.

Serial Number

The serial number of the master volume.

Name

The name of the master volume.

Size

Total size of the master volume.

Status

Indicates whether the master volume is available or unavailable.

Status-Reason

Shows --- for Available status, or a reason for Unavailable status:

- MV Not Accessible: Master volume is not accessible
- MV Not Found: Master volume is not found
- RV: Replication volume (either a primary volume or a secondary volume)
- RV Prepared: Replication-prepared volume, which could become a secondary volume in a replication set
- SP Not Accessible: Snap pool is not accessible
- SP Not Found: Snap pool is not found
- Unknown Reason

Snap-Pool

The name of the snap pool.

Snapshots

The number of snapshots that exist for the master volume.

Snap Data

The amount of snap-pool space occupied by this master volume for its associated snapshots (preserved and write data).

Rollback

Either the percent complete if rollback is in progress, or --- if rollback is not in progress.

Examples

Show information about all master volumes.

```
# show master-volumes
```

Show information about master volumes associated with snap pool spV1.

```
# show master-volumes snap-pool spV1
```

Basetypes

- [master-volumes on page 624](#)
- [status on page 689](#)

See also

- [convert master-to-std on page 57](#)
- [create master-volume on page 67](#)
- [delete all-master-volumes on page 107](#)
- [delete volumes on page 130](#)
- [expand volume on page 142](#)
- [rollback volume on page 190](#)

show network-parameters

Description

Shows the settings and health of each controller module's network port.

Minimum role

monitor

Syntax

```
show network-parameters
```

Output

IP Address

The network port IP address.

Gateway

The network port gateway IP address.

Subnet Mask

The network port IP subnet mask.

MAC Address

The controller's unique Media Access Control address.

Addressing Mode

- Manual: Network settings are set manually (statically).
- DHCP: DHCP is used to set network parameters.

Link Speed

- Unknown: For a system operating in Single Controller mode, this controller module is not present.
- 10mbps: The network port link speed is set to 10 Mb/s.
- 100mbps: The network port link speed is set to 100 Mb/s.
- 1000mbps: The network port link speed is set to 1000 Mb/s.

Duplex Mode

- Undefined: For a system operating in Single Controller mode, this controller module is not present.
- half: The network port duplex mode is set to half duplex.
- full: The network port duplex mode is set to full duplex.

Health

The health of the network connection.

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

If Health is not OK, this field shows the reason for the health state.

Health Recommendation

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

```
Show network parameters for each controller module.  
# show network-parameters
```

Basetypes

- [network-parameters on page 625](#)
- [status on page 689](#)

See also

- [set network-parameters on page 247](#)

show ntp-status

Description

Shows the status of the use of Network Time Protocol (NTP) in the system.

Minimum role

monitor

Syntax

```
show ntp-status
```

Output

NTP Status

- activated: NTP is enabled.
- deactivated: NTP is disabled. This is the default.

NTP Server Address

- The current NTP server IP address if NTP is enabled.

show peer-connections

- The last-set NTP server IP address if NTP was enabled and has been disabled.
- 0.0.0.0 if the NTP server IP address has not been set.

Last Server Contact

The date and time in the format year-month-day hour:minutes:seconds of the last message received from the NTP server, or none.

Examples

Show NTP status for the system.

```
# show ntp-status
```

Basetypes

- [ntp-status on page 627](#)
- [status on page 689](#)

See also

- [set controller-date on page 215](#)

show peer-connections

Description

Shows information about a peer connection between two systems.

You can run this command on either the local or remote system.

Minimum role

monitor

Syntax

```
show peer-connections
```

```
[verify-links]  
[peer-connection-ID]
```

Parameters

verify-links

Optional. If a peer connection ID is specified, this parameter displays the ports that can be seen by each port on each peer system.

peer-connection-ID

Optional. Specifies the name or serial number of the peer connection for which to show information. If this parameter is not specified the command shows information for all peer connections.

Output

Peer Connection Name

The name of the peer connection.

Peer Connection Type

The type of ports being used for the peer connection:

- iSCSI: iSCSI ports.

Connection Status

- Online: The systems have a valid connection.
- Offline: No connection is available to the remote system.

Health

- OK
- Fault
- Unknown

Health Reason

If **Health** is not OK, this field shows the reason for the health state.

Health Recommendation

If **Health** is not OK, this field shows recommended actions to take to resolve the health issue.

Local Port

The IDs of ports in the local system.

Port Address

The assigned port IP address.

Remote Port

The IDs of ports in the remote system.

Reachable Remote Links

Shown by the `verify-links` parameter. The IDs of linked ports in the remote system.

Reachable Local Links

Shown by the `verify-links` parameter. The IDs of linked ports in the local system.

Examples

Show information for all peer connections.

```
# show peer-connections
```

Show information for peer connection Peer1.

```
# show peer-connections Peer1
```

Show information for peer connection Peer1 and the ports that can be seen from each port.

```
# show peer-connections Peer1 verify-links
```

Basetypes

- [peer-connections on page 628](#)
- [status on page 689](#)

See also

- [create peer-connection on page 69](#)
- [delete peer-connection on page 115](#)
- [query peer-connection on page 151](#)
- [set peer-connection on page 253](#)

show pools

Description

Shows information about linear and virtual pools. The command will show information for all pools by default, or you can use parameters to filter the output. The system can have a maximum of two virtual pools. The system can have a maximum of two virtual pools.

show pools

- i Note:** For a virtual pool, new data will not be written to, or existing data migrated to, a degraded disk group unless it is the only disk group having sufficient available space for the data.

Minimum role

monitor

Syntax

```
show pools
[type linear|virtual]
[pool]
```

type linear|virtual

Optional. Specifies whether to show information for linear pools or for virtual pools. If this parameter is omitted, information will be shown for both types.

pool

Optional. The name or serial number of the pool for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all pools.

Output

Name

The name of the pool.

Serial Number

The serial number of the pool.

Class

- Linear: Linear pool.
- Virtual: Virtual pool.

Total Size

The total capacity of the pool.

Avail

The available capacity in the pool.

Snap Size

The pool capacity used by linear snap pools or virtual snapshots.

OverCommit

- Enabled: The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool.
- Disabled: The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.

show pools

Disk Groups

The number of disk groups in the pool.

Volumes

The number of volumes in the pool.

Low Thresh

The low threshold for page allocation as a percentage of pool capacity. When this threshold is exceeded, event 462 will be logged with Informational severity. The default is 25%.

Mid Thresh

The middle threshold for page allocation as a percentage of pool capacity. When this threshold is exceeded, event 462 will be logged. If the pool is not overcommitted, the event will have Informational severity. If the pool is overcommitted, the event will have Warning severity. The default is 50%.

High Thresh

The high threshold for page allocation as a percentage of pool capacity. The threshold value is automatically calculated based on the available capacity of the pool minus 200 GB of reserved space. When this threshold is exceeded, event 462 will be logged. If the pool is not overcommitted, the event will have Informational severity. If the pool is overcommitted, the event will have Warning severity and the system will use write-through cache mode until page allocation drops back below this threshold.

Sec Fmt

The sector format of disks in the pool.

- 512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.
- 512e: All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.
- Mixed: The pool contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

Show information about all pools.

```
# show pools
```

```
Show information about virtual pools.  
# show pools type virtual
```

Basetypes

- [pools on page 634](#)
- [disk-groups on page 549](#)
- [tiers \(QXS-4 and QXS-6 Series Only\) on page 703](#)
- [status on page 689](#)

See also

- [delete pools on page 116](#)
- [set pool on page 255](#)
- [show pool-statistics below](#)

show pool-statistics

Description

Shows live or historical performance statistics for virtual pools. For pool performance statistics, the system samples live data every 30 seconds and historical data every quarter hour, and retains historical data for 6 months.

The historical option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the time-range and count parameters. If both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

Statistics shown only in XML API output are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

```
To show live statistics:  
show pool-statistics  
[pools pool]  
[tier performance|standard|archive|readcache]  
  
To show historical statistics:  
show pool-statistics  
[all]  
[count number-of-data-samples]  
[filename filename.csv]  
historical  
[pools pool]  
[tier performance|standard|archive|readcache]  
[time-range "date/time-range"]
```

Parameters

all

Optional. Specifies to show the full set of performance metrics. If this parameter is omitted, the default set of performance metrics will be shown.

count number-of-data-samples

Optional. Specifies the number of data samples to display, from 1 to 100. Each sample will be shown as a separate row in the command output. If this parameter is omitted, 100 samples will be shown. If you specify this parameter, do not specify the `time-range` parameter.

filename filename.csv

Optional. Specifies to save historical statistics, in CSV format, to a file on the controller. To access the file, use FTP.

historical

Optional. Specifies to show historical statistics. If this parameter is omitted, live statistics will be shown.

pools pool

Optional. Specifies the name or serial number of the virtual pool for which to show information. If this parameter is omitted, information will be shown for both pools A and B. A name that includes a space must be enclosed in double quotes.

tier performance|standard|archive|readcache

Optional. Specifies the tier for which to show statistics.

time-range "date/time-range"

Optional. Specifies the date/time range of historical statistics to show, in the format "`start yyyy-mm-ddhh:mm [AM|PM] end yyyy-mm-ddhh:mm [AM|PM]`". If the start date/time is specified but no end date/time is specified, the current date/time will be used as the end date/time. The system will return the oldest sample taken after the start time and the latest sample taken before the end time. If the specified start date/time is earlier than the oldest sample, that sample will be used as the start date/time. If you specify this

parameter, do not specify the count parameter. If this parameter is omitted, the most recent 100 data samples will be displayed.

disks

Optional. Specifies a comma-separated list of disks for which to show information. If this parameter is omitted, information will be shown for all disks. For disk syntax, see [Command Syntax on page 13](#).

Output

Live

Pool

The name of the pool.

Pages Allocated per Min

The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.

Pages Deallocated per Min

The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data.

Pages Unmapped per Minute

The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host.

Time Since Reset

The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

show pool-statistics

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Historical

For a pool:

Pool

The name of the pool.

Total I/Os

The total number of read and write operations since the last sampling time.

Reads

Shown by the `all` parameter. The number of read operations since the last sampling time.

Writes

Shown by the `all` parameter. The number of write operations since the last sampling time.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the `all` parameter. The amount of data read since the last sampling time.

Data Written

Shown by the `all` parameter. The amount of data written since the last sampling time.

Total IOPS

The total number of read and write operations per second since the last sampling time.

Read IOPS

Shown by the `all` parameter. The number of read operations per second since the last sampling time.

Write IOPS

Shown by the `all` parameter. The number of write operations per second since the last sampling time.

Total B/s

The total data transfer rate, in bytes per second, since the last sampling time.

Read B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for write operations since the last sampling time.

Allocated Pages

The number of 4-MB pages allocated to volumes in the pool.

Sample Time

Date and time, in the format `year-month-day hour:minutes:seconds`, when the data sample was taken.

For each tier in the pool:

Pool

The name of the pool.

Tier

The name of the tier.

Total I/Os, Reads, Writes, Data Transferred, Data Read, Data Written, Total IOPS, Read IOPS, Write IOPS, Total B/s, Read B/s, Write B/s

As described for a pool, above.

Allocated Pages

The number of 4-MB pages allocated to volumes in the tier.

Page Moves In

The number of pages moved into this tier from a different tier.

Page Moves Out

The number of pages moved out of this tier to other tiers.

Page Rebalances

The number of pages moved between disks in this tier to automatically load balance.

Initial Allocations

The number of 4-MB pages that are allocated as a result of host writes. This number does not include pages allocated as a result of background tiering page movement. (Tiering moves pages from one tier to another, so one tier will see a page deallocated, while another tier will show pages allocated. These background moves are not considered initial allocations.)

Unmaps

The number of 4-MB pages that are automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).

RC Copies

The number of 4-MB pages copied from spinning disks to SSD read cache (read flash cache).

Zero-Pages Reclaimed

The number of empty (zero-filled) pages that were reclaimed during this sample period.

Sample Time

Date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.

Examples

Show live statistics for both pools.

```
# show pool-statistics
```

Show historical statistics from a specified date and time range for pool A.

```
# show pool-statistics pools A historical time-range "start 2014-06-01 4:40 PM  
end 2014-06-01 5:00 PM"
```

Show all samples of historical statistics for the Standard tier in pool A.

```
# show pool-statistics historical all pools A tier standard
```

Basetypes

- [pool-statistics on page 633](#) (live)
- [resettable-statistics on page 664](#) (live)
- [tier-statistics \(QXS-4 and QXS-6 Series Only\) on page 702](#) (live)
- [pool-summary on page 634](#) (historical)
- [pool-hist-statistics on page 632](#) (historical)
- [tier-summary \(QXS-4 and QXS-6 Series Only\) on page 703](#) (historical)
- [tier-hist-statistics \(QXS-4 and QXS-6 Series Only\) on page 699](#) (historical)
- [readcache-hist-statistics on page 647](#) (historical)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [reset pool-statistics on page 178](#)
- [show pools on page 378](#)

show ports

Description

Shows information about host ports in both controllers.

Minimum role

monitor

Syntax

```
show ports  
[detail]
```

Parameters

detail

Optional. This parameter shows additional detail about the port status, including SFP information.

Output

Ports

Controller ID and port number

Media

- FC(P): Fibre Channel Point-to-Point
- FC(L): Fibre Channel-Arbitrated Loop (public or private)
- FC(-): Not applicable, as when the port is disconnected
- SAS: Serial Attached SCSI
- iSCSI: Internet SCSI

Target ID

Port WWN or IQN

Status

- Up: The port is cabled and has an I/O link.
- Warning: Not all of the port's PHYs are up.
- Error: The port is reporting an error condition.
- Not Present: The controller module is not installed or is down.
- Disconnected: Either no I/O link is detected or the port is not cabled.

Speed(A)

- Actual link speed in Gbit/s.
- Blank if not applicable.

Speed(C)

Configured host-port link speed. Not shown for SAS.

- FC: Auto, 16Gb, 8Gb, or 4Gb (Gbit/s)
- iSCSI: Auto
- Blank if not applicable

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

show ports

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Topo (C)

FC and SAS only. Configured topology.

Lanes Expected

SAS only. If the `detail` parameter is specified, this field shows the expected number of PHY lanes in the SAS port.

Active Lanes

SAS only. If the `detail` parameter is specified, this field shows the number of active lanes in the SAS port. If the port is connected and fewer lanes are active than are expected, the port status will change to `Warning`, the health will change to `Degraded`, and event 354 will be logged.

Disabled Lanes

SAS only. If the `detail` parameter is specified, this field shows the number of disabled lanes in the SAS port. If the `Ports/Conn` setting does not match the type of cable connected to the port, event 569 will report two lanes in the port are disabled. This field can be used to identify those lanes.

PID

FC only. If the `detail` parameter is specified, this field is shown. If the port is using loop topology and the port status is `Up`, this field shows the primary loop ID. If the port is not using loop topology or the port status is not `Up`, this field shows `N/A`.

IP Version

iSCSI only. IPv4 or IPv6.

IP Address

iSCSI only. Assigned port IP address.

Gateway

iSCSI only. For IPv4, gateway IP address for assigned IP address.

Netmask

iSCSI only. For IPv4, subnet mask for assigned IP address.

Default Router

iSCSI only. For IPv6, default router for assigned IP address.

Link-Local Address

iSCSI only. For IPv6, the link-local address that is automatically generated from the MAC address and assigned to the port.

MAC

iSCSI only. Unique Media Access Control (MAC) hardware address, also called the physical address.

SFP Status

If the `detail` parameter is specified, this field shows the SFP status:

- `OK`
- `Not present`: No SFP is inserted in this port.
- `Not compatible`: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.
- `Incorrect protocol`: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.

show ports

Part Number

If the `detail` parameter is specified, this field shows the SFP part number.

Supported Speeds

FC only. If the `detail` parameter is specified, this field shows the link speeds that the SFP supports.

Ports/Conn

3004 Series SAS controller module only. The number of virtual host ports per controller host-port connector. This reflects whether the system is set to use fan-out SAS cables or standard SAS cables.

- 1: The system is set to use standard SAS cables.
- 2: The system is set to use fan-out SAS cables.

10G Compliance

iSCSI only. If the `detail` parameter is specified, this field shows the SFP's 10G compliance code, if supported.

Ethernet Compliance

iSCSI only. If the `detail` parameter is specified, this field shows the SFP's Ethernet compliance code, if supported.

Cable Technology

iSCSI only. If the `detail` parameter is specified, this field shows whether the SFP supports active or passive cable technology.

Cable Length

iSCSI only. If the `detail` parameter is specified, this field shows the link length (in meters) that is supported by the SFP while operating in compliance with applicable standards for the cable type.

Examples

Show information about host ports in each controller module.

```
# show ports
```

Show detailed information about host ports in each controller module.

```
# show ports detail
```

Basetypes

- [port on page 640](#)
- [status on page 689](#)

See also

- [set host-name \(Deprecated\) on page 237](#)

show power-supplies

Description

Shows information about each power supply in the storage system.

Minimum role

monitor

Syntax

```
show power-supplies
```

Output

Encl

The ID of the enclosure that contains the power supply.

Serial Number

The serial number of the power supply.

Name

The power supply identifier and location.

Firmware Version

- (blank): Not applicable.
- The firmware revision of the power supply.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

Show information about each power supply in each enclosure.
show power-supplies

Basetypes

- [power-supplies on page 642](#)
- [fan on page 599](#)
- [status on page 689](#)

See also

- [show fans on page 346](#)
- [show frus on page 352](#)

show priorities

Description

Shows snapshot-retention priorities for a specified snap pool. This command applies to linear storage only.

Snap-pool priorities, in conjunction with snapshot priorities, determine which snapshots are retained if system resource limitations require some snapshots to be automatically deleted.

Lower-priority snapshots will be deleted before higher-priority snapshots. Priority values are 0–65535.

Minimum role

monitor

Syntax

show priorities

snap-pool

Parameters

snap-pool

The name or serial number of the snap pool, as shown by the [show snap-pools on page 421](#) command.

Output

Attribute Name

- Standard Snapshot
- Volume Copy Snapshot: A snapshot that is being used to copy data from a source volume to a destination volume. This attribute is temporary for the duration of the volume-copy process.
- Replication Snapshot
- Replicating Snapshot: A snapshot that is being replicated to a secondary volume. This snapshot is required in order to resume the replication. The attribute is temporary for the duration of the replication process.
- Common Sync Point Snapshot: The latest snapshot that is copy-complete on all secondary volumes. It identifies a common point in time that is known by all destinations.
- Only Sync Point Snapshot: The only sync point that is available on at least one secondary volume. If this snapshot is removed, then the next replication requires a full sync to be performed.
- Queued Snapshot: A snapshot that was taken for remote replication but is queued waiting for the previous replications to complete.
- DRM Snapshot: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).

Priority

Retention priority for the corresponding attribute. Values are shown as hexadecimal numbers.

Examples

Show priorities for snap-pool SP1.

```
# show priorities SP1
```

Basetypes

- [attribute-priorities on page 518](#)
- [status on page 689](#)

See also

- [set priorities on page 256](#)
- [show snap-pools on page 421](#)

show protocols

Description

Shows which management services and protocols are enabled or disabled.

Minimum role

monitor

Syntax

```
show protocols
```

Output

Web Browser Interface (HTTP)

Shows whether the standard Disk Management Utility web server is enabled or disabled. The default is Disabled.

Secure Web Browser Interface (HTTPS)

Shows whether the secure Disk Management Utility web server is enabled or disabled. The default is Enabled.

Command Line Interface (Telnet)

Shows whether the standard CLI is enabled or disabled. The default is Enabled.

Secure Command Line Interface (SSH)

Shows whether the secure shell CLI is enabled or disabled. The default is Enabled.

Storage Management Initiative Specification (SMI-S)

Shows whether the secure SMI-S interface is enabled or disabled. When enabled, this option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5989. The default is Enabled.

Unsecure Storage Management Initiative Specification (SMI-S 5988)

Shows whether the secure SMI-S interface is enabled or disabled. When enabled, this option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988. The default is Disabled.

File Transfer Protocol (FTP)

Shows whether the expert interface for performing actions such as updating firmware is enabled or disabled. The default is Enabled.

Simple Network Management Protocol (SNMP)

Shows whether the SNMP interface is enabled or disabled. When this is disabled, all SNMP requests to the MIB are disabled and SNMP traps are disabled. The default is Enabled.

show protocols

Service Debug

Shows whether the Telnet debug port is enabled or disabled. The default is Disabled.

In-band SES Management (SES)

Shows whether the in-band SES interface is enabled or disabled. The default is Enabled.

Activity Progress Reporting (activity)

Shows whether access to the activity progress interface via HTTP port 8081 is enabled or disabled. This mechanism reports whether a firmware update or partner firmware update operation is active and shows the progress through each step of the operation. In addition, when the update operation completes, status is presented indicating either the successful completion, or an error indication if the operation failed. This is disabled by default.

Management Mode

Shows the default management mode, which controls the terminology used in command output and system messages. This setting does not affect access to commands.

- v2: Uses terminology that is oriented to managing linear storage. For example, *vdisk* for disk groups and pools.
- v3: Uses terminology that is oriented to managing virtual and linear storage. For example, *disk group* for disk groups and *pool* for pools.

To see the management mode for the current CLI session, which can be set differently than the default, use the [show cli-parameters on page 304](#) command.

Examples

Show the status of service and security protocols.

```
# show protocols
```

Basetypes

- [security-communications-protocols on page 673](#)
- [status on page 689](#)

See also

- [set protocols on page 259](#)
- [show cli-parameters on page 304](#)

show provisioning

Description

Shows information about how the system is provisioned. This command shows the associations between controllers, disks, vdisks or pools, volumes, and mappings. The command will show information for all associations by default, or you can use parameters to filter the output.

This command is useful for the following purposes:

- You want a quick overview of how the system is provisioned.
- You know of a disk-related issue (perhaps from the event log) and want to understand what components it may be impacting. You can use this command to see which volume WWNs are affected, which you can use on the host to determine which device node might be seeing errors.
- You know of a volume-level issue and want to determine which associated components to investigate. You can use this command to quickly see which controller owns the volume and which disks are associated with the volume. For example, perhaps at the OS level, a certain device node (target) looks “slow” relative to the rest of the targets. You can correlate the OS device node to the volume WWN (or LUN), and then use the command output to find the associated controller and disks.

Minimum role

monitor

Syntax

```
show provisioning  
[disks disks | luns LUNs | pool pools | ports ports | vdisks vdisks | volumes  
volumes]  
[no-mapping]  
[unhealthy]
```

Parameters

`disks disks`

Optional. Shows provisioning information for the specified list of disks. For disk syntax, see [Command Syntax on page 13](#). This command does not support the use of hyphens to indicate a range of disks.

`luns LUNs`

Optional. Shows provisioning information for the specified list of LUNs.

`no-mapping`

Optional. Shows the Mapped field but no other mapping information. If this parameter is omitted, all mapping information is shown.

show provisioning

pool pools

Optional. Shows provisioning information for the specified list of pools. A name that includes a space must be enclosed in double quotes.

ports ports

Optional. Shows provisioning information for the specified list of ports. For port syntax, see [Command Syntax on page 13](#). This command does not support the use of hyphens to indicate a range of ports.

vdisks vdisks

Optional. For linear storage, this shows provisioning information for the specified list of vdisks. A name that includes a space must be enclosed in double quotes.

volumes volumes

Optional. Shows provisioning information for the specified list of volumes. A name that includes a space must be enclosed in double quotes.

unhealthy

Optional. Shows provisioning information for vdisks or pools whose health is not OK. If this parameter is omitted, provisioning information is shown for all vdisks or pools.

Output

Volume information:

Volume

- Volume name.
- Blank if the vdisk or pool does not have a volume.

WWN

- Volume World Wide Name.
- Blank if the vdisk or pool does not have a volume.

Ctlr

Owning controller of the vdisk or pool.

Disks

Shorthand list of the disks within a vdisk or pool.

Pool (v3)

Pool name.

Vdisk (v2)

Vdisk name.

Health

Health of the associated vdisk or pool:

- OK
- Degraded
- Fault
- N/A
- Unknown

Mapped

Indicates whether the volume is mapped. This is useful when the `no-mapping` parameter is specified to hide detailed mapping information.

- Yes: The volume is mapped.
- No: The volume is not mapped.

Mapping information:

Ports

- Controller host ports that the mapping applies to.
- Blank if not mapped or mapped as no-access.

LUN

- LUN that identifies the volume to a host.
- Blank if not mapped or mapped as no-access.

Access

Type of host access to the volume:

- read-write: The host has read and write access to the volume. This is the default.
- read-only: The host has read access to the volume.
- no-access: The host is denied access to the volume.
- not-mapped: The host is not mapped to the volume.

Host-Port-Identifier (v2) or Identifier (v3)

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).
- all other initiators: The volume's default mapping.

Nickname

Host nickname, or blank if not set or for all other hosts

Profile

- Standard: Default profile.
- HP-UX: The host uses Flat Space Addressing.

Examples

```
Show provisioning for the system.  
# show provisioning  
Show provisioning for vdisk myR1.
```



```
# show provisioning vdisks myR1
Show provisioning for all unhealthy vdisks.
# show provisioning unhealthy
```

Basetypes

- [provisioning on page 645](#)
- [status on page 689](#)

See also

- [show disk-groups on page 317](#)
- [show disks on page 325](#)
- [show maps on page 368](#)
- [show pools on page 378](#)
- [show vdisks on page 449](#)

show redundancy-mode

Description

Shows the redundancy status of the system.

Minimum role

monitor

Syntax

```
show redundancy-mode
```

Output

Controller Redundancy Mode

Shows the system's operating mode, also called the cache redundancy mode:

- **Independent Cache Performance Mode:** For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- **Active-Active ULP:** Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- **Single Controller:** The enclosure contains a single controller.
- **Failed Over:** Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- **Down:** Both controllers are not operational.

Controller Redundancy Status

- **Redundant with independent cache:** Both controllers are operational but are not mirroring their cache metadata to each other.
- **Redundant:** Both controllers are operational.
- **Operational but not redundant:** In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.
- **Down:** This controller is not operational.
- **Unknown:** Status information is not available.

ControllerID Status

- **Operational:** The controller is operational.
- **Down:** The controller is installed but not operational.
- **Not Installed:** The controller is not installed.

ControllerIDSerial Number

- **Controller module serial number**
- **Not Available:** The controller is down or not installed.

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- **Operational**
- **Not Operational**
- **Not Communicating**
- **Unknown**

Examples

```
Show the redundancy status of the system.  
# show redundancy-mode
```

Basetypes

- [redundancy on page 648](#)
- [status on page 689](#)

show refresh-counters

Description

In XML API format only, shows when the data represented by the basetype was last updated.

The value 0 means the data has never been updated and is not cached. A value other than 0 is a timestamp indicating that the data has been updated. If the value has changed since the last time you called this command then the data has changed.

Minimum role

monitor

Syntax

```
show refresh-counters
```

Basetypes

- [refresh-counters on page 650](#)
- [status on page 689](#)

See also

- [set cli-parameters on page 212](#)

show remote-systems

Description

Shows information about remote systems associated with the local system. This command applies to linear storage only.

Minimum role

monitor

Syntax

```
show remote-systems  
[system]
```

Parameters

system

Optional. The name or network-port IP address of the remote system about which to show information.

Output

System Name

The name of the remote system.

System Contact

The name of the person who administers the remote system.

System Location

The location of the remote system.

System Information

A brief description of the remote system.

Vendor Name

The vendor name of the remote system.

Product ID

The product model identifier of the remote system.

Product Brand

The brand name of the remote system.

IP Address Controller A

The IP address of the network port in controller A in the remote system.

IP Address Controller B

The IP address of the network port in controller B in the remote system.

Username

The name of a user with the manage role in the remote system.

Status

- **Uninitialized:** This system hasn't communicated with the remote system.
- **Ready:** This system has contacted the remote system and it is ready to use.
- **Connected:** This system is transferring data to the remote system.
- **Not Connected:** The system is not connected to the remote system.

Last Connected

Date and time, in the format `year-month-day hour:minutes:seconds (UTC)`, when successful communication was last established between the MC in the local system and the MC in the remote system. This value does not indicate when connection status was last determined, and will not be updated if the remote MC is not accessible or if the connection status is `Not Connected`.

Examples

```
Show information about remote system System2.  
# show remote-systems System2
```

Basetypes

- [remote-system on page 653](#)
- [status on page 689](#)

See also

- [create remote-system on page 71](#)
- [delete remote-system on page 118](#)
- [remote on page 156](#)
- [set remote-system on page 261](#)

show replication-images

Description

Shows information about replication images. This command applies to linear storage only.

The command will show information for all replication images by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show replication-images  
[set replication-set]  
[replication-volume]
```

Parameters

`set replication-set`

Optional. Specifies the name or serial number of a replication set for which to show image information. A name that includes a space must be enclosed in double quotes.

`replication-volume`

Optional. Specifies the name or serial number of a replication volume for which to show image information. A name that includes a space must be enclosed in double quotes. If the name is not unique within the replication set, the local volume is assumed. If the name is not unique across replication sets, specify the set parameter.

Output

Replication volume summary information:

Name

The replication volume name.

Serial Number

The replication volume serial number.

Type

The replication volume type:

- **Primary Volume:** The volume is the primary volume in a replication set.

show replication-images

- **Secondary Volume:** The volume is the secondary volume in a replication set.

Replication volume image information:

Image Serial Number

The replication image serial number.

Image Name

The user-defined name assigned to the primary image.

Snapshot Serial

The replication snapshot serial number associated with the image. The replication snapshot is associated with the replication volume specified in the request.

Snapshot Name

The replication snapshot name associated with the image. For a secondary image, this value is not filled in until the replication is completed.

Creation Date/Time

The date and time when the replication image was created on the replication volume.

Information shown for secondary images, not primary images:

Status

The status of the replication image:

- **N/A:** The image information is not valid.
- **Queued:** The image is known to exist in the primary-view volume but replication has not started.
- **Replicating:** The image is being replicated.
- **Suspended:** The image is being replicated but replication is suspended.
- **Complete:** The image is created, fully replicated, and available.
- **Create-Snapshot:** The image is fully replicated but a snapshot of the image is being created.
- **Offline:** The image has been replicated but is unusable due to an error.

Progress

The percentage complete if the image is being replicated. Applies only to secondary volumes.

Start Date/Time

The date and time when replication started on the replication volume.

Last Update

The date and time when the image was last updated (either due to an ongoing replication operation or the replication being completed).

Suspended

The date and time when the image was suspended or resumed.

Est Complete

The estimated time when replication is expected to complete.

Time [HH:MM:SS]

The total time of replication (in hours, minutes, and seconds) including any suspension time.

Examples

```
Show information about replication images for replication set rsvol1.  
# show replication-images rsvol1
```

Basetypes

- [replication-volume-summary on page 663](#)
- [status on page 689](#)

See also

- [show replication-sets below](#)
- [show replication-volumes on page 411](#)

show replication-sets

For virtual storage

Description

Shows information about replication sets in the peer connection.

You can view information about all replication sets or a specific replication set.

For virtual storage, you can run this command on either the primary or secondary system. In console mode, this command does not show the serial numbers of items such as replication volumes. To see serial numbers, run this command in XML API mode.

Timestamps use the local time zone of the system on which this command is run.

Minimum role

monitor

Syntax

```
show replication-sets  
    [replication-set-ID]
```

Parameters

replication-set-ID

Optional. The name or serial number of a replication set for which to display information at the replication set level. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all replication sets.

Output

Overview information:

Name

The replication set name.

Group

- Yes: The replication set is part of a group.
- No: The replication set is not part of a group.

Primary Location

The location of the primary volume in the replication set: Local or Remote.

Peer

The name of the peer connection.

Primary-Volume

The primary volume name. If it is a volume group, it uses the .* notation.

Primary Volume

The primary volume name. If it is a volume group, it uses the .* notation.

Secondary Volume

The secondary volume name. If it is a volume group, it uses the .* notation.

Status

- Not Ready: The replication set is not ready for replications because the system is still preparing the replication set.
- Unsynchronized: The primary and secondary volumes are unsynchronized because the system has prepared the replication set, but the initial replication has not run.
- Running: A replication is in progress.

- Ready: The replication set is ready for a replication.
- Suspended: Replications have been suspended.
- Unknown: This system cannot communicate with the primary system and thus cannot be sure of the current state of the replication set. Check the state of the primary system.

Last Successful Run

The date and time when the system took a snapshot of the primary volume in preparation for starting the last successful replication run. The value shows when the primary and secondary volumes were last known to be in sync.

Last Status

The status of the last attempted replication.

Last run or current run information:

Replication

Last Run or Current Run.

Progress

The percentage complete for an active replication. Otherwise, 0%.

Data Transferred

The total number of bytes transferred.

Start Time

The date and time when the replication started.

End Time

For the last run, the date and time when the replication ended.

Estimated Completion Time

For the current run, the date and time when the replication is estimated to end.

Run Error

A message that says whether the replication succeeded or an error occurred.

Examples

Show information about all replication sets.

```
# show replication-sets
```

Show information about replication set RS1.

```
# show replication-sets RS1
```

Basetypes

- [cs-replication-set on page 541](#)
- [status on page 689](#)

See also

- [create replication-set on page 72](#)
- [delete replication-set on page 119](#)
- [resume replication-set on page 189](#)
- [set replication-set on page 266](#)
- [suspend replication-set](#)

For linear storage

Description

Shows information about replication sets in the local system. This command applies to linear storage only. You can view information about all replication sets or a specific replication set.

Minimum role

monitor

Syntax

```
show replication-sets  
  [replication-set-ID]
```

Parameters

replication-set-ID

Optional. The name or serial number of a replication set or volume for which to display replication-set-level information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all replication sets.

Output

Replication set information:

Name

The replication set name.

Serial Number

The replication set serial number.

Replication volume information:

Name

The replication volume name.

Serial Number

The replication volume serial number.

Status

Replication volume status:

- **Initializing:** The initial (full) replication to the volume is in progress.
- **Online:** The volume is online and is consistent with the last replicated image.
- **Inconsistent:** The volume is online but is in an inconsistent state. A full replication is required to initialize it.
- **Replicating:** The volume is online and replication is in progress.
- **Replicate-delay:** The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.
- **Suspended:** The volume is online but the in-progress replication has been suspended.
- **Offline:** The volume cannot be accessed or is unusable due to an error.
- **Establishing proxy:** The volume is establishing a proxy connection to a remote volume. This will occur when a detached secondary volume is reattached and is re-establishing a connection with the primary system in preparation for replication.
- **Detached:** The volume is detached for removal.

Status-Reason

More information about the status value, or N/A for **Online** status.

Monitor

The replication volume monitoring status:

- **OK:** Communication to the remote volume is successfully occurring on the FC or iSCSI network.
- **Failed:** Communication to the remote volume has failed because of an FC or iSCSI network issue or because the remote volume has gone offline.

Location

The replication volume location: **Local** or **Remote**.

Primary-Volume

The primary volume name. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Serial

Primary volume serial number. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Status

Primary volume status: **Online**, **Offline**, **Conflict**, or **N/A**.

show replication-sets

MaxQueue

The number of replication images to consider when determining the next image to replicate. Used only if the `On Collision` parameter is set to `Oldest`.

MaxRetryTime

The amount of time in seconds that the replication volume should retry a replication operation on any specific image when errors occur. Used only if the `On Error` parameter is set to `Retry`.

On Error

The error policy to invoke when errors occur during the replication process: `Retry` or `Suspend`.

Link Type

The type of ports used to link the primary and secondary volumes:

- `FC`: FC ports.
- `iSCSI`: iSCSI ports.

On Collision

The collision policy used to determine the next image to replicate when multiple replication images are queued: `Newest` or `Oldest`.

Monitor Interval

The interval in seconds at which the primary volume should query the secondary volume.

Priority

The priority of the replication process on the replication volume: `Low`, `Medium`, or `High`.

Connection Status

- `Not Attempted`: Communication has not been attempted to the remote volume.
- `Online`: The volumes in the replication set have a valid connection but communication is not currently active.
- `Active`: Communication is currently active to the remote volume.
- `Offline`: No connection is available to the remote system.

Connection Time

The date and time of the last communication with the remote volume, or `N/A`.

Remote link information:

Connected Ports

- For a remote primary or secondary volume, this field shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller. If no path is found, `N/A` is shown.
- For a local primary or secondary volume, this field shows `N/A`.

Remote Address

The address of each host port in the remote system through which the volume is accessible.

Examples

```
Show information about all replication sets.  
# show replication-sets  
  
Show information about replication set RS1.  
# show replication-sets RS1
```

Basetypes

- [replication-set on page 658](#)
- [status on page 689](#)

See also

- [show replication-images on page 403](#)
- [show replication-volumes below](#)

show replication-volumes

Description

Shows information about volumes in replication sets. This command applies to linear storage only.

The command will show information for all replication volumes by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show replication-volumes  
[set replication-set]  
[replication-volume]
```

Parameters

set replication-set

Optional. Specifies the name or serial number of a replication set for which to show volume information. A name that includes a space must be enclosed in double quotes.

replication-volume

Optional. Specifies the name or serial number of a replication volume for which to show information. A name that includes a space must be enclosed in double quotes. If the name is not unique within the replication set, the local volume is assumed. If the name is not unique across replication sets, specify the set parameter.

Output

Replication volume information:

Name

The replication volume name.

Serial Number

The replication volume serial number.

Status

The replication volume status:

- **Initializing:** The initial (full) replication to the volume is in progress.
- **Online:** The volume is online and is consistent with the last replicated image.
- **Inconsistent:** The volume is online but is in an inconsistent state. A full replication is required to initialize it.
- **Replicating:** The volume is online and replication is in progress.
- **Replicate-delay:** The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.
- **Suspended:** The volume is online but the in-progress replication has been suspended.
- **Offline:** The volume cannot be accessed and is unusable due to an error.
- **Establishing proxy:** The volume is establishing a proxy connection to a remote volume. This will occur when a detached secondary volume is reattached and is re-establishing a connection with the primary system in preparation for replication.
- **Detached:** The volume is detached for removal.

Status-Reason

More information about the status value, or N/A for Online status.

Monitor

The replication volume monitoring status:

- **OK:** Communication to the remote volume is successfully occurring on the iSCSI network.
- **Failed:** Communication to the remote volume has failed because of an iSCSI communication issue or because the remote volume has gone offline.

Location

The replication volume location: Local or Remote.

show replication-volumes

Primary-Volume

The primary volume name. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Serial

The primary volume serial number. If the replication set has a primary-volume conflict, all associated primary volumes are displayed.

Primary-Volume-Status

The primary volume status: `Online`, `Offline`, `Conflict`, or `N/A`.

MaxQueue

The maximum number of replication images to consider when determining the next image to replicate. Used only if the `On Collision` parameter is set to `Oldest`. The default is 32.

MaxRetryTime

The maximum amount of time in seconds that the replication volume should retry a replication operation on any specific image when errors occur. Used only if the `On Error` parameter is set to `Retry`. The default is 1800.

On Error

The error policy to invoke when errors occur during the replication process:

- `Retry`: Retry the replication for the time specified by the `MaxRetryTime` value. This is the default.
- `Suspend`: Suspend the replication until the error is resolved automatically or through user intervention.

Link Type

The type of ports used to link the primary and secondary volumes:

- `FC`: FC ports.
- `iSCSI`: iSCSI ports.

On Collision

The collision policy used to determine the next image to replicate when multiple replication images are queued:

- `Newest`: Only the latest replication image should be considered for the next replication operation.
- `Oldest`: Only the latest n replication images should be considered for the next replication operation, where n is defined by the `MaxQueue` value and the oldest of these images should be considered first. This is the default.

Monitor Interval

The interval in seconds at which the primary volume should query the secondary volume. The default is 300.

Priority

The priority of the replication process on the replication volume:

- `High`: Replication has higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.
- `Medium`: Replication performance is balanced with host I/O performance.
- `Low`: Replication runs at a slower rate with minimal effect on host I/O. Use when streaming data without interruption is more important than data redundancy.

Connection Status

- **Not Attempted:** Communication has not been attempted to the remote volume.
- **Online:** The volumes in the replication set have a valid connection but communication is not currently active.
- **Active:** Communication is currently active to the remote volume.
- **Offline:** No connection is available to the remote system.

Connection Time

The date and time of the last communication with the remote volume, or N/A.

Remote link information:

Connected Ports

- For a remote primary or secondary volume, this field shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller. If no path is found, N/A is shown.
- For a local primary or secondary volume, this field shows N/A.

Remote Address

The address of each host port in the remote system through which the volume is accessible.

Examples

Show information about all replication volumes.

```
# show replication-volumes
```

Show information about replication volume MyData in replication set RS1.

```
# show replication-volumes set RS1 MyData
```

Basetypes

- [replication-volume on page 659](#)
- [status on page 689](#)

See also

- [set replication-volume-parameters on page 267](#)
- [show replication-sets on page 405](#)

show sas-link-health

Description

Shows the condition of SAS expansion-port connections.

Minimum role

monitor

Syntax

```
show sas-link-health
```

Output

Encl

The enclosure ID.

Ctlr

The ID of the controller module or expansion module.

Name

- Out Port: Egress (expansion) port in a controller module or an expansion module. Can be connected to an ingress port in an expansion module.
- In Port: Ingress port in an expansion module. Can be connected to an egress (expansion) port in a controller module or an expansion module.

Status

- Up: The port is cabled and has an I/O link.
- Warning: Not all of the port's PHYs are up.
- Error: The port is reporting an error condition.
- Not Present: The controller module is not installed or is down.
- Disconnected: Either no I/O link is detected or the port is not cabled.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

```
Show the condition of SAS expansion-port connections in each enclosure.  
# show sas-link-health
```

Basetypes

- [expander-ports on page 597](#)
- [status on page 689](#)

show schedule-details (Deprecated)

Use [show schedules below](#).

show schedules

Description

Shows information about all task schedules.

Minimum role

monitor

Syntax

```
show schedules  
[schedule-name]
```

schedule-name

Optional. Shows information about the specified schedule only. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all schedules.

Output

Schedule Name

The schedule name.

Schedule Specification

The schedule settings for running the associated task.

Status

- **Uninitialized:** The task is not yet ready to run.
- **Ready:** The task is ready to run at the next scheduled time.
- **Suspended:** The task had an error and is holding in its current state.
- **Expired:** The task exceeded a constraint and will not run again.
- **Invalid:** The task is invalid.
- **Deleted:** The task has been deleted.

Next Time

The date and time, in the format year-month-day hour:minutes:seconds (UTC), when the schedule will next run.

Task To Run

The name of the task that the schedule runs.

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error occurred.

Task-specific information, as shown by the [show task-details \(Deprecated\) on page 435](#) command.

Examples

Show information about all task schedules.

```
# show schedules
```

```
Show information about schedule Sched2.  
# show schedules Sched2
```

Basetypes

- [schedules on page 672](#)
- [status on page 689](#)

See also

- [create schedule on page 79](#)
- [delete schedule on page 120](#)
- [set schedule on page 269](#)
- [show task-details \(Deprecated\) on page 435](#)

show sensor-status

Description

Shows the status of each environmental sensor in each enclosure.

Information shown only for a controller enclosure: on-board temperature, disk controller temperature, memory controller temperature, supercapacitor voltage and charge, overall unit (enclosure) status.

Information shown for all enclosures: temperature, voltage, and current for each IOM (controller module or expansion module); temperature, voltage, and current for each PSU (power supply).

Normal and error ranges for temperature and voltage are specified in the Setup Guide.

Minimum role

monitor

Syntax

```
show sensor-status
```

Output

Enc1

The enclosure ID.

Drawer

The drawer ID.

Sensor Name

The sensor name and location.

Value

- For a sensor, its value.
- For Overall Unit Status, one of the status values below.

Status

- **OK:** The sensor is present and detects no error condition.
- **Warning:** The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds.
- **Critical:** The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold.
- **Unavailable:** The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup.
- **Unrecoverable:** The enclosure management processor (EMP) cannot communicate with the sensor.
- **Unknown:** The sensor is present but status is not available.
- **Not Installed:** The sensor is not present.
- **Unsupported:** Status detection is not implemented.

Examples

```
Show the status of each environmental sensor in each enclosure.  
# show sensor-status
```

Basetypes

- [sensors on page 676](#)
- [drawer-sensors on page 566](#)
- [status on page 689](#)

show shutdown-status

Description

Shows whether each Storage Controller is active or shut down.

Minimum role

monitor

Syntax

```
show shutdown-status
```

Output

Controller A

- up (active)
- down (shut down or killed)
- not installed

Controller B

- up (active)
- down (shut down or killed)
- not installed

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- Operational
- Not Operational
- Not Communicating
- Unknown

Examples

```
Show the shutdown status of each controller.  
# show shutdown-status
```

Basetypes

- [show-other-mc-status on page 678](#)
- [shutdown-status on page 679](#)
- [status on page 689](#)

See also

- [restart mc on page 184](#)
- [restart sc on page 185](#)
- [shutdown on page 473](#)

show snap-pools

Description

Shows information about snap pools. This command applies to linear storage only.

The command will show information for all snap pools by default, or you can use parameters to filter the output.

- i Note:** The process of freeing space associated with deleted snapshots occurs more slowly when the system is operating write-through cache mode than in write-back cache mode. Therefore, there will be a delay between deleting the snapshots and when their used space is shown as free space by the show snap-pools command.

Minimum role

monitor

Syntax

```
show snap-pools  
[controller a|b|both]  
[pool pool]
```


show snap-pools

Parameters

controller a|b|both

Optional. Shows snap pools owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, all snap pools owned by either controller are shown.

pool pool

Optional. Specifies the name or serial number of the vdisk that contains the snap pools for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for snap pools in all vdisks.

Output

Vdisk

The name of the vdisk that contains the snap pool.

Serial Number

The serial number of the snap pool.

Name

The name of the snap pool.

Size

Total size of the snap pool volume.

Free (size)

The amount of free space available in the snap pool.

Master Volumes

The number of master volumes associated with this snap pool.

Snapshots

The number of snapshots using this snap pool.

Status

- **Available:** The snap pool is available for use.
- **Offline:** The snap pool is not available for use, as in the case where its disks are not present.
- **Corrupt:** The snap pool's data integrity has been compromised. The snap pool can no longer be used.

Threshold

Snap pool threshold level:

- **Warning:** The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator. The default is 75%.
- **Error:** The snap pool is nearly full and unless corrective action is taken, snapshot data loss is probable. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered. The default is 90%.
- **Critical:** The snap pool is 98% full and data loss is imminent. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.

%Usage

Threshold value (percent of snap pool space used) that triggers the threshold's policy.

show snap-pools

Policy

Recovery policy to invoke when threshold value is reached:

- **autoexpand:** Try to expand the snap pool by the `SizeToExpand` value. If the snap pool's space usage reaches the percentage specified by its error threshold, the system will log Warning event 230 and will try to expand the snap pool by the snap pool's `SizeToExpand` value (below).
 - If the snap pool is successfully expanded, the system will log Informational event 444.
 - If the snap pool cannot be expanded because there is not enough available space in its vdisk, the system will log Warning event 444 and will automatically delete the oldest snapshot that is not a current sync point.

Each time the snap-pool's error threshold is reached and the system cannot auto-expand the vdisk, the oldest remaining snapshot that is not a current sync point will be deleted. This behavior occurs for each snap pool independently, based on its space usage.

- **deleteoldestsnapshot:** Delete the oldest snapshot.
- **deletesnapshots:** Delete all snapshots.
- **haltwrites:** Halt writes to the snap pool.
- **notifyonly:** Generates an event to notify the administrator.

SizeToExpand

- **size:** For the autoexpand policy, the size by which to automatically expand the snap pool when the threshold is reached.
- **N/A:** The policy is not set to autoexpand.

Examples

Show information about all snap pools.

```
# show snap-pools
```

Show information snap pools owned by controller A.

```
# show snap-pools controller a
```

Basetypes

- [snap-pools on page 679](#)
- [status on page 689](#)

See also

- [create snap-pool on page 81](#)
- [delete snap-pool on page 121](#)
- [expand snap-pool on page 139](#)

- [set snap-pool-policy on page 271](#)
- [set snap-pool-threshold on page 273](#)

show snapshot-space

Description

Shows snapshot-space settings for each virtual pool. This includes space used by replication snapshots.

Minimum role

monitor

Syntax

```
show snapshot-space
```

Output

Pool

The pool for which information is displayed (A or B).

Limit (%Pool)

The percentage of the pool that can be used for snapshots (the snapshot space).

Limit Size

The actual size of the snapshot space.

Allocated (%Pool)

The percentage of the pool currently used by snapshots.

Allocated (%Snapshot Space)

The percentage of the snapshot space currently used by snapshots.

Allocated Size

The actual amount of space currently used by snapshots.

Low Threshold (%Snapshot Space)

A percentage of the snapshot space designated as the low threshold

Middle Threshold (%Snapshot Space)

A percentage of the snapshot space designated as the middle threshold.

High Threshold (%Snapshot Space)

A percentage of the snapshot space designated as the high threshold.

Limit Policy

The limit policy for when the percentage of the pool designated for snapshots is reached.

- `notify-only`: When the snapshot space is reached an event is generated and logged. This is the default.
- `delete`: When the snapshot space is reached an event is generated and logged and automatic deletion of snapshots occurs.

Examples

```
Show snapshot-space settings for each virtual pool.
```

```
# show snapshot-space
```

```
Show information snap pools owned by controller A.
```

```
# show snap-pools controller a
```

Basetypes

- [snap-space on page 680](#)
- [status on page 689](#)

See also

- [set snapshot-space on page 274](#)
- [show pools on page 378](#)

show snapshots

Description

Shows information about snapshots. The command will show information for all snapshots by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show snapshots  
[controller a|b|both]  
[master-volume master-volume]  
[pool pool]  
[snap-pool snap-pool]  
[type standard|replication|all]  
[volume volume]
```

Parameters

controller a|b|both

Optional. Shows snapshots owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, snapshots owned by either controller are shown.

master-volume master-volume

Optional. Shows snapshots associated with the specified master volume name or serial number. A name that includes a space must be enclosed in double quotes.

pool pool

Optional. Specifies the name or serial number of the pool that contains the snapshots for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for snapshots in all pools.

snap-pool snap-pool

Optional. Shows snapshots associated with the specified snap pool name or serial number. A name that includes a space must be enclosed in double quotes.

type standard|replication|all

Optional. Shows only standard (non-replication) snapshots, only replication snapshots, or snapshots of all types. If this parameter is omitted, snapshots of all types are shown.

volume volume

Optional. Shows snapshots associated with the specified volume name or serial number. A name that includes a space must be enclosed in double quotes.

Output

Pool

The name of the pool that contains the snapshot.

Serial Number

Snapshot serial number

Name

The name of the snapshot.

Creation Date/Time

The date and time when the snapshot was prepared or committed.

show snapshots

Status

- Available
- Unavailable: See the Status-Reason value.

Status-Reason

Shows N/A for Available status, or one of the following reasons for Unavailable status:

- snapshot not found
- snap pool not found
- master volume not found
- snapshot pending (not yet committed)
- snap pool not accessible
- master volume not accessible
- Volume copy with modified data is in progress
- Rollback with modified data is in progress
- Unknown reason

Parent Volume

The name of the volume of which the snapshot was taken.

Base Vol

The root of the snapshot tree, if any. A snapshot tree is a series of inter-related snapshots of a volume and can be 254 levels deep.

Snaps

The number of child snapshots (snapshots taken of this snapshot).

TreeSnaps

The number of snapshots taken of the base volume and its children. This count includes the base volume and all snapshots that share the base volume as their root.

Snap-Pool

- The name of the snap pool for linear snapshots.
- Blank for virtual snapshots.

Snap Data

The total amount of write data associated with the snapshot.

Unique Data

The amount of write data that is unique to the snapshot.

Shared Data

The amount of write data that is shared between this snapshot and other snapshots.

Retention Priority

The retention priority for the snapshot.

- never-delete: Snapshots will never be deleted.
- high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.
- medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.
- low: Snapshots may be deleted.

Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.

Examples

```
Show information about all snapshots.  
# show snapshots  
  
Show information about snapshots of volume v2.  
# show snapshots volume v2
```

Basetypes

- [snapshots on page 681](#)
- [status on page 689](#)

See also

- [show master-volumes on page 371](#)
- [show pools on page 378](#)
- [show snap-pools on page 421](#)
- [show volumes on page 467](#)

show snmp-parameters

Description

Shows SNMP settings for event notification.

Minimum role

monitor

Syntax

```
show snmp-parameters
```

Output

SNMP Trap Notification Level

- **crit**: Only Critical events are sent as traps.
- **error**: Error and Critical events are sent as traps.
- **warn**: Warning, Error, and Critical events are sent as traps.
- **info**: All events are sent as traps.
- **none**: No events are sent as traps and traps are disabled.

SNMP Trap Host IP#

The IP address of each trap host.

SNMP read community

The community string for read-only access. The value is obscured for users having only the monitor role and is shown in clear text for users having the manage role.

SNMP write community

The community string for write access. The value is obscured for users having only the monitor role and is shown in clear text for users having the manage role.

Examples

```
Show SNMP notification settings.  
# show snmp-parameters
```

Basetypes

- [snmp-parameters on page 687](#)
- [status on page 689](#)

See also

- [set snmp-parameters on page 276](#)
- [set protocols on page 259](#)
- [show protocols on page 393](#)

show syslog-parameters

Description

Shows syslog notification parameters for events and managed logs.

Minimum role

monitor

Syntax

```
show syslog-parameters
```

Output

Syslog Host IP

The IP address of the remote syslog server to use for the notifications.

Syslog Notification Level

Shows the minimum severity for which the system sends notifications:

- **crit**: Sends notifications for Critical events only.
- **error**: Sends notifications for Error and Critical events.
- **warn**: Sends notifications for Warning, Error, and Critical events.
- **info**: Sends notifications for all events.
- **none**: Disables syslog notification and clears the settings.

Syslog Host Port

The port on which the remote syslog facility is expected to listen for notifications.

Examples

```
Show settings for remote syslog notification.  
# show syslog-parameters
```

Basetypes

- [syslog-parameters on page 689](#)

- [status on page 689](#)

See also

- [set syslog-parameters on page 278](#)

show system

Description

Shows information about the storage system. If the system's health is not OK, each unhealthy component is listed with information to help you resolve the health problem.

Minimum role

monitor

Syntax

```
show system  
[detail]
```

Parameters

detail

Optional. Shows the SCSI Vendor ID and SCSI Product ID fields on a system where they are hidden by default.

Output

System Name

The name of the system. The default is `Uninitialized Name`.

System Contact

The name of the person who administers the system. The default is `Uninitialized Contact`.

System Location

The location of the system. The default is `Uninitialized Location`.

show system

System Information

A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.

Midplane Serial Number

The serial number of the controller enclosure midplane.

Vendor Name

The vendor name.

Product ID

The product model identifier.

Product Brand

The product brand name.

SCSI Vendor ID

The vendor name returned by the SCSI INQUIRY command.

SCSI Product ID

The product identifier returned by the SCSI INQUIRY command.

Enclosure Count

The number of enclosures in the system.

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Health Reason

If Health is not OK, this field shows the reason for the health state.

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- Operational
- Not Operational
- Not Communicating
- Unknown

PFU Status

Shows whether partner firmware update is running on the system, or is idle.

Supported Locales

Supported display languages: Arabic (ar), Portuguese, (br), English (en), Spanish (es), French (fr), German (de), Italian (it), Japanese (jp), Korean (ko), Dutch (nl), Russian (ru), Chinese-Simplified (zh-s), Chinese-Traditional (zh-t).

Examples

```
Show information about the system.  
# show system
```

Basetypes

- [system on page 690](#)
- [status on page 689](#)

See also

- [set system on page 280](#)
- [show system-parameters below](#)

show system-parameters

Description

Shows certain storage-system settings and configuration limits. For a summary of the physical and logical limits of the storage system, see the system configuration limits topic in the Disk Management Utility help.

Minimum role

monitor

Syntax

```
show system-parameters
```

Output

ULP Enabled

Shows that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers. The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can choose any available path to access a LUN

show system-parameters

regardless of disk group ownership. When ULP is in use, the system's operating/cache-redundancy mode is shown as Active-Active ULP. ULP uses the T10 Technical Committee of INCITS Asymmetric Logical Unit Access (ALUA) extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.

Host Profiles Enabled

Shows whether host profiles are enabled.

Number of Host Ports

The number of host-interface ports in the controller enclosure.

Maximum Disks

The number of disks that the system supports.

Maximum Volumes

The number of volumes that the system supports.

Maximum Linear Disk Groups (v3)

The number of linear disk groups that the system supports.

Maximum Linear Vdisks (v2)

The number of vdisks that the system supports.

Maximum LUNs

The number of LUNs that the system supports.

Maximum Linear Disk Groups per Controller (v3)

The number of linear disk groups that each controller supports.

Maximum Linear Vdisks per Controller (v2)

The number of vdisks that each controller supports.

Maximum Virtual Pools per Controller

The number of virtual pools that each controller supports.

Maximum Virtual Disk Groups per Pool

The number of virtual pools that each pool can contain.

Maximum Host Groups

The number of host groups that the system supports.

Maximum Hosts per Host Group

The maximum number of hosts that a host group can contain.

Maximum Initiators per Host

The maximum number of initiators that a host can contain.

Maximum Volume Groups per Controller

The maximum number of volume groups that each controller supports.

Maximum Volumes per Volume Group

The maximum number of volumes that a volume group can contain.

Local Controller

The ID of the controller you are accessing.

Serial Number

The last six digits of the midplane serial number.

Examples

```
Show settings and configuration limits for the storage system.  
# show system-parameters
```

Basetypes

- [system-parameters-table on page 693](#)
- [status on page 689](#)

See also

- [show system on page 431](#)

show task-details (Deprecated)

Use [show task-details \(Deprecated\) above](#).

show tasks

Description

Shows information about tasks.

Minimum role

monitor

Syntax

```
show tasks  
[task-name]
```

show tasks

task-name

Optional. Shows information about the specified task only. If this parameter is omitted, information is shown for all tasks.

Output

For a TakeSnapshot task:

Task Name

The name of the task.

Task Type

TakeSnapshot

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State

The current step of the task:

- Start
- VerifyVolume
- ValidateLicensingLimit
- CreateName
- CreateSnap
- VerifySnap
- InspectRetention
- FindOldestSnap
- UnmapSnap
- ResetSnap
- RenameSnap

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Source Volume

The name of the master volume.

Source Volume Serial

The serial number of the master volume.

show tasks

Prefix

The label that identifies snapshots created by this task.

Count

The number of snapshots to retain with this prefix. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.

Last Created

- The name of the last snapshot created by the task.
- Blank if the task has not taken a snapshot.

Snapshot Name

- The name of each snapshot taken.
- Blank if the task has not taken a snapshot.

Snapshot Serial

- The serial number of each snapshot taken.
- Blank if the task has not taken a snapshot.

For a ResetSnapshot task:

Task Name

The name of the task.

Task Type

ResetSnapshot

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Deleted: The task is expired but this state is not yet synchronized to the partner controller.

Task State

The current step of the task:

- Start
- VerifySnap
- UnmapSnap
- ResetSnap

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Snapshot Name

The name of the snapshot to reset.

Snapshot Serial Number

The serial number of the snapshot to reset.

show tasks

For a VolumeCopy task:

Task Name

The name of the task.

Task Type

VolumeCopy

Status

- **Uninitialized:** The task is not yet ready to run.
- **Ready:** The task is ready to run.
- **Active:** The task is running.
- **Error:** The task has an error.
- **Deleted:** The task is expired but this state is not yet synchronized to the partner controller.

Task State

The current step of the task:

- Start
- VerifyVolume
- CreateName
- ObtainMap
- UnmapVolume
- CreateVolume
- RemapVolume
- VerifyCreatedVolume

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Source Volume

The name of the volume to be copied.

Source Volume Serial

The serial number of the volume to be copied.

Destination Vdisk

The name of the vdisk in which the new volume will be created.

Destination Pool

The name of the pool in which the new volume will be created.

Destination Vdisk Serial

The serial number of the destination vdisk.

Destination Pool Serial

The serial number of the destination pool.

Prefix

The label that identifies copies created by this task.

Modified Data

- **modified:** The copy includes modified snapshot data.

show tasks

- **preserved:** The copy excludes modified snapshot data.

Last Created

- The name of the last volume created by the task.
- Blank if the task has not taken a volume.

For a ReplicateVolume task:

Task Name

The name of the task.

Task Type

ReplicateVolume

Status

- **Uninitialized:** The task is not yet ready to run.
- **Ready:** The task is ready to run.
- **Active:** The task is running.
- **Error:** The task has an error.
- **Deleted:** The task has been deleted.

Task State

The current step of the task:

- Start
- VerifyVolume
- CreateName
- RepVolume
- VerifySnap

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Primary Volume Name

The name of the volume to replicate.

Primary Volume Serial Number

The serial number of the volume to replicate.

Prefix

The label that identifies snapshots created by this task.

Mode

- **new-snapshot:** Replicate a new snapshot of the primary volume.
- **last-snapshot:** Replicate the most recent existing snapshot of the primary volume.

Last Created

- The name of the last snapshot created by the task.
- Blank if the task has not created a snapshot.

show tasks

Last Used Snapshot

For a task whose replication mode is last-snapshot, the name of the last snapshot used for replication. Otherwise, N/A.

For a Replicate task:

Task Name

The name of the task.

Task Type

Replicate

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Deleted: The task is expired but this state is not yet synchronized to the partner controller.

Task State

The current step of the task:

- Idle
- Replicate
- VerifyRunning

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Task Name

The name of the task.

For an EnabledDSD task:

Task Name

The name of the task.

Task Type

EnabledDSD

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Deleted: The task is expired but this state is not yet synchronized to the partner controller.

Task State

The current step of the task, which is always Start.

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

For a DisabledSD task:

Task Name

The name of the task.

Task Type

DisabledSD

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Deleted: The task is expired but this state is not yet synchronized to the partner controller.

Task State

The current step of the task, which is always Start .

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

Examples

Show information about all tasks.

```
# show tasks
```

Show information about task Task1.

```
# show tasks Task1
```

Basetypes

- [tasks on page 697](#)
- [status on page 689](#)

See also

- [create schedule on page 79](#)
- [create task on page 83](#)
- [delete task on page 125](#)

- [set task on page 281](#)
- [show schedules on page 416](#)

show tiers (QXS-4 and QXS-6 Series Only)

Description

Shows information about tiers.

Minimum role

monitor

Syntax

```
show tiers  
tier performance|standard|archive|readcache|all
```

Parameters

tier performance|standard|archive|readcache|all
Specifies the tier for which to show information.

Output

Pool

The name of the pool.

Tier

The name of the tier.

% of Pool

The percentage of pool capacity that the tier occupies.

Disks

The number of disks in the tier.

Total Size

The total capacity of the tier.

Alloc Size

The amount of space currently allocated to volumes in the tier.

Available Size

The available capacity in the tier.

Examples

Show information about all tiers.

```
# show tiers tier all
```

Show information about the Standard tier.

```
# show tiers tier standard
```

Basetypes

- [tiers \(QXS-4 and QXS-6 Series Only\) on page 703](#)
- [status on page 689](#)

See also

- [show tier-statistics \(QXS-4 and QXS-6 Series Only\) below](#)

show tier-statistics (QXS-4 and QXS-6 Series Only)

Description

Shows live performance statistics for tiers. The command will show information for all tiers by default, or you can use parameters to filter the output. For tier performance statistics, the system samples live data every 30 seconds.

Properties shown only in XML API format are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

```
show tier-statistics  
[pool pool]  
tier performance|standard|archive|readcache|all
```

Parameters

pool pool

Optional. Specifies the name or serial number of the pool for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all pools.

tier performance|standard|archive|readcache|all

Specifies the tier for which to show statistics.

Output

Pool

The name of the pool.

Tier

The name of the tier.

Pages Allocated per Min

The rate, in pages per minute, at which pages are allocated to volumes in the tier because they need more space to store data.

Pages Deallocated per Min

The rate, in pages per minute, at which pages are deallocated from volumes in the tier because they no longer need the space to store data.

Pages Reclaimed

The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).

Pages Unmapped per Minute

The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host.

Time Since Reset

The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Examples

Show statistics for all tiers.

```
# show tier-statistics tier all
```

Show statistics for the Standard tier in pool A.

```
# show tier-statistics pool A tier standard
```

Basetypes

- [tier-statistics \(QXS-4 and QXS-6 Series Only\) on page 702](#)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [show pools on page 378](#)
- [show tiers \(QXS-4 and QXS-6 Series Only\) on page 442](#)

show unwritable-cache

Description

Shows the percentage of unwritable data in the system. This data has not been written to disk because it is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume's disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host and disk.

Minimum role

monitor

Syntax

```
show unwritable-cache
```

Output

Percent of unwritable cache in controller ID
The percentage of cache space occupied by unwritable data in the indicated controller module.

Examples

```
Show the percentage of unwritable cache data in each controller.  
# show unwritable-cache
```

Basetypes

- [unwritable-cache on page 708](#)
- [status on page 689](#)

See also

- [clear cache on page 51](#)

show users

Description

Shows configured user accounts.

Minimum role

monitor

Syntax

```
show users  
[show-snmp-password]  
[user]
```

Parameters

`show-snmp-password`

Optional. Minimum role: `manage`. For SNMPv3 users, this parameter shows `Password` and `Privacy Password` values in clear text for reference when configuring users in the corresponding management application. If this parameter is omitted, password values are displayed obscured for security reasons.

`user`

Optional. Shows settings for the specified user only. If this parameter is omitted, settings are shown for all users.

Output

`Username`

The user name.

`Roles`

- `monitor`: The user can view but not change system settings.
- `manage`: The user can view and change system settings.
- `admin`: The user can view and change system settings.
- `diagnostic`: The user can view and change system settings.

`User Type`

The user's experience level: `Novice`, `Standard`, `Advanced`, or `Diagnostic`. This parameter does not affect access to commands.

show users

User Locale

The display language for this user. The default is English.

WBI

- x: The user can access the web-browser interface (the Disk Management Utility). This is the default.
- (blank): The user cannot access this interface.

CLI

- x: The user can access the command-line interface. This is the default.
- (blank): The user cannot access this interface.

FTP

- x: The user can access the FTP interface.
- (blank): The user cannot access this interface. This is the default.

SMI-S

- x: The user can access the Storage Management Initiative Specification (SMI-S) interface.
- (blank): The user cannot access this interface. This is the default.

SNMP

- U: The user can access the SNMPv3 interface and view the MIB.
- T: The user can access the SNMPv3 interface and receive trap notifications.
- (blank): The user cannot access this interface. This is the default.

Authentication Type

- MD5: MD5 authentication. This is the default.
- SHA: SHA (Secure Hash Algorithm) authentication.
- none: No authentication.

Privacy Type

- DES: Data Encryption Standard.
- AES: Advanced Encryption Standard.
- none: No encryption. This is the default.

Password

The user password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password.

Privacy Password

The encryption password for an SNMPv3 user whose privacy type is set to DES or AES.

Trap Host Address

SNMP trap destination for an SNMPv3 user that can receive trap notifications.

Examples

Show information about all users.

```
# show users
```

Show information about user JSmith.

```
# show users JSmith
```

As a user with the manage role, show information—including SNMP passwords—for SNMPv3 user Traps.

```
# show users Traps show-snmp-password
```

Basetypes

- [users on page 708](#)
- [status on page 689](#)

See also

- [create user on page 88](#)
- [delete user on page 126](#)
- [set user on page 283](#)

show vdisks

Description

Shows information about all or specified vdisks.

Minimum role

monitor

Syntax

```
show vdisks
```

[*vdisks*]

Parameters

vdisks

Optional. A comma-separated list of the names or serial numbers of the vdisks to show information about. A name that includes a space must be enclosed in double quotes.

Output

Name

The vdisk name.

Size

The vdisk size.

Free

The amount of free (available) space in the vdisk.

Own

Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.

Pref

The controller that owns the vdisk and its volumes during normal operation.

RAID

The vdisk RAID level.

Class

- **Linear**: The vdisk acts as a linear pool.
- **Virtual**: The disk group is in a virtual pool.

Disks

The number of disks in the vdisk.

Spr

The number of spares assigned to the vdisk.

Chk

- For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk.
- For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).
- For RAID 50, the vdisk chunk size calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For a vdisk configured to use 64-KB chunk size and 4-disk subvdisks, the value would be 192k (64KB x 3).

Status

- **CRIT**: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.
- **DMGD**: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.

show vdisks

- FTDN: Fault tolerant with a down disk. The vdisk is online and fault tolerant, but some of its disks are down.
- FTOL: Fault tolerant and online.
- MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.
- OFFL: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost.
- QTCR: Quarantined critical. The vdisk is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 vdisk or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined.
- QTDN: Quarantined with a down disk. The RAID-6 vdisk has one inaccessible disk. The vdisk is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined.
- QTOF: Quarantined offline. The vdisk is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 vdisk.
- STOP: The vdisk is stopped.
- UNKN: Unknown.
- UP: Up. The vdisk is online and does not have fault-tolerant attributes.

Jobs

Shows whether a job is running and its percent complete.

- DRSC: A disk is being scrubbed.
- EXPD: The vdisk is being expanded.
- INIT: The vdisk is initializing.
- RCON: The vdisk is being reconstructed.
- VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.
- VPREP: The virtual disk group is being prepared for use in a virtual pool.
- VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.
- VREMV: The disk group and its data are being removed.
- VRFY: The vdisk is being verified.
- VRSC: The vdisk is being scrubbed.
- Blank if no job is running.

Job%

- 0%-99%: Percent complete of running job
- Blank if no job is running (job has completed)

Serial Number

The vdisk serial number.

Spin Down

- Disabled: DSD is disabled for the vdisk. This is the default.

show vdisks

- **Enabled - all spinning:** DSD is enabled for the vdisk.
- **Partial spin-down:** DSD is enabled for the vdisk and its disks are partially spun down to conserve power.
- **Full spin-down:** DSD is enabled for the vdisk and its disks are fully spun down to conserve power.

SD Delay

The period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.

Sec Fmt

The sector format of disks in the vdisk.

- **512n:** All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.
- **512e:** All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.
- **Mixed:** The vdisk contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

Show information about all vdisks.

```
# show vdisks
```

Show information about vdisk vd0002.

```
# show vdisks vd0002
```

Basetypes

- [virtual-disks on page 716](#)
- [status on page 689](#)

See also

- [create vdisk on page 92](#)
- [delete vdisks on page 127](#)
- [expand vdisk on page 140](#)
- [set vdisk on page 287](#)

show vdisk-statistics

Description

Shows live or historical performance statistics for vdisks. This command applies to linear storage only.

You can view live statistics for all or specified vdisks, or historical statistics for a specified vdisk. The system samples disk-performance statistics every quarter hour and retains performance data for 6 months.

The `historical` option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters. If both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

For each vdisk these statistics quantify destages, read-aheads, and host reads that are cache misses. For example, each time data is written from a volume's cache to disks in the vdisk that contains the volume, the vdisk's statistics are adjusted.

Properties shown only in XML API format are described in [XML API Basetype Properties on page 508](#).

- i Note:** Values for the amount of data transferred and for data throughput appear to be much higher in historical output than in live output. This is caused by a difference in the way that historical and live values are calculated.
- Live values are calculated based on the vdisk as viewed from the controller cache perspective. In the live statistics, performance numbers are obtained by accounting for when data is written from cache to disk or is read from disk to cache.
- Historical data is obtained by using the summation of the disk statistics for the disks in the vdisk. The historical vdisk data shows transfers to and from the disks in the vdisk that include the overhead of any RAID transfers as well as any host activity.
- Because I/Os from the RAID engine are included, values for the historical data appear higher than the numbers for the live data.

Minimum role

monitor

Syntax

To show live statistics:

```
show vdisk-statistics  
[vdisks]
```

To show historical statistics:

```
show vdisk-statistics  
[all]  
[count number-of-data-samples]  
historical  
[time-range "date/time-range"]  
vdisk
```

Parameters

all

Optional. Specifies to show the full set of performance metrics. If this parameter is omitted, the default set of performance metrics will be shown.

count number-of-data-samples

Optional. Specifies the number of data samples to display, from 1 to 100. Each sample will be shown as a separate row in the command output. If this parameter is omitted, 100 samples will be shown. If you specify this parameter, do not specify the `time-range` parameter.

historical

Optional. Specifies to show historical statistics. If this parameter is omitted, live statistics will be shown.

time-range "date/time-range"

Optional. Specifies the date/time range of historical statistics to show, in the format "`start yyyy-mm-dd hh:mm [AM|PM] end yyyy-mm-dd hh:mm [AM|PM]`". If the start date/time is specified but no end date/time is specified, the current date/time will be used as the end date/time. The system will return the oldest sample taken after the start time and the latest sample taken before the end time. If the specified start date/time is earlier than the oldest sample, that sample will be used as the start date/time. If you specify this parameter, do not specify the `count` parameter. If this parameter is omitted, the most recent 100 data samples will be displayed.

vdisk

Specifies the name or serial number of one vdisk for which to show historical statistics. A name that includes a space must be enclosed in double quotes.

vdisks

Optional. Specifies a comma-separated list of the names or serial number of vdisks for which to show live statistics. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, statistics will be shown for all vdisks.

Output

Live

Name

The vdisk name.

Serial Number

The vdisk serial number.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

Amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

I/O Resp Time

The average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.

Read Resp Time

The average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.

Write Resp Time

The average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.

Reset Time

The date and time, in the format year-month-day hour:minutes:seconds, when these statistics were last reset, either by a user or by a controller restart.

Historical

Name

The vdisk name.

Serial Number

The vdisk serial number.

Data Transferred

The total amount of data read and written since the last sampling time.

Total B/s

The data transfer rate, in bytes per second, for read and write operations since the last sampling time.

show vdisk-statistics

Sample Time

The date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.

Historical, All

Name

The vdisk name.

Serial Number

The vdisk serial number.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the all parameter. The amount of data read since the last sampling time.

Data Written

Shown by the all parameter. The amount of data written since the last sampling time.

Total B/s

The data transfer rate, in bytes per second, since the last sampling time. This is the sum of Read B/s and Write B/s.

Read B/s

Shown by the all parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the all parameter. The data transfer rate, in bytes per second, for write operations since the last sampling time.

Sample Time

The date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.

Examples

Show live statistics for vdisks VD1 and MyVdisk.

```
# show vdisk-statistics VD1,MyVdisk
```

Show historical statistics from a specified date and time range for vdisk VD2.

```
# show vdisk-statistics VD2 historical time-range "start 2013-01-18 4:40 PM  
end 2013-01-18 5:00 PM"
```

Show all historical statistics (the latest 100 samples) for vdisk VD2.

```
# show vdisk-statistics VD2 historical all
```

Basetypes

- [vdisk-statistics on page 712](#) (live)

- [virtual-disk-summary on page 715](#) (historical)
- [vdisk-hist-statistics on page 711](#) (historical)
- [status on page 689](#)

See also

- [reset all-statistics on page 169](#)
- [reset vdisk-statistics on page 182](#)
- [show vdisks on page 449](#)

show versions

Description

Shows firmware and hardware version information for each controller module.

Minimum role

monitor

Syntax

```
show versions  
[detail]
```

Parameters

`detail`

Optional. Shows information about the versions of firmware and hardware in each controller module. If this parameter is omitted, only firmware-bundle information is shown.

Examples

```
Show firmware-bundle version information for the system.
```

```
# show versions  
Show detailed version information for each controller module.  
# show versions detail
```

Basetypes

- [versions on page 714](#)
- [status on page 689](#)

See also

- [show inquiry on page 362](#)

show volumecopy-status

Description

Shows information about in-progress volume copy operations. This command applies to linear storage only. While a volume copy is in progress, the destination volume cannot be accessed.

Minimum role

monitor

Syntax

```
show volumecopy-status  
[controller a|b|both]
```

Parameters

controller a|b|both

Optional. Shows volume copy operations for volumes owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, all volume copy operations are shown.

Output

VC Volume Name

The name of the destination volume.

Serial Number

The serial number of the destination volume.

Vdisk

The name of the destination vdisk.

Source Volume

The name or serial number of the source volume.

Progress

The percent complete of the volume copy.

Status

- VC OnLine: A volume copy is in progress to the destination volume.
- VC Offline: The source volume went offline while a volume copy was in progress. When the source volume comes back online, the copy process resumes from the point where it stopped.
- Unknown: Status is unknown.

Status-Reason

More information about the Status value.

Examples

```
Show information about volume copies in progress for controller A.  
# show volumecopy-status controller a
```

Basetypes

- [volume-copy-status on page 723](#)
- [status on page 689](#)

See also

- [abort volumecopy on page 36](#)
- [versions \(Deprecated\) on page 499](#)

show volume-copies

Description

Shows information about in-progress copy volume operations.

Minimum role

monitor

Syntax

```
show volume-copies
```

Parameters

Src Volume

The name of the source volume.

Src Type

The type of the source volume: Virtual or Linear.

Src Pool

The name of the source pool: A or B.

Dest Volume

The name of the destination volume.

Dest Type

The type of the destination volume.

Dest Pool

The name of the destination pool: A or B.

Progress

The percent complete of the operation.

Examples

```
Show information about in-progress copy volume operations.
```

```
# show volume-copies
```

Basetypes

- [copy-volumes on page 538](#)
- [status on page 689](#)

See also

- [abort copy on page 30](#)
- [copy volume on page 59](#)

show volume-groups

Description

Shows information about specified volume groups or all volume groups

Minimum role

monitor

Syntax

```
show volume-groups  
[volume-groups]
```

Parameters

volume-groups

Optional. A comma-separated list of the names of volume groups for which to show information. If this parameter is omitted, information is shown for all volume groups.

Output

Volume group information:

Group Name

The name of the volume group.

Serial Number

The serial number of the volume group.

Type

The group type, which is Volume.

Number of Members

The number of volumes in the volume group.

Volume information:

Pool

The name of the pool that contains the volume.

Name

The name of the volume.

Total Size

The total size of the volume.

Alloc Size

The amount of space currently allocated to a virtual volume, or the total size of a linear volume.

Class

- Virtual: The volume is in a virtual pool.

Type

- base: Base volume
- standard: Standard volume
- standard*: Destination of an in-progress volume copy and cannot be mounted/ presented/mapped until the copy is complete
- snap-pool: Snap-pool volume
- master volume: Master volume
- snapshot: Snapshot volume
- replication source: Source for an in-progress replication to a secondary volume

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Reason

If Health is not OK, this field shows the reason for the health state.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Examples

Show information about all volume groups.

```
# show volume-groups
```

Show information about volume groups VGroup1 and VGroup2.

```
# show volume-groups VGroup1,VGroup2
```

Basetypes

- [volume-groups on page 725](#)
- [volumes on page 729](#)
- [status on page 689](#)

See also

- [create volume-group on page 98](#)
- [delete vdisk-spare \(Deprecated\) on page 128](#)
- [set volume-group on page 292](#)

show volume-maps (Deprecated)

Use [show maps on page 368](#).

show volume-names

Description

Shows volume names and serial numbers. This reduced form of the [show volumes on page 467](#) command is optimized for seeking basic volume information from a remote system.

Minimum role

monitor

Syntax

```
show volume-names  
[volumes]
```

Parameters

volumes

Optional. A comma-separated list of the names or serial numbers of the volumes for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all volumes.

Output

Name

The name of the volume.

Serial Number

The serial number of the volume.

Examples

```
Show volume names and serial numbers.  
# show volume-names
```

Basetypes

- [volume-names on page 727](#)
- [status on page 689](#)

See also

- [show maps on page 368](#)
- [show volumes on page 467](#)

show volume-reservations

Description

Shows persistent reservations for all or specified volumes. The persistent group reservations (PGR) mechanism enables application clients on multiple hosts to control access to a storage volume, and limits access by other hosts.

Each host must be registered with the storage system in order to establish a persistent reservation for a volume, thereby becoming a reservation holder.

If the system gets into an abnormal state and you need to remove all registrations and reservations for specified volumes to return them to a “clean” state, you can use the [release volume on page 155](#) command. This command must be used with care, as described in its help.

For more information about persistent reservations, see the SPC-3 specification at <http://www.t10.org>.

Minimum role

monitor

Syntax

```
show volume-reservations  
[all|volumes]
```

Parameters

all|volumes

Optional. Specifies all volumes, or a comma-separated list of the names or serial numbers of specific volumes. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all volumes.

Output

Properties are described in alphabetical order.

Host ID

The host WWPN or iSCSI node name.

Key

The reservation key, shown as a hexadecimal value.

Name

The name of the volume.

PGR Generation

The generation of the volume reservation, shown as a hexadecimal value.

Ports

The controller host-port identifiers.

Reservation Type

- **Write Exclusive:** Write commands are only allowed for a single reservation holder.
- **Exclusive Access:** Certain access (read, write) commands are only allowed for a single reservation holder.
- **Write Exclusive - Registrants Only:** Write commands are only allowed for registered hosts. There is a single reservation holder.
- **Exclusive Access - Registrants Only:** Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.
- **Write Exclusive - All Registrants:** Write commands are only allowed for registered hosts. There is a single reservation holder.
- **Exclusive Access - All Registrants:** Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.
- **Undefined:** The volume has no persistent reservations.

Scope

The reservation scope, Logical Unit.

Serial Number

The serial number of the volume.

Volume Reserved

- **Free:** The volume is not reserved.
- **Reserved:** The volume has been reserved by a host.

Examples

```
Show reservations for all volumes.  
# show volume-reservations  
  
Show reservations for volume v2.  
# show volume-reservations v2
```

Basetypes

- [volume-reservations on page 727](#)
- [status on page 689](#)

See also

- [release volume on page 155](#)
- [show volumes below](#)

show volumes

Description

Shows information about volumes. The command will show information for all volumes by default, or you can use parameters to filter the output.

Minimum role

monitor

Syntax

```
show volumes
[details]
[pool pool]
[protection-info]
[type all|base|snap-pool|mastervolume|snapshot|standard|primary-volume
|secondary-volume|replication-volume]
[vdisk vdisks]
[volumes]
```

Parameters

details

Optional. Shows additional information about the volumes.

pool pool

Optional. The name or serial number of the pool that contains the volumes for which to show information. A name that includes a space must be enclosed in double quotes.

type all|base|snap-pool|mastervolume|snapshot|standard|primary-volume
|secondary-volume|replication-volume

Optional.

- all: Show all volumes.

show volumes

- **base**: Show only virtual volumes that are not snapshots of any other volume. Not supported.
- **snap-pool**: Show only snap pools. Not supported.
- **mastervolume**: Show only master volumes. Not supported.
- **snapshot**: Show only snapshots. Not supported.
- **standard**: Show only standard volumes.
- **primary-volume**: Show only primary volumes. Not supported.
- **secondary-volume**: Show only secondary volumes. Not supported.
- **replication-volume**: Show only primary volumes and secondary volumes. Not supported.

If this parameter is omitted, all volumes are shown.

vdisk vdisks

Optional. A comma-separated list of the names or serial numbers of the vdisks containing the volumes to show. A name that includes a space must be enclosed in double quotes.

volumes

Optional. A comma-separated list of the names or serial numbers of volumes for which to show information. A name that includes a space must be enclosed in double quotes.

Output

Properties are described in alphabetical order.

Action

If Health is not OK, this field shows recommended actions to take to resolve the health issue.

Alloc Size

The amount of space currently allocated to a virtual volume, or the total size of a linear volume.

Cache Opt

Shown by the `details` parameter. The cache optimization mode:

- **standard**: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.
- **no-mirror**: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

Class

- **Linear**: The volume is in a linear pool.
- **Virtual**: The volume is in a virtual pool.

Desc

Shown by the `details` parameter.

- For HP-UX, a text value (set in-band by a host application) that identifies the volume.
- Blank if not set.

show volumes

Health

- OK
- Degraded
- Fault
- N/A
- Unknown

Name

The name of the volume.

PI-Format

Shown by the `protection-info` parameter.

- T1: Host PI (Type 1) is enabled for the volume.
- T0: Host PI (Type 0) is disabled for the volume.

Reason

If Health is not OK, this field shows the reason for the health state.

Role

Shown by the `details` parameter.

- Copy Source: The volume is the source for a volume copy operation.
- Copy Destination: The volume is the destination for a volume copy operation.
- Primary: The volume is the primary volume in a replication set.
- Secondary: The volume is the secondary volume in a replication set.
- (blank): Not applicable.

Serial Number

Shown by the `details` or `protection-info` parameter. The serial number of the volume.

Size

The total size of the volume.

Snap-Pool

Shown by the `details` parameter. The name of the snap pool. Not applicable.

Snap Retention Priority

Shown by the `details` parameter. The retention priority for snapshots of the volume.

- never-delete: Snapshots will never be deleted.
- high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.
- medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.
- low: Snapshots may be deleted.

Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.

Tier Affinity

Shown by the `details` parameter.

show volumes

- **No Affinity:** This setting uses the highest available performing tiers first and only uses the Archive tier when space is exhausted in the other tiers. Volume data will swap into higher performing tiers based on frequency of access and tier space availability. This is the default.
- **Archive:** This setting prioritizes the volume data to the least performing tier available. Volume data can move to higher performing tiers based on frequency of access and available space in the tiers.
- **Performance:** This setting prioritizes volume data to the higher performing tiers. If no space is available, lower performing tier space is used. Performance affinity volume data will swap into higher tiers based upon frequency of access or when space is made available.

Total Size

The total size of the volume.

Type

- **base:** Base volume
- **standard:** Standard volume
- **standard*:** Destination of an in-progress volume copy and cannot be mounted/presented/mapped until the copy is complete
- **snap-pool:** Snap-pool volume
- **master volume:** Master volume
- **snapshot:** Snapshot volume
- **replication source:** Source for an in-progress replication to a secondary volume

Vdisk

The name of the vdisk that contains the volume.

WR Policy

Shown by the `details` parameter. The cache write policy:

- **write-back:** Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default.
- **write-through:** Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

WWN

Shown by the `details` parameter. The World Wide Name of the volume, used by host-based Storage Replication Adapter (SRA) software to identify the volume.

Examples

```
Show about all volumes.  
# show volumes
```

```
Show detailed information for volume volA.  
# show volumes details volA
```

Basetypes

- [volumes on page 729](#)
- [status on page 689](#)

See also

- [create volume on page 95](#)
- [delete volumes on page 130](#)
- [expand volume on page 142](#)
- [set vdisk-spare \(Deprecated\) on page 289](#)
- [show disk-groups on page 317](#)
- [show maps on page 368](#)
- [show pools on page 378](#)
- [show vdisks on page 449](#)

show volume-statistics

Description

Shows live performance statistics for all or specified volumes. For each volume these statistics quantify I/O operations between hosts and the volume. For example, each time a host writes to a volume's cache, the volume's statistics are adjusted. For volume performance statistics, the system samples live data every 15 seconds.

Statistics shown only in XML API output are described in [XML API Basetype Properties on page 508](#).

Minimum role

monitor

Syntax

```
show volume-statistics  
[volumes]
```

Parameters

volumes

Optional. A comma-separated list of the names or serial numbers of the volumes for which to show information. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, information is shown for all volumes.

Output

Name

The name of the volume.

Serial Number

The serial number of the volume.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Allocated Pages

The number of pages allocated to the volume.

% Performance

The percentage of volume capacity occupied by data in the Performance tier. Not applicable.

% Standard

The percentage of volume capacity occupied by data in the Standard tier.

% Archive

The percentage of volume capacity occupied by data in the Archive tier.

% RC

The percentage of read-cache capacity that is occupied. Not applicable.

Reset Time

The date and time, in the format year-month-dayhour:minutes:seconds, when these statistics were last reset, either by a user or by a controller restart.

Examples

Show live performance statistics for all volumes.

```
# show volume-statistics
```

Show live performance statistics for volume v0001.

```
# show volume-statistics v0001
```

Basetypes

- [volume-statistics on page 738](#)
- [status on page 689](#)


See also

- [reset all-statistics on page 169](#)
- [reset volume-statistics on page 183](#)
- [show volumes on page 467](#)

shutdown

Description

Shuts down the Storage Controller in a controller module. This ensures that a proper failover sequence is used, which includes stopping all I/O operations and writing any data in write cache to disk.

 **Caution:** Performing a shut down will cause data to be unavailable from the Storage Controller that is shut down. If the Storage Controller in each controller module is shut down, hosts cannot access the system's data.

Perform a shut down before removing a controller module or powering down the system.

Minimum role

manage

Syntax

```
shutdown  
[a|b|both]
```

Parameters

a|b|both

Optional. Specifies to shut down the Storage Controller in controller A, B, or both. If this parameter is omitted, the command affects the controller being accessed.

Examples

```
Shut down the Storage Controller in controller A.  
# shutdown a
```

See also

- [restart mc on page 184](#)
- [restart sc on page 185](#)
- [show shutdown-status on page 420](#)

start drawer

Description

Restarts a drawer that was stopped. Starting a drawer can take several minutes to complete.

A stopped drawer's health is N/A and its status is Unavailable. When a drawer is successfully restarted, the health will change to OK and the status to Up, and event 526 will be logged. Use the `show enclosures` command and event log to determine when a drawer has been restarted.

Minimum role

manage

Syntax

```
start drawer  
drawer-ID
```

Parameters

drawer-ID

The ID of the drawer to start. For drawer syntax, see [Command Syntax on page 13](#).

Examples

```
Start drawer 2.1.  
# start drawer 2.1
```

See also

- [show enclosures on page 338](#)
- [show frus on page 352](#)
- [stop drawer on page 477](#)

start vdisk

Description

Restarts a vdisk that was stopped in order to move its disks into this system.

For a replication set, starting a vdisk is part of the process for moving a secondary volume from a primary system into a secondary system. The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.

start vdisk

- c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

i Note: If the replication set was deleted while the secondary volume's vdisk was stopped, restarting the vdisk will make the set partially reappear. To clean up this remnant, reattach the secondary volume, set it to be the primary volume (by using the `set replication-primary-volume` command), and then delete the replication set again.

Minimum role

manage

Syntax

```
start vdisk
vdisk
```

Parameters

vdisk

The name or serial number of the vdisk to start. A name that includes a space must be enclosed in double quotes.

Examples

Start vdisks `vd2` and `vd1`, which respectively contain a snap pool and the associated secondary volume.

```
# start vdisk vd2
```

```
Success: Command completed successfully. (2012-01-21 12:26:32)
```

```
# start vdisk vd1
```

```
Success: Command completed successfully. (2012-01-21 12:26:37)
```

See also

- [detach replication-volume on page 134](#)
- [reattach replication-volume on page 153](#)
- [show vdisks on page 449](#)
- [stop vdisk on the next page](#)

stop drawer

Description

Stops a drawer to prepare the drawer for removal.

When a drawer is successfully stopped, the drawer's health changes to N/A, its status changes to `Unavailable`, and event 525 is logged. Use the `show enclosures` command and the event log to determine when a drawer has been stopped.

⚠ Caution: All disks in the stopped drawer are not visible to the system. If a vdisk is in or spans a stopped drawer, the availability and/or health of the vdisk may be affected. To avoid data loss, quiesce I/O to volumes on vdisks in the drawer.

Minimum role

manage

Syntax

```
stop drawer  
[prompt yes|no]  
drawer-ID
```

Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed. Use this only if proper precautions have been taken to ensure no data is lost.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

drawer- ID

The ID of the drawer to stop. For drawer syntax, see [Command Syntax on page 13](#).

Examples

```
Stop drawer 2.1.  
# stop drawer 2.1
```

See also

- [show enclosures on page 338](#)
- [show frus on page 352](#)
- [start drawer on page 474](#)

stop vdisk

Description

Stops a vdisk to prepare its disks for removal.

For a replication set, stopping a vdisk is part of the process for moving a secondary volume from a primary system into a secondary system. The process to move a secondary volume is:

1. In the system where the secondary volume resides:
 - a. Detach the secondary volume.
 - b. If the secondary volume's vdisk contains other secondary volumes, detach those volumes.
 - c. Stop the secondary volume's vdisk.
 - d. If the secondary volumes' snap pools are in other vdisks, stop those vdisks.
 - e. Move the vdisks into the secondary system. This system must support the link type that the replication set is configured to use. For example, if the replication set's link type is configured to use FC links, the secondary system must have FC ports.
2. In the secondary system:
 - a. Start the snap pools' vdisks.
 - b. Start the secondary volumes' vdisks.
 - c. Reattach the secondary volumes.

Before stopping a vdisk, ensure that all secondary volumes that it contains are detached. When a vdisk is stopped:

- The volumes in the vdisk become inaccessible to hosts.
- Its cached data is flushed to disk.
- Removing its disks will not cause the system to report errors or to attempt reconstruction.

i Note: You cannot stop a vdisk that contains a primary volume.

i Note: If a secondary volume and its snap pool are in different vdisks, you cannot stop the snap pool's vdisk until you stop the secondary volume's vdisk.

If the stop operation succeeds, the vdisk's health is shown as Unknown and its status is shown as STOP.

If the stop operation succeeded for the secondary volume's vdisk and for its snap pool's vdisk (if applicable), you can move the disks into the remote system.

Minimum role

manage

Syntax

```
stop vdisk  
vdisk
```

Parameters

vdisk

The name or serial number of the vdisk to stop. A name that includes a space must be enclosed in double quotes.

Examples

```
Stop vdisks vd1 and vd2, which respectively contain a secondary volume and its snap pool.  
# stop vdisk vd1  
Success: Command completed successfully. (2012-01-21 12:26:07)  
# stop vdisk vd2  
Success: Command completed successfully. (2012-01-21 12:26:12)
```

See also

- [detach replication-volume on page 134](#)
- [reattach replication-volume on page 153](#)
- [show vdisks on page 449](#)
- [start vdisk on page 475](#)

suspend replication

Description

Suspends the current replication operation on the specified secondary volume. This command must be issued on the system that owns the secondary volume. This command applies to linear storage only.

Once suspended, the replication must be resumed or aborted to allow the volume to resume normal operation.

Minimum role

manage

Syntax

```
suspend replication  
[set replication-set]  
replication-volume
```

Parameters

`set replication-set`

Optional. The name or serial number of the replication set

`replication-volume`

The name or serial number of the secondary volume. A name that includes a space must be enclosed in double quotes. If the name is not unique across replication sets, specify the `set` parameter.

Examples

Suspend replication of primary volume V1 to secondary volume rV1.
suspend replication rV1

See also

- [abort replication on page 31](#)
- [resume replication on page 188](#)
- [show replication-sets on page 405](#)
- [show replication-volumes on page 411](#)



Chapter 7: Alphabetical List of Commands (T-V)

This chapter contains the following topics:

Alphabetical List of Commands	482
test	483
trust	485
unfail controller	491
unmap volume	492
verify disk-groups	493
verify links	495
verify remote-link	496
verify vdisk	498
versions (Deprecated)	499
volumecopy	500

Alphabetical List of Commands

This chapter is organized to help you find a command by name. Each command topic includes one or more of the following sections:

test

Description	The command's purpose and notes about its usage
Minimum role	The minimum user role required to use the command
Syntax	The command's syntax
Parameters	Descriptions of the command's parameters
Output	Descriptions of fields shown in console format
Examples	One or more examples of the command's usage in console format
Basetypes	References to descriptions of basetype properties shown in XML API format
See also	References to commands that are used with the command

test

Description

Sends a test message to configured destinations for event notification and managed logs. After issuing this command, verify that the test message reached its destinations.

Minimum role

manage

Syntax

```
test
email|managedlogs|managedlogswarn|managedlogswrap|notification|snmp
[region crash1|crash2|crash3|crash4|ecdebug|mc|scdebug]
```

Parameters

email|managedlogs|managedlogswarn|managedlogswrap|notification|snmp

- **email**: This option behaves the same as the notification option and remains for backward compatibility only.
- **managedlogs**: Specify this option to test receipt of the managed-logs notification that logs need to be transferred. (Event 400)

test

- `managedlogswarn`: Specify this option to test receipt of the managed-logs notification that logs are nearly full and must be transferred to avoid losing older entries. (Event 401)
- `managedlogswrap`: Specify this option to test receipt of the managed-logs notification that logs have wrapped and older entries may be lost. (Event 402)
- `notification`: Specify this option to test receipt of event-notification messages by every interface that is configured to receive them, such as email, SNMP, and SMI-S. (Event 312)
- `snmp`: This option behaves the same as the `notification` option.

`region crash1|crash2|crash3|crash4|ecdebug|mc|scdebug`

Optional. For use with the managed logs feature, this parameter specifies the log type (debug-data region) for which to send notifications.

- `crash1`, `crash2`, `crash3`, or `crash4`: Specify one of these options to send notification for one of the Storage Controller's four crash logs.
- `ecdebug`: Specify this option to send notification for the Expander Controller log.
- `mc`: Specify this option to send notification for the Management Controller log.
- `scdebug`: Specify this option to send notification for the Storage Controller log, which includes the event log.

If this parameter is omitted, the command sends four representative log types: `crash1`, `ecdebug`, `scdebug`, and `mc`.

Examples

Test receipt of event notifications by every interface that is configured to receive them.

```
# test notification
```

Test receipt of the managed-logs notification that the SC log needs to be transferred.

```
# test managedlogs region scdebug
```

See also

- [set email-parameters on page 223](#)
- [set snmp-parameters on page 276](#)

trust

Description

Enables an offline or non-fault-tolerant disk group to be brought online for emergency data recovery. This command must be enabled before each use. If used improperly this command can cause unstable operation and data loss. Before use, carefully read the cautions and procedures below.

The `trust` command provides an opportunity to recover data from a disk group that has failed due to disk failure. The command forces a resynchronization of the metadata (as well as time and date stamps) that unifies members of a disk group, and essentially puts the disk group back into an accessible state. As long as the failed disks are operable, data can be read from the disks and restored to another location.


From examining the state of the disks, if the command determines that the trust operation is unsafe—that it may result in an unstable disk group with data corruption—the command will fail. You may then seek assistance from technical support or run the command with a special parameter to acknowledge the risk of proceeding. Otherwise, if the command determines the operation to be safe, the command will proceed.

When the “trusted” disk group is back online, back up its data and audit the data to make sure that it is intact. Then delete that disk group, create a new disk group, and restore data from the backup to the new disk group. Using a trusted disk group is only a disaster-recovery measure. The disk group has no tolerance for any additional failures.

The following procedure outlines the general steps for performing a trust operation, but the best procedure to follow for your situation may vary from this procedure. Before starting this procedure, it is recommended that you contact technical support for assistance in determining if the trust operation is applicable to your situation, and for assistance in performing it.

Caution:

1. Do not use the `trust` command when the storage system is unstable. For example, if there are many power or topology-change events.
2. The `trust` command can be run on a quarantined-offline or offline disk group. In many cases the disk group will be automatically dequarantined. If you cannot resolve the issue that caused the disk to become quarantined such that it is automatically dequarantined, and if the trust operation is applicable to your situation, then proceed to `trust`.


 **Note:** The best practice is to dequarantine the disk group and then proceed to `trust` the offline disk group. If the dequarantine command fails then perform `trust` on the quarantined disk group.

3. Never update controller-module, expansion-module, or disk firmware when the disk group is offline or non-fault-tolerant.
4. Never clear unwritten data cache when a disk group is offline or non-fault-tolerant.
5. Do not use the `trust` command on a disk group that failed during disk-group expansion.
6. Do not use the `trust` command on a disk group with status `CRIT`. Instead, add spares and let the system reconstruct the disk group.

The `trust` command must be used in CLI console mode.

Steps for running the trust command

1. Disable background scrub of disks and disk group to avoid running scrubs automatically.
2. Identify the cause for the disk group becoming offline or non-fault-tolerant.
3. If an external issue (power, cabling, and so forth) caused the disk group to fail, fix the external issue before continuing to the next step.
4. Disable host access to the failed disk group. In a single-controller configuration, disconnect the host-port cables. In a dual-controller configuration:
 - a. Determine the owning controller of the failed disk group.
 - b. As a precautionary measure, remove the host-port cables of the owning controller of the offline disk group.
5. Unseat the spare disks associated with the disk group to prevent reconstruction.

 **Caution:** It is recommended to avoid reconstruction after using the trust command. Reconstruction causes heavy usage of disks that were already reporting errors. This usage could cause the disks to fail during reconstruction, which can cause data to be unrecoverable.

6. Enable the trust command.
7. Run the trust command on the disk group.
8. If the trust command determines that it would be unsafe to proceed, it will fail. If this happens you can either:
 - Contact Support for further assistance. This is *recommended*.
 - Proceed by re-enabling trust and running trust with the unsafe parameter. This is *not* recommended because in most cases it will result in an unstable disk group with data corruption.

After running the trust command

1. Reinsert the host-port cables.
2. Perform a complete backup of the disk group.
3. Delete the disk group.
4. Replace the failed disks with new disks.
5. Re-create the disk group.
6. Restore the data from the backup performed in step 2.
7. Restore original disk-group ownership.
8. Re-enable background scrub operations.

Minimum role

manage

Syntax

```
trust  
[enable|disable]  
[disk-group disk-group]  
[unsafe]  
[vdisk vdisk]
```

Parameters

enable|disable
Optional.

- **enable**: Enables the trust command before use.
- **disable**: Disables the trust command if it is not used after being enabled. If trust is not explicitly disabled, it will be automatically disabled when the user's CLI session ends.

disk-group disk-group
Optional. The name or serial number of the disk group to trust. A name that includes a space must be enclosed in double quotes.

unsafe
Optional. Specifies to proceed with a trust operation that is determined to be unsafe because it must use out-of-sync or partially reconstructed disks, which in most cases will result in an unstable disk group with data corruption.

vdisk vdisk
Optional. The name or serial number of the disk group to trust. A name that includes a space must be enclosed in double quotes.

Output

With the unsafe parameter

Location
The enclosure ID and slot number of the disk.

Serial Number
The serial number of the disk.

Type

- SAS: Enterprise SAS
- SAS MDL: Midline SAS
- sSAS: SAS SSD

State

- AVAIL: Available

trust

- FAILED: The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.
- GLOBAL SP: Global spare
- LEFTOVR: Leftover
- VDISK: Used in a disk group
- VDISK SP: Spare assigned to a disk group

Partially Recon Target

- True: The disk contains partially reconstructed data.
- False: The disk does not contain partially reconstructed data.

Out Of Sync

- True: The disk data is out of sync with other disks in the disk group.
- False: The disk data is in sync with other disks in the disk group.

Age

The age of the disk in the disk group. The age value starts at 1 and is incremented for all good disks in the disk group each time there is a change in the disk configuration of the disk group, such as when a disk is detected to have failed or be missing. Therefore, if a disk has a lower age than other disks in the disk group, that disk is out-of-sync with the other disk group members. This value can be used as a guide to decide which disks to physically remove before doing the trust operation to minimize the amount of corrupt data in the trusted disk group if you want to use the `unsafe` parameter.

Examples

Trust a disk group which has enough good disks to complete the trust operation. The disk group may have out-of-sync or partially reconstructed disks but they are not needed to complete the trust operation. The command completes successfully.

```
# trust enable
```

```
Success: Command completed successfully. - Trust is enabled. (2013-09-17 04:29:28)
```

```
# trust vdisk disk-group data_1
```

```
Success: Command completed successfully. (data_1) - Trust operation completed successfully for this vdisk disk group. (2013-09-17 04:29:35)
```

Trust a disk group which does not have enough good disks available to complete the trust operation. The command fails.

```
# trust enable
```

```
Success: Command completed successfully. - Trust is enabled. (2013-09-17 04:12:49)
```

```
# trust vdisk disk-group data_1
```

trust

Error: The trust operation failed because the vdisk disk group has an insufficient number of in-sync disks. - Please contact Support for further assistance. (2013-09-17 04:13:13)

Trust a disk group which has out-of-sync or partially reconstructed disks that would be needed to complete the trust operation. The command fails.

```
# trust enable
```

```
Success: Command completed successfully. - Trust is enabled. (2013-09-17 09:06:41)
```

```
# trust vdisk disk-group data_1
```

Error: Command failed. - The vdisk disk group specified contains out-of-sync or partially reconstructed disks that are necessary to restore the vdisk disk group to an accessible state. Continuing with the trust operation may lead to data corruption. Please contact Support for further assistance. (2013-09-08 09:06:46)

Continuing the previous example, you decide to re-enable trust and proceed by specifying the unsafe parameter.

```
# trust enable
```

```
Success: Command completed successfully. - Trust is enabled. (2013-09-17 09:06:48)
```

```
# trust vdisk disk-group data_1 unsafe
```

Location	Serial Number	Type	State	Partially Reconstructed
1.2	SN	SAS	LEFTOVR	False
True	6			
1.4	SN	SAS	VDISK	False
False	7			
1.4	SN	SAS	VIRTUAL POOL	False
False	7			
1.5	SN	SAS	LEFTOVR	True
False	4			

```
-----
```

```
Out Of Sync Age
```

```
-----
```

```
1.2 SN SAS LEFTOVR False
```

```
True 6
```

```
1.4 SN SAS VDISK False
```

```
False 7
```

```
1.4 SN SAS VIRTUAL POOL False
```

```
False 7
```

```
1.5 SN SAS LEFTOVR True
```

```
False 4
```

```
-----
```

WARNING: Found partially reconstructed and out-of-sync disk(s). Using these disks for trust will in most cases cause data corruption.

Because of the risk of data corruption, it is recommended that you continue the trust operation only with the supervision of Support personnel. If you are ready to continue, enter "continue" at the prompt or enter "abort" to abort the operation and leave the vdisk disk group offline.

```
> continue
```

If you continue with the trust operation, you risk corrupting data in this vdisk disk group. Enter "accept" at the prompt if you intend to accept this risk and

trust

proceed with the trust operation or enter "abort" to abort the operation and leave the vdisk disk group offline.

> **accept**

Success: Command completed successfully. (data_1) - Trust operation completed successfully for this vdisk disk group. (2013-09-17 09:07:31)

Abort an unsafe trust operation when you decide not to risk using bad disks.

trust enable

Success: Command completed successfully. - Trust is enabled. (2013-09-17 09:05:37)

trust vdisk disk-group data_1 unsafe

Location	Serial Number	Type	State	Partially Reconstructed
Out Of Sync	Age			

1.2	SN	SAS	LEFTOVR	False
True	6			
1.4	SN	SAS	VDISK	False
False	7			
1.4	SN	SAS	VIRTUAL POOL	False
False	7			
1.5	SN	SAS	LEFTOVR	True
False	4			

WARNING: Found partially reconstructed and out-of-sync disk(s). Using these disks for trust will in most cases cause data corruption.

Because of the risk of data corruption, it is recommended that you continue the trust operation only with the supervision of Support personnel. If you are ready to continue, enter "continue" at the prompt or enter "abort" to abort the operation and leave the vdisk disk group offline.

> **continue**

If you continue with the trust operation, you risk corrupting data in this vdisk disk group. Enter "accept" at the prompt if you intend to accept this risk and proceed with the trust operation or enter "abort" to abort the operation and leave the vdisk disk group offline.

> **abort**

Error: Command was aborted by user. (2013-09-17 09:05:49)

After enabling trust, disable it if you decide not to run trust vdisk disk-group.

trust disable

Success: Command completed successfully. - Trust is disabled. (2013-09-17 17:40:01)

See also

- [show disk-groups on page 317](#)

- [show vdisks on page 449](#)
- [verify disk-groups on page 493](#)
- [verify vdisk on page 498](#)

unfail controller

Description

Allows the partner controller module to recover from a simulated failure performed with the [fail on page 145](#) command (which requires the manage role). If you attempt to unfail a controller that is operating, the command will have no effect.

Minimum role

manage

Syntax

```
unfail controller
```

Examples

```
From controller A, unfail the partner controller.  
# unfail controller b
```

See also


- [fail on page 145](#)
- [show controllers on page 309](#)

unmap volume

Description

Deletes explicit mappings or the default mapping for specified volumes. When an explicit mapping between an initiator and a volume is deleted, access by that initiator to the volume is controlled by the volume's default mapping (described in help for [create volume on page 95](#)). When a default mapping is deleted, access by initiators to the volume is controlled by any explicit mappings of those initiators to the volume. If neither mapping exists, the volume is unavailable to initiators.

If you want to mask access for a specific initiator to a specific volume, use the [map volume on page 147](#) command and set the access parameter to `no-access`.

 **Caution:** When a volume is unmapped from an initiator, the initiator will no longer be able to access the volume's data.

Minimum role

manage

Syntax

To delete explicit mappings:

```
unmap volume  
  [host hosts]  
  [initiator initiators/hosts/host-groups]  
  volumes/volume-groups
```

To delete the default mappings:

```
unmap volume  
  volumes/volume-groups
```

Parameters

`host hosts`

Deprecated—use the initiator parameter instead.

`initiator initiators/hosts/host-groups`

Optional. A comma-separated list of initiators, hosts, or host groups from which to unmap volumes. For initiator, host, and host-group syntax, see [Command Syntax on page 13](#). If this parameter is omitted, mapping changes apply to all initiators that are not explicitly mapped (the default mapping).

`volumes`/`volume-groups`

A comma-separated list of volumes or volume groups to unmap. For a volume, specify its name or serial

number. For a volume group, specify the name as `volume-group.*`. A name that includes a space must be enclosed in double quotes.

Examples

```
Delete explicit mappings for Host1 to volumes V1 and V3 (leaving the default mappings, if any, unchanged).
```

```
# unmap volume initiator Host1.* V1,V3
```

```
Delete volume V2's default mapping (leaving explicit mappings, if any, unchanged).
```

```
# unmap volume V2
```

```
Delete explicit mappings for initiator FC-port1 to volume group MyVolumes (leaving the default mappings, if any, unchanged).
```

```
# unmap volume initiator FC-port1 MyVolumes.*.*
```

See also

- [map volume on page 147](#)
- [show hosts \(Deprecated\) on page 360](#)
- [show maps on page 368](#)
- [show volumes on page 467](#)

verify disk-groups

Description

Analyzes redundant disk groups to find and fix inconsistencies between their redundancy data and their user data.

This command acts on all disks in a disk group but not dedicated spares or leftover disks. This command will find and optionally fix parity mismatches for RAID 3, 5, 6, and 50 5 and 6, and mirror mismatches for RAID 1 and 10. This command can be performed only on a disk group whose status is FTOL (fault tolerant and online). This command cannot be performed for NRAID or RAID 0.

Verification can last over an hour, depending on disk group size, utility priority, and amount of I/O activity. You can use a disk group while it is being verified. To view the progress of a verify (VRFY) job, use the `show disk-groups` command.

When verification is complete, event 21 is logged and specifies the number of inconsistencies found. Such inconsistencies can indicate that a disk is going bad.

i Note: The [scrub disk-groups on page 199](#) command operates similarly to verify disk-groups and can find and fix media errors for any RAID level, including NRAID and RAID 0.

Minimum role

manage

Syntax

```
verify disk-groups  
[fix yes|no]  
disk-groups
```

Parameters

fix yes|no

Optional. Specifies whether or not to automatically fix parity mismatches by making parity match the data in all cases. The default is no.

disk-groups

A comma-separated list of the names or serial numbers of the disk groups to verify. A name that includes a space must be enclosed in double quotes.

Examples

```
Start verifying disk group dg1.  
# verify disk-group dg1
```

See also

- [abort verify on page 35](#)
- [scrub disk-groups on page 199](#)
- [show disk-groups on page 317](#)

verify links

Description

Verifies FC host-port link paths between controller A and controller B host-port links. This command is not applicable to a system with SAS controller modules.

If a remote system is specified, all link paths between the local system and the remote system are tested. Otherwise, link paths between controller A and controller B in the local system are tested. The remote system must already have been added by using the [create remote-system on page 71](#) command.

For replication purposes, this tests the links to be used for replication from one system to another system. To verify bidirectional communication, run this command from the primary system to the secondary system, and then from the secondary system to the primary system.

Minimum role

manage

Syntax

```
verify link  
[link-type FC|iSCSI|ALL]  
[remote-system system]
```

Parameters

link-type FC|iSCSI|ALL

Optional. Specifies the type of host-port links to verify:

- FC: Verify FC-to-FC links only.
- iSCSI: Verify iSCSI-to-iSCSI links only.
- ALL: Verify all FC-to-FC and iSCSI-to-iSCSI links.

If this parameter is omitted, all links are verified.

remote-system system

Optional. The remote system's name or the IP address of one of its controller network ports. A name that includes a space must be enclosed in double quotes. If this parameter is omitted, links between the local controllers are verified.

Output

Port

The port ID in the local system.

Type

- FC: FC port.
- iSCSI: iSCSI port.
- Unknown: Port type is unknown.

Links

The IDs of linked ports in the target system.

Examples

Verify all links between controllers A and B in the local system.

```
# verify links
```

Verify all links between the local system and remote system System2.

```
# verify links remote-system System2
```

Basetypes

- [remote-links on page 651](#)
- [status on page 689](#)

See also

- [show remote-systems on page 401](#)
- [verify remote-link below](#)

verify remote-link

Description

Verifies host-port links between the local system and a specified remote system. This command applies to linear storage only. This command is not applicable to a system with SAS controller modules.

All link paths, or only paths having a specified link type, between the two systems are tested. The remote system must already have been added by using the [create remote-system on page 71](#) command.

verify remote-link

For replication purposes, this tests the links to be used for replication from one system to another system. To verify bidirectional communication, run this command from the primary system to the secondary system, and then from the secondary system to the primary system.

Minimum role

manage

Syntax

```
verify remote-link  
[link-type FC|iSCSI|ALL]  
remote-system system
```

Parameters

`link-type FC|iSCSI|ALL`

Optional. Specifies the type of host-port links to verify:

- FC: Verify FC-to-FC links only.
- iSCSI: Verify iSCSI-to-iSCSI links only.
- ALL: Verify all FC-to-FC and iSCSI-to-iSCSI links.

If this parameter is omitted, all links are verified.

`remote-system system`

The remote system's name or the IP address of one of its controller network ports.

Output

Port

The port ID in the local system.

Type

- FC: FC port.
- iSCSI: iSCSI port.
- Unknown: Port type is unknown.

Links

The IDs of linked ports in the remote system.

Examples

Verify all links between the local system and a remote system.

```
# verify remote-link remote-system System2
```

Verify only iSCSI links between two systems having FC and iSCSI ports.

```
# verify remote-link remote-system System2 link-type iSCSI
```

Basetypes

- [remote-links on page 651](#)
- [status on page 689](#)

See also

- [show remote-systems on page 401](#)
- [verify links on page 495](#)

verify vdisk

Description

Analyzes redundant vdisks to find and fix inconsistencies between their redundancy data and their user data.

This command acts on all disks in a vdisk but not dedicated spares or leftover disks. This command will find and optionally fix parity mismatches for RAID 3, 5, 6, and 50, and mirror mismatches for RAID 1 and 10. This command can be performed only on a vdisk whose status is FTOL (fault tolerant and online). This command cannot be performed for NRAID or RAID 0.

Verification can last over an hour, depending on vdisk size, utility priority, and amount of I/O activity. You can use a vdisk while it is being verified. To view the progress of a verify (VRFY) job, use the [show vdisks on page 449](#) command.

When verification is complete, event 21 is logged and specifies the number of inconsistencies found. Such inconsistencies can indicate that a disk is going bad.

i Note: The [scrub vdisk on page 200](#) command operates similarly to `verify vdisk` and can find and fix media errors for any RAID level, including NRAID and RAID 0.

Minimum role

manage

Syntax

```
verify vdisk  
[fix yes|no]  
vdisks
```

Parameters

fix yes|no

Optional. Specifies whether or not to automatically fix parity mismatches by making parity match the data in all cases. The default is no.

vdisks

A comma-separated list of the names or serial numbers of the vdisks to verify. A name that includes a space must be enclosed in double quotes.

Examples

```
Start verifying vdisk vd1.  
# verify vdisk vd1
```

See also

- [abort verify on page 35](#)
- [scrub vdisk on page 200](#)
- [show vdisks on page 449](#)
- [verify disk-groups on page 493](#)

versions (Deprecated)

Use [show versions on page 457](#).

volumecopy

Description

Copies a standard, master, or snapshot volume to a new standard volume. This command applies to linear storage only.

The destination volume you specify must be in a vdisk owned by the same controller as the source volume. If the source volume is a snapshot, you can choose whether to include its modified data (data written to the snapshot since it was created). The destination volume is completely independent of the source volume.

The first time a volume copy is created of a standard volume, the volume is converted to a master volume and a snap pool is created in the volume's vdisk. The snap pool's size is either 20% of the volume size or 5.37 GB, whichever is larger. The recommended minimum size for a snap pool is 50 GB. Before creating or scheduling copies, verify that the vdisk has enough free space to contain the snap pool.

Before copying a master volume, verify that the snap-pool has space for a transient snapshot, which is used to track changes to the master volume while the copy is in progress.

For a master volume, the volume copy creates a transient snapshot, copies the data from the snapshot, and deletes the snapshot when the copy is complete. For a snapshot, the volume copy is performed directly from the source. This source data may change if modified data is to be included in the copy and the snapshot is mounted/presented/mapped and I/O is occurring to it.

To ensure the integrity of a copy of a master volume, unmount/unpresent/unmap the volume or at minimum perform a system cache flush and refrain from writing to the volume. Since the system cache flush is not natively supported on all operating systems, it is recommended to unmount/unpresent/unmap temporarily. The volume copy is for all data on the disk at the time of the request, so if there is data in the operating-system cache, that will not be copied over. Unmounting/unpresenting/unmapping the volume forces the cache flush from the operating system. After the volume copy has started, it is safe to remount/re-present/remap the volume and/or resume I/O.

To ensure the integrity of a copy of a snapshot with modified data, unmount/unpresent/unmap the snapshot or perform a system cache flush. The snapshot will not be available for read or write access until the volume copy is complete, at which time you can remount/re-present/remap the snapshot. If modified write data is not to be included in the copy, then you may safely leave the snapshot mounted/presented/mapped. During a volume copy using snapshot modified data, the system takes the snapshot offline.

While the copy operation is in progress, the destination volume type is shown as `standard*`. When complete, it changes to `standard`. To see the volume copy's progress use the [show volumecopy-status on page 458](#) command.

Minimum role

manage

Syntax

```
volumecopy  
dest-vdisk vdisk  
[modified-snapshot yes|no]  
[prompt yes|no|expert]  
source-volume source-volume  
destination-volume
```

Parameters

`dest-vdisk`

The name or serial number of the destination vdisk. A name that includes a space must be enclosed in double quotes.

`modified-snapshot yes|no`

Optional. Specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot.

- `yes`: Include modified snapshot data.
- `no`: Exclude modified snapshot data.

If this parameter is omitted for a snapshot, modified snapshot data is excluded.

`prompt yes|no|expert`

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.
- `expert`: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

`source-volume source-volume`

The name or serial number of the volume or snapshot to copy. A name that includes a space must be enclosed in double quotes.

`destination-volume`

A name for the volume to create in the destination vdisk. Input rules:

- The value is case sensitive.
- The value can have a maximum of 2032 bytes, where ASCII characters are 1 byte.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.

Examples

Copy master volume MV1 to new volume MV1copy on vdisk VD2.

```
# volumecopy source-volume MV1 dest-vdisk VD2 MV1copy
```

Copy standard volume V1 on vdisk vd01 to new volume V1_copy on the same vdisk.

```
# volumecopy source-volume V1 dest-vdisk vd01 V1_copy
```

See also

- [abort volumecopy on page 36](#)
- [create task on page 83](#)
- [show vdisks on page 449](#)
- [show volumecopy-status on page 458](#)
- [show volumes on page 467](#)



Chapter 8: XML API Basetype Properties

This chapter contains the following topics:

XML API Basetype Properties	508
advanced-settings-table	510
attribute-priorities	518
cache-parameter	518
cache-settings	520
certificate-status	521
chap-records	522
cli-parameters	523
code-load-readiness	527
code-load-readiness-reasons	527
compact-flash	528
controller-cache-parameters	529
controllers	530
controller-statistics	536
copy-volumes	538
cs-replicate-tasks	539

cs-replication	539
cs-replication-set	541
debug-log-parameters	543
disk-groups	549
disk-group-statistics	558
disk-group-statistics-paged	560
disk-hist-statistics	560
disk-statistics	563
drawer-sensors	566
drawers	568
drive-parameters	571
drive-summary	572
drives	573
email-parameters	583
enclosure-fru	585
enclosure-list	588
enclosures	590
events	594
eventsLogs	596
expander-ports	597
fan	599
fc-port	601
fde-state (QXS-4 and QXS-6 Series)	602
host	603
host-group	604
host-group-view	604
host-port-statistics	605
hosts	607
host-view	608

host-view-mappings	609
initiator	609
initiator-view	610
inquiry	611
io-modules	612
iscsi-parameters	614
iscsi-port	615
license	617
local-ports	622
local-ports-detail	622
log-header-table	623
master-volumes	624
network-parameters	625
ntp-status	627
peer-connection-info	627
peer-connections	628
peer-controllers	629
peer-ports	630
policy-threshold	630
pool-hist-statistics	632
pool-statistics	633
pool-summary	634
pools	634
port	640
power-supplies	642
product-info	645
provisioning	645
readcache-hist-statistics	647
redundancy	648

refresh-counters	650
remote-addresses	651
remote-links	651
remote-ports	652
remote-ports-detail	652
remote-system	653
replicate-volume-tasks	655
replication-image	656
replication-image-params	657
replication-set	658
replication-volume	659
replication-volume-summary	663
reset-snapshot-tasks	664
resettable-statistics	664
sas-host-phy-statistics	665
sas-port	666
sas-status-controller-a	667
sas-status-drawer	672
schedules	672
security-communications-protocols	673
sensors	676
show-other-mc-status	678
shutdown-status	679
snap-pools	679
snap-space	680
snapshots	681
snapshot-with-retention-tasks	686
snap-tasks	687
snmp-parameters	687

status	689
syslog-parameters	689
system	690
system-parameters-table	693
tasks	697
tier-hist-statistics (QXS-4 and QXS-6 Series Only)	699
tier-statistics (QXS-4 and QXS-6 Series Only)	702
tier-summary (QXS-4 and QXS-6 Series Only)	703
tiers (QXS-4 and QXS-6 Series Only)	703
time-settings-table	705
unhealthy-component	706
unwritable-cache	708
users	708
vdisk-hist-statistics	711
vdisk-statistics	712
versions	714
virtual-disk-summary	715
virtual-disks	716
volume-copy-status	723
volume-copy-tasks	724
volume-groups	725
volume-group-view	725
volume-group-view-mappings	726
volume-names	727
volume-reservations	727
volumes	729
volume-statistics	738
volume-view	740
volume-view-mappings	741

XML API Basetype Properties

This section describes the basetype properties that CLI commands display in XML API format, and is organized to help you find a basetype by name. This section excludes basetypes that are for internal use only.

Each basetype topic includes the following information:

- References to CLI commands that directly use the basetype.
- For each property, the values of its name and type elements, and a description of the values that the property may show. For descriptions of other elements see .
- References to embedded or nested basetypes that the output may show.

Basetypes A - P

advanced-settings-table on page 510	attribute-priorities on page 518	cache-parameter on page 518	cache-settings on page 520
certificate-status on page 521	chap-records on page 522	cli-parameters on page 523	code-load-readiness on page 527
code-load-readiness-reasons on page 527	compact-flash on page 528	controllers on page 530	controller-statistics on page 536
copy-volumes on page 538	cs-replicate-tasks on page 539	cs-replication on page 539	cs-replication-set on page 541
debug-log-parameters on page 543	disk-groups on page 549	disk-group-statistics on page 558	disk-group-statistics-paged on page 560
disk-hist-statistics on page 560	disk-statistics on page 563	drawer-sensors on page 566	drawers on page 568
drive-parameters on page 571	drive-summary on page 572	drives on page 573	email-parameters on page 583
enclosure-fru on page 585	enclosure-list on page 588	enclosures on page 590	events on page 594
eventsLogs on page 596	expander-ports on page 597	fan on page 599	fc-port on page 601
fde-state (QXS-4 and QXS-6 Series) on page 602	host on page 603	host-group on page 604	host-group-view on page 604

host-port-statistics on page 605	hosts on page 607	host-view on page 608	host-view-mappings on page 609
initiator on page 609	initiator-view on page 610	inquiry on page 611	io-modules on page 612
iscsi-parameters on page 614	iscsi-port on page 615	license on page 617	local-ports on page 622
local-ports-detail on page 622	log-header-table on page 623	master-volumes on page 624	network-parameters on page 625
ntp-status on page 627	peer-connection-info on page 627	peer-connections on page 628	peer-controllers on page 629
peer-ports on page 630	policy-threshold on page 630	pool-hist-statistics on page 632	pool-statistics on page 633
pool-summary on page 634	pools on page 634	port on page 640	power-supplies on page 642
product-info on page 645	provisioning on page 645		

Basetypes R - Z

readcache-hist-statistics on page 647	redundancy on page 648	refresh-counters on page 650	remote-addresses on page 651
remote-links on page 651	remote-ports on page 652	remote-ports-detail on page 652	remote-system on page 653
replicate-volume-tasks on page 655	replication-image on page 656	replication-image-params on page 657	replication-set on page 658
replicate volume on page 167	replication-volume-summary on page 663	reset-snapshot-tasks on page 664	resettable-statistics on page 664
sas-host-phy-statistics on page 665	sas-port on page 666	sas-status-controller-a on page 667	sas-status-drawer on page 672
schedules on page 672	security-communications-protocols on page 673	sensors on page 676	show-other-mc-status on page 678
shutdown-status on page 679	snap-pools on page 679	snap-space on page 680	snapshots on page 681

snapshot-with-retention-tasks on page 686	snap-tasks on page 687	snmp-parameters on page 687	status on page 689
syslog-parameters on page 689	system on page 690	system-parameters-table on page 693	tasks on page 697
tier-hist-statistics (QXS-4 and QXS-6 Series Only) on page 699	tier-statistics (QXS-4 and QXS-6 Series Only) on page 702	tier-summary (QXS-4 and QXS-6 Series Only) on page 703	tiers (QXS-4 and QXS-6 Series Only) on page 703
time-settings-table on page 705	unhealthy-component on page 706	unwritable-cache on page 708	users on page 708
vdisk-hist-statistics on page 711	vdisk-statistics on page 712	versions on page 714	virtual-disk-summary on page 715
virtual-disks on page 716	volume-copy-status on page 723	volume-copy-tasks on page 724	volume-groups on page 725
volume-group-view on page 725	volume-group-view-mappings on page 726	volume-names on page 727	volume-reservations on page 727
volumes on page 729	volume-statistics on page 738	volume-view on page 740	volume-view-mappings on page 741

advanced-settings-table

This basetype is used by [show advanced-settings on page 293](#).

Table 10: advanced-settings-table properties

Name	Type	Description
background-scrub	string	Shows whether disks in disk groups are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the <code>background-scrub-interval</code> parameter. <ul style="list-style-type: none"> Disabled: Background disk-group scrub is disabled. This is the default. Enabled: Background disk-group scrub is enabled.

Name	Type	Description
background-scrub-numeric	uint32	Numeric equivalents for background-scrub values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
background-scrub-interval	uint16	Shows the interval between background disk-group scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.
partner-firmware-upgrade	string	Shows whether component firmware versions are monitored and will be automatically updated on the partner controller. <ul style="list-style-type: none"> Disabled: Partner firmware upgrade is disabled. Enabled: Partner firmware upgrade is enabled. This is the default.
partner-firmware-upgrade-numeric	uint32	Numeric equivalents for partner-firmware-upgrade values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
utility-priority	string	Priority at which data-redundancy utilities, such as disk group verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect disk group background scrub, which always runs at "background" priority.) <ul style="list-style-type: none"> High: Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default. Medium: Utility performance is balanced with host I/O performance. Low: Utilities run at a slower rate with minimal effect on host I/O.
utility-priority-numeric	uint32	Numeric equivalents for utility-priority values. <ul style="list-style-type: none"> 0: High 1: Medium 2: Low
smart	string	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none"> Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system. Enabled: SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default. Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.

Name	Type	Description
smart-numeric	uint32	Numeric equivalents for <code>smart</code> values. <ul style="list-style-type: none"> 0: Detect-Only 1: Enabled 2: Disabled
dynamic-spare	string	Shows whether the storage system will automatically use a compatible disk as a spare to replace a failed disk in a disk group if no compatible spare is available. <ul style="list-style-type: none"> Disabled: The dynamic spares feature is disabled. This is the default. Enabled: The dynamic spares feature is enabled.
emp-poll-rate	uint32	Shows the interval in seconds at which the storage system will poll each enclosure's Enclosure Management Processor (EMP) for status changes, from 5 to 3600 seconds. The default is 5 seconds.
host-cache-control	string	Shows whether hosts are allowed to use the SCSI <code>MODE SELECT</code> command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> Disabled: Host control of caching is disabled. This is the default. Enabled: Host control of caching is enabled.
host-cache-control-numeric	uint32	Numeric equivalents for <code>host-cache-control</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
sync-cache-mode	string	Shows how the SCSI <code>SYNCHRONIZE CACHE</code> command is handled. <ul style="list-style-type: none"> Immediate: Good status is returned immediately and cache content is unchanged. This is the default. Flush To Disk: Good status is returned only after all write-back data for the specified volume is flushed to disk.
sync-cache-mode-numeric	uint32	Numeric equivalents for <code>sync-cache-mode</code> values. <ul style="list-style-type: none"> 0: Immediate 1: Flush to Disk

Name	Type	Description
independent-cache	string	Shows the cache redundancy mode for a dual-controller storage system. <ul style="list-style-type: none"> Disabled: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. This is the default. Enabled: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
independent-cache-numeric	uint32	Numeric equivalents for independent-cache values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
missing-lun-response	string	Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access. <ul style="list-style-type: none"> Not Ready: Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is sensekey = 2, code = 4, qualifier = 3. This is the default. Illegal Request: Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is sensekey = 5, code = 25h, qualifier = 0.
missing-lun-response-numeric	uint32	Numeric equivalents for missing-lun-response values. <ul style="list-style-type: none"> 0: Not Ready 1: Illegal Request
controller-failure	string	Shows whether the cache policy will change from write-back to write-through when a controller fails. <ul style="list-style-type: none"> Disabled: The controller failure trigger is disabled. This is the default. Enabled: The controller failure trigger is enabled.
controller-failure-numeric	uint32	Numeric equivalents for controller-failure values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Name	Type	Description
super-cap-failure	string	Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails. <ul style="list-style-type: none"> Disabled: The supercapacitor failure trigger is disabled. Enabled: The supercapacitor failure trigger is enabled. This is the default.
super-cap-failure-numeric	uint32	Numeric equivalents for <code>super-cap-failure</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
compact-flash-failure	string	Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation. <ul style="list-style-type: none"> Disabled: The CompactFlash failure trigger is disabled. Enabled: The CompactFlash failure trigger is enabled. This is the default.
compact-flash-failure-numeric	uint32	Numeric equivalents for <code>compact-flash-failure</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
power-supply-failure	string	Shows whether the cache policy will change from write-back to write-through when a power supply fails. <ul style="list-style-type: none"> Disabled: The power-supply failure trigger is disabled. This is the default. Enabled: The power-supply failure trigger is enabled.
power-supply-failure-numeric	uint32	Numeric equivalents for <code>power-supply-failure</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
fan-failure	string	Shows whether the cache policy will change from write-back to write-through when a fan fails. <ul style="list-style-type: none"> Disabled: The fan failure trigger is disabled. This is the default. Enabled: The fan failure trigger is enabled.
fan-failure-numeric	uint32	Numeric equivalents for <code>fan-failure</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Name	Type	Description
temperature-exceeded	string	Shows whether the system will shut down a controller when its temperature exceeds the critical operating range. <ul style="list-style-type: none"> Disabled: The over-temperature trigger is disabled. This is the default. Enabled: The over-temperature trigger is enabled.
temperature-exceeded-numeric	uint32	Numeric equivalents for temperature-exceeded values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
partner-notify	string	Shows whether the partner controller will be notified when a trigger condition occurs. <ul style="list-style-type: none"> Disabled: Notification is disabled. The partner controller will continue using its current caching mode. This is the default. Enabled: Notification is enabled. The partner controller will change to write-through mode for better data protection.
partner-notify-numeric	uint32	Numeric equivalents for partner-notify values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
auto-write-back	string	Shows whether the cache policy will change from write-through to write-back when the trigger condition is cleared. <ul style="list-style-type: none"> Disabled: Auto-write-back is disabled. Enabled: Auto-write-back is enabled. This is the default.
auto-write-back-numeric	uint32	Numeric equivalents for auto-write-back values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-dsd-enable	string	Shows whether available disks and global spares will spin down after a period of inactivity shown by the disk-dsd-delay property. <ul style="list-style-type: none"> Disabled: Drive spin down for available disks and global spares is disabled. This is the default. Enabled: Drive spin down for available disks and global spares is enabled.
disk-dsd-enable-numeric	uint32	Numeric equivalents for disk-dsd-enable values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-dsd-delay	uint16	Specifies the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.

Name	Type	Description
background-disk-scrub	string	Shows whether disks that are not in disk groups are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 72 hours. <ul style="list-style-type: none"> Disabled: Background disk scrub is disabled. This is the default. Enabled: Background disk scrub is enabled.
background-disk-scrub-numeric	uint32	Numeric equivalents for background-disk-scrub values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
managed-logs	string	Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log-collection system to avoid losing diagnostic data as logs fill. <ul style="list-style-type: none"> Disabled: The managed logs feature is disabled. This is the default. Enabled: The managed logs feature is enabled.
managed-logs-numeric	uint32	Numeric equivalents for managed-logs values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
single-controller	string	For a system that had two controller modules but now has only one and is intended to be used as a single-controller system, this property shows whether the operating/redundancy mode is set to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP. <ul style="list-style-type: none"> Enabled: Single Controller mode is enabled. Disabled: Single Controller mode is disabled.
single-controller-numeric	string	Numeric equivalents for single-controller values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-protection-info	string	Shows whether the disk PI process of the E2E PI feature is enabled globally for disks and vdisks. <ul style="list-style-type: none"> Disabled: Disk PI is disabled. This is the default. Enabled: Disk PI is enabled.
disk-protection-info	string	Not supported.

Name	Type	Description
disk-protection-info-numeric	uint32	Numeric equivalents for protection-info values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
disk-protection-info-numeric	uint32	Not supported.
auto-stall-recovery	string	Shows whether the auto stall recovery feature is enabled, which detects situations where a controller stall is preventing I/O operations from completing, and recovers the system so that at least one controller is operational, thus avoiding data-unavailability situations. <ul style="list-style-type: none"> Disabled: Auto stall recovery is disabled. Enabled: Auto stall recovery is enabled. This is the default.
auto-stall-recovery-numeric	uint32	Numeric equivalents for auto-stall-recovery values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
restart-on-capifail	string	Shows whether a Storage Controller that experiences a CAPI hang will be forced to restart. A CAPI hang is perceived as a management-interface hang. As part of the restart process, a dump file is created and event 107 is logged. To provide the dump file to technical support for debugging, use the Save Logs action in the SMC.
restart-on-capifail-numeric	uint32	Numeric equivalents for restart-on-capi-fail values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
large-pools	string	Shows whether the large-pools feature is enabled. This option provides the capability to create a virtual pool larger than 300 TiB on each controller by limiting the number of user-defined snapshots that can be created in snapshot trees. <ul style="list-style-type: none"> enabled or on: The maximum size for a virtual pool will increase to 512 TiB. The maximum number of volumes per snapshot tree will decrease to 9 (base volume plus 8 snapshots). disabled or off: The maximum size for a virtual pool will increase to 300 TiB. The maximum number of volumes per snapshot tree will decrease to 255 (base volume plus 254 snapshots). This is the default.
large-poolsnumeric	uint32	Numeric equivalents for large-pools values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

attribute-priorities

This basetype is used by [set syslog-parameters on page 278](#).

Table 11: attribute-priorities properties

Name	Type	Description
attribute-name	string	Snapshot retention attribute. <ul style="list-style-type: none">• Standard Snapshot• Volume Copy Snapshot: A snapshot that is being used to copy data from a source volume to a destination volume. This attribute is temporary for the duration of the volume-copy process.• Replication Snapshot• Replicating Snapshot: A snapshot that is being replicated to a secondary volume. This snapshot is required in order to resume the replication. The attribute is temporary for the duration of the replication process.• Common Sync Point Snapshot: The latest snapshot that is copy-complete on all secondary volumes. It identifies a common point in time that is known by all destinations.• Only Sync Point Snapshot: The only sync point that is available on at least one secondary volume. If this snapshot is removed, then the next replication requires a full sync to be performed.• Queued Snapshot: A snapshot that was taken for remote replication but is queued waiting for the previous replications to complete.• DRM Snapshot: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).
priority-value	string	Retention priority for the corresponding attribute. Values are shown as hexadecimal numbers.

cache-parameter

This basetype is used by [show cache-parameters on page 299](#), when a volume is specified, to show volume cache properties.

Table 12: cache-parameter properties

Name	Type	Description
serial-number	string	If a volume is specified, its serial number.
volume-name	string	If a volume is specified, its name.
write-policy	string	If a volume is specified, its cache write policy. <ul style="list-style-type: none"> <code>write-back</code>: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default. <code>write-through</code>: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.
write-policy-numeric	uint32	Numeric equivalents for <code>write-policy</code> values. <ul style="list-style-type: none"> 0: <code>write-through</code> 1: <code>write-back</code>
cache-optimization	string	If a volume is specified, its cache optimization mode. <ul style="list-style-type: none"> <code>standard</code>: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default. <code>no-mirror</code>: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost. <code>atomic-write</code>: This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
cache-optimization-numeric	uint32	Numeric equivalents for <code>cache-optimization</code> values. <ul style="list-style-type: none"> 0: <code>standard</code> 2: <code>no-mirror</code> 3: <code>atomic-write</code>

Name	Type	Description
<code>read-ahead-size</code>	<code>string</code>	<p>If a volume is specified, its read-ahead cache setting.</p> <ul style="list-style-type: none">• Disabled: Read-ahead is disabled.• Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.• Stripe: Read-ahead is set to one stripe. The controllers treat NRAID and RAID-1 disk groups internally as if they have a stripe size of 512 KB, even though they are not striped.• 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.
<code>read-ahead-size-numeric</code>	<code>uint32</code>	<p>Numeric equivalents for <code>read-ahead-size</code> values.</p> <ul style="list-style-type: none">• -2: Stripe• -1: Adaptive• 0: Disabled• 524288: 512 KB• 1048576: 1 MB• 2097152: 2 MB• 4194304: 4 MB• 8388608: 8 MB• 16777216: 16 MB• 33554432: 32 MB

cache-settings

This basetype is used by `show cache-parameters` [on page 299](#) to show system cache properties.

Table 13: cache-settings properties

Name	Type	Description
operation-mode	string	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none">Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.Active-Active ULP (Unified LUN Presentation): Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.Single Controller: There is only a single controller in the enclosure.Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.Down: Both controllers are not operational.
operation-mode-numeric	uint32	Numeric equivalents for operation-mode values. <ul style="list-style-type: none">1: Independent Cache Performance Mode2: Active-Active ULP3: Single Controller4: Failed Over5: Down
controller-cache-parameters	Embedded; see controller-cache-parameters on page 529 .	

certificate-status

This basetype is used by [show certificate on page 301](#).

Table 14: certificate-status properties

Name	Type	Description
controller	string	<ul style="list-style-type: none">A: Controller A.B: Controller B.

Name	Type	Description
controller-numeric	string	Numeric equivalents for controller values. <ul style="list-style-type: none">0: A1: B
certificate-status	string	<ul style="list-style-type: none">Customer-supplied: The controller is using a certificate that you have uploaded.System-generated: The controller is using system-generated certificates.Unknown status: The controller's certificate cannot be read. This most often occurs when a controller is restarting or the certificate replacement process is still in process.
certificate-status-numeric	uint32	Numeric equivalents for certificate-status values. <ul style="list-style-type: none">0: Default1: Customer-supplied
certificate-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the certificate was created.
certificate-signature	string	The first few characters of the certificate file. This property is for diagnostic purposes, and can be used to verify that the proper certificate is in use.
certificate-text	string	The full text of the certificate.

chap-records

This basetype is used by [show channels \(Deprecated\)](#) on page 303.

Table 15: chap-records properties

Name	Type	Description
initiator-name	string	The originator name.
initiator-secret	string	The secret that the recipient uses to authenticate the originator.
oname	string	For mutual CHAP, the recipient name.
osecret	string	For mutual CHAP, the secret that the originator uses to authenticate the recipient.

cli-parameters

This basetype is used by [show cli-parameters on page 304](#).

Table 16: cli-parameters properties

Name	Type	Description
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).
output-format	string	<ul style="list-style-type: none">• <code>console</code>: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. This is the default.• <code>api</code>: Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by <code>COMP</code> elements.• <code>api-embed</code>: Alternate form of XML output which displays “child” objects embedded (indented) under “parent” objects.• <code>ipa</code>: Alternate form of XML output.• <code>json</code>: Alternate data-interchange format.
output-format-api	string	<ul style="list-style-type: none">• <code>console</code>• <code>api</code>• <code>api-brief</code>• <code>api-embed</code>• <code>api-embed-brief</code>• <code>json</code>• <code>json-full</code>
output-format-api-numeric	uint32	Numeric equivalents for <code>output-format-api</code> values. <ul style="list-style-type: none">• 1: <code>console</code>• 2: <code>api</code>• 3: <code>api-brief</code>• 4: <code>api-embed</code>• 5: <code>api-embed-brief</code>• 6: <code>json</code>• 7: <code>json-full</code>
brief-mode	string	<ul style="list-style-type: none">• Enabled: In XML output, this setting shows a subset of attributes of object properties. The <code>name</code> and <code>type</code> attributes are always shown.• Disabled: In XML output, this setting shows all attributes of object properties. This is the default.

Name	Type	Description
brief-mode-numeric	uint32	Numeric equivalents for brief-mode values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
base	uint8	Alias for storage-size-base.
pager	string	<ul style="list-style-type: none">• Enabled: Halts output after each full screen to wait for keyboard input. This is the default.• Disabled: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.
pager-numeric	uint32	Numeric equivalents for pager values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
locale	string	Display language. <ul style="list-style-type: none">• English (the default)• Spanish• French• German• Italian• Japanese• Korean• Dutch• Chinese-simplified• Chinese-traditional• Korean• Arabic• Portuguese• Russian

Name	Type	Description
locale-numeric	uint32	<p>Numeric equivalents for locale values.</p> <ul style="list-style-type: none">• 0: English• 1: Spanish• 2: French• 3: German• 4: Italian• 5: Japanese• 9: Korean• 6: Dutch• 7: Chinese-simplified• 8: Chinese-traditional• 9: Korean• 10: Arabic• 11: Portuguese• 12: Russian
storage-size-base	uint8	<p>Base for entry and display of storage-space sizes.</p> <ul style="list-style-type: none">• 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.• 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. <p>Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.</p>
storage-size-precision	uint8	<p>Number of decimal places (1–10) for display of storage-space sizes. The default is 1.</p>
storage-size-units	string	<p>Unit for display of storage-space sizes.</p> <ul style="list-style-type: none">• Auto: Lets the system determine the proper unit for a size. This is the default.• MB: Sizes are shown in megabytes.• GB: Sizes are shown in gigabytes.• TB: Sizes are shown in terabytes. <p>Based on the precision setting, if a size is too small to meaningfully display in the selected unit, the system uses a smaller unit for that size. For example, if <code>storage-size-units</code> is set to TB, <code>storage-size-precision</code> is set to 1, and <code>storage-size-base</code> is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.</p>

Name	Type	Description
storage-size-units-numeric	uint32	Numeric equivalents for <code>storage-size-units</code> values. <ul style="list-style-type: none"> • 0: Auto • 1: MB • 2: GB • 3: TB
temperature-scale	string	<ul style="list-style-type: none"> • Fahrenheit: Temperatures are shown in degrees Fahrenheit. • Celsius: Temperatures are shown in degrees Celsius. This is the default.
temperature-scale-numeric	uint32	Numeric equivalents for <code>temperature-scale</code> values. <ul style="list-style-type: none"> • 0: Fahrenheit • 1: Celsius
user-type	string	The logged-in user's experience level. <ul style="list-style-type: none"> • Novice • Standard (the default) • Advanced • Diagnostic
user-type-numeric	uint32	Numeric equivalents for <code>user-type</code> values. <ul style="list-style-type: none"> • 1: Novice • 2: Standard • 3: Advanced • 4: Diagnostic
username	string	The logged-in user name.
management-mode	string	The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session. <ul style="list-style-type: none"> • v2: Uses terminology that is oriented to managing linear storage. For example, <i>vdisk</i> for disk groups and pools. • v3: Uses terminology that is oriented to managing virtual and linear storage. For example, <i>disk group</i> for disk groups and <i>pool</i> for pools.
management-mode-numeric	uint32	Numeric equivalents for <code>management-mode</code> values. <ul style="list-style-type: none"> • 2: v2 • 3: v3

code-load-readiness

This basetype is used by [check firmware-upgrade-health on page 49](#).

Table 17: code-load-readiness properties

Name	Type	Description
overall-health	string	<ul style="list-style-type: none">• Pass: There are no risks to performing firmware upgrade.• Fail: At least one condition exists that presents a risk of upgrade failure or loss of availability.
overall-health-numeric	string	Numeric equivalents for overall-health values. <ul style="list-style-type: none">• 0: Pass• 1: Fail
code-load-readiness-reasons	Embedded;	see code-load-readiness-reasons below .

code-load-readiness-reasons

This basetype is used by [check firmware-upgrade-health on page 49](#).

Table 18: code-load-readiness-reasons properties

Name	Type	Description
readiness-reason	string	The condition that was detected.
failure-risks	string	The problems that are likely to result if you do not resolve the conditions before performing a firmware upgrade.
failure-risks-numeric	uint32	Numeric equivalents for failure-risks values.

compact-flash

This basetype is used by [show controllers on page 309](#).

Table 19: compact-flash properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none">• Ctlr A CF: CompactFlash card in controller A.• Ctlr B CF: CompactFlash card in controller B.
controller-id	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none">• 0: B• 1: A
name	string	<ul style="list-style-type: none">• Controller A CompactFlash• Controller B CompactFlash
status	string	<ul style="list-style-type: none">• Not Installed• Installed
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: Not Installed• 1: Installed
cache-flush	string	<ul style="list-style-type: none">• Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.• Disabled: Cache flush is disabled.
cache-flush-numeric	uint32	Numeric equivalents for cache-flush values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
health	string	<ul style="list-style-type: none">• OK• Fault• N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 2: Fault• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.

Name	Type	Description
health-recommendation	string	If Health is not OK, the recommended action to take to resolve the health issue.

controller-cache-parameters

This basetype is used by [show cache-parameters on page 299](#) to show controller cache properties.

Table 20: controller-cache-parameters properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"> cache-params-a: Cache parameters for controller A. cache-params-b: Cache parameters for controller B.
controller-id	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none"> 0: B 1: A
name	string	<ul style="list-style-type: none"> Controller A Cache Parameters Controller B Cache Parameters
write-back-status	string	Shows the current, system-wide cache policy as determined by auto-write-through logic. This value is not settable by users. If an auto-write-through trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. <ul style="list-style-type: none"> Enabled: Write-back. This is the normal state. Disabled: Write-through. Not up: The controller is not up.
write-back-status-numeric	uint32	Numeric equivalents for write-back-status values. <ul style="list-style-type: none"> 0: Enabled (write-back) 1: Disabled (write-through) 2: Not up

Name	Type	Description
compact-flash-status	string	<ul style="list-style-type: none"> • Not Installed: The CompactFlash card is not installed. • Installed: The CompactFlash card is installed.
compact-flash-status-numeric	uint32	Numeric equivalents for compact-flash-status values. <ul style="list-style-type: none"> • 0: Not Installed • 1: Installed
compact-flash-health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
compact-flash-health-numeric	uint32	Numeric equivalents for compact-flash-health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
cache-flush	string	<ul style="list-style-type: none"> • Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down. • Disabled: Cache flush is disabled.
cache-flush-numeric	uint32	Numeric equivalents for cache-flush values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled

controllers

This basetype is used by [show configuration on page 307](#) and [show controllers on page 309](#).

Table 21: controllers properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"> • controller a • controller b

Name	Type	Description
controller-id	string	<ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-id-numeric	uint32	<ul style="list-style-type: none"> 0: B 1: A
serial-number	string	<ul style="list-style-type: none"> Serial number of the controller module. Not Available: The controller module is down or not installed.
hardware-version	string	Controller module hardware version.
cpld-version	string	Complex Programmable Logic Device (CPLD) firmware version.
mac-address	string	Controller network port MAC address.
node-wwn	string	Storage system World Wide Node Name (WWNN).
active-version	uint32	The configured network port IP version. <ul style="list-style-type: none"> 4: IPv4 6: IPv6
ip-address	string	Controller network port IP address.
ip-subnet-mask	string	Controller network port IP subnet mask.
ip-gateway	string	Controller network port gateway IP address.
disks	uint32	Number of disks in the storage system.
number-of-storage-pools	uint32	Number of virtual pools in the storage system. Not applicable.
virtual-disks	uint32	Number of disk groups in the storage system.
cache-memory-size	uint32	Controller cache memory size (MB).
system-memory-size	uint32	Controller module cache memory size, in MB, including CPU memory available to I/O.
host-ports	uint32	Number of host ports in the controller module.
drive-channels	uint32	Number of expansion ports in the controller enclosure.
drive-bus-type	string	Controller interface to disks. <ul style="list-style-type: none"> SAS

Name	Type	Description
drive-bus-type-numeric	uint32	Numeric equivalent for drive-bus-type value. <ul style="list-style-type: none"> 8: SAS
status	string	<ul style="list-style-type: none"> Operational Down Not installed Unknown
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> 0: Operational 1: Down 2: Not installed 3: Unknown
failed-over	string	Indicates whether the partner controller has failed over to this controller. <ul style="list-style-type: none"> No: The partner controller has not failed over to this controller. Yes: The partner controller has either failed or been shut down, and its responsibilities have been taken over by this controller. There will be a delay between the time that the value of the status property becomes Down for one controller and the time that the value of the failed-over property becomes Yes for the other controller. This time period is the time that it takes for a controller to take over the responsibilities of its partner.
failed-over-numeric	uint32	Numeric equivalents for failed-over values. <ul style="list-style-type: none"> 0: No 1: Yes
fail-over-reason	string	If failed-over is Yes, a reason for the failover appears; otherwise, Not applicable appears.
fail-over-reason-numeric	uint32	Numeric equivalents for fail-over-reason values.
sc-fw	string	Storage Controller firmware version.
vendor	string	Controller manufacturer.
model	string	Controller model.
sc-cpu-type	string	Storage Controller processor type.
sc-cpu-speed	sint32	Storage Controller processor speed.

Name	Type	Description
internal-serial-number	string	Internal serial number of the controller.
cache-lock	string	Shows whether hosts are prevented from using the SCSI <code>MODE SELECT</code> command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> • No: Hosts are permitted to disable write-back cache. • Yes: Hosts are prevented from disabling write-back cache.
cache-lock-numeric	uint32	Numeric equivalents for <code>cache-lock</code> values. <ul style="list-style-type: none"> • 0: No • 1: Yes
write-policy	string	The current, system-wide cache policy as determined by auto-write-through (AWT) logic. This value is not settable by users. If an AWT trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. <ul style="list-style-type: none"> • <code>write-back</code>: This is the normal state. • <code>write-through</code> • <code>Not up</code>: The controller is not up.
write-policy-numeric	uint32	Numeric equivalents for <code>write-policy</code> values. <ul style="list-style-type: none"> • 0: <code>write-back</code> • 1: <code>write-through</code> • 2: <code>Not up</code>.
description	string	FRU long description.
part-number	string	Part number for the FRU.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), when the controller's PCBA was programmed.
mfg-date-numeric	uint32	Unformatted <code>mfg-date</code> value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.

Name	Type	Description
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
locator-led	string	Shows the state of the locator LED on a controller module. <ul style="list-style-type: none"> • Off • On
locator-led-numeric	uint32	Numeric equivalents for the locator-led property. <ul style="list-style-type: none"> • 0: Off • 1: On
ssd-alt-path-iocount	uint8	The ratio of I/Os that alternate between the primary path and the alternate path to the SSDs. Thus, if the value is 3, then every third I/O will go to the alternate path.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
position	string	Position of the controller module, as viewed from the back of the enclosure. <ul style="list-style-type: none"> • Left • Right • Top • Bottom
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"> • 0: Left • 1: Right • 2: Top • 3: Bottom

Name	Type	Description
phy-isolation	string	Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller. <ul style="list-style-type: none"> Enabled: PHY fault isolation is enabled. This is the default. Disabled: PHY fault isolation is disabled.
phy-isolation-numeric	uint32	Numeric equivalents for phy-isolation values. <ul style="list-style-type: none"> 0: Enabled 1: Disabled
redundancy-mode	string	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none"> Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. Active-Active ULP: Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. Single Controller: The enclosure contains a single controller. Single Controller: The enclosure contains a single controller. Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. Down: Both controllers are not operational.
redundancy-mode-numeric	uint32	Numeric equivalents for redundancy-mode values. <ul style="list-style-type: none"> 1: Independent Cache Performance Mode 2: Active-Active ULP 3: Single Controller 4: Failed Over 5: Down

Name	Type	Description
redundancy-status	string	<ul style="list-style-type: none">Redundant with independent cache: Both controllers are operational but are not mirroring their cache metadata to each other.Redundant: Both controllers are operational.Operational but not redundant: In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.Down: This controller is not operational.Unknown: Status information is not available.
redundancy-status-numeric	uint32	Numeric equivalents for redundancy-status values. <ul style="list-style-type: none">0: Operational but not redundant1: Redundant with independent cache3: Redundant4: Down5: Unknown
unhealthy-component	Embedded; see unhealthy-component on page 706 .	
ip-address	Embedded; see network-parameters on page 625 .	
port-details	Embedded; see port on page 640 .	
enclosure-id	Embedded; see expander-ports on page 597 .	
compact-flash	Embedded; see compact-flash on page 528 .	

controller-statistics

This basetype is used by [show controller-statistics on page 313](#).

Table 22: controller-statistics properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none">controller acontroller b
cpu-load	uint32	Percentage of time the CPU is busy, from 0 to 100.

Name	Type	Description
power-on-time	uint32	Number of seconds since the controller was restarted.
write-cache-used	uint32	Percentage of write cache in use, from 0 to 100.
bytes-per-second	uint64	The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted <code>bytes-per-second</code> value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	For the controller whose host ports had I/O activity, the number of read operations since these statistics were last reset or since the controller was restarted.
read-cache-hits	uint64	For the controller that owns the volume, the number of times the block to be read is found in cache.
read-cache-misses	uint64	For the controller that owns the volume, the number of times the block to be read is not found in cache.
number-of-writes	uint64	For the controller whose host ports had I/O activity, the number of write operations since these statistics were last reset or since the controller was restarted.
write-cache-hits	uint64	For the controller that owns the volume, the number of times the block written to is found in cache.
write-cache-misses	uint64	For the controller that owns the volume, the number of times the block written to is not found in cache.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted <code>data-read</code> value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.

Name	Type	Description
data-written-numeric	uint64	Unformatted data-written value.
num-forwarded-cmds	uint32	The current count of commands that are being forwarded or are queued to be forwarded to the partner controller for processing. This value will be zero if no commands are being forwarded or are queued to be forwarded.
reset-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted reset-time value.
start-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <i>iops</i> and <i>bytes-per-second</i> values.
start-sample-time-numeric	uint32	Unformatted start-sample-time value.
stop-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the <i>iops</i> and <i>bytes-per-second</i> values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.
total-power-on-hours	string	The total amount of hours the controller has been powered on in its life time.

copy-volumes

This basetype is used by [show volume-copies on page 460](#).

Table 23: copy-volumes properties

Name	Type	Description
source-volume	string	The name of the source volume.
source-volumeserial	string	The serial number of the source volume.
source-type	string	The type of the source volume: <code>Virtual</code> or <code>Linear</code> .
source-pool-name	string	The name of the source pool: A or B.
destination-volume	string	The name of the destination volume.
destinationvolume-serial	string	The serial number of the destination volume.
destination-type	string	The type of the destination volume.
destination-poolname	string	The name of the destination pool: A or B.
progress	string	The percent complete of the operation.

cs-replicate-tasks

This basetype is used by [show schedules on page 416](#).

Table 24: cs-replicate-tasks properties

Name	Type	Description
replication-setname	string	The name of the replication set.
replication-setserialnum	string	The serial number of the replication set.

cs-replication

This basetype is used by [show replication-sets on page 405](#).

Table 25: cs-replication properties

Name	Type	Description
replication-state	string	<ul style="list-style-type: none"> Last Run Current Run
replication-statenumeric	uint32	Numeric equivalents for replication-state values. <ul style="list-style-type: none"> 0: Last Run 1: Current Run
image-generation	int32	The generation number of the replication. If the replication set is unsynchronized, which means the replication set is ready for replication but no replications have been performed
progress	string	The percentage complete of the active replication. Otherwise, 0%.
total-datatransferred	uint64	The total number of bytes transferred.
total-datatransferrednumeric	uint64	Unformatted total-data-transferred value.
collection-time	uint32	The date and time when the replication data shown by this command was collected.
collection-timnumeric	uint32	Unformatted collection-time value.
time-start	string	The date and time when the replication started.
time-start-numeric	uint32	Unformatted time-start value.
time-end	string	The date and time when the replication ended.
time-end-numeric	uint32	Unformatted time-end value.
estimated-timecompletion	string	The date and time when the replication is estimated to end.
estimated-timecompletion-numeric	uint32	Unformatted estimated-time-completion value.
most-recentsuspend-time	string	The most recent time that the replication was suspended.
most-recentsuspend-timnumeric	uint32	Unformatted most-recent-suspend-time value.

Name	Type	Description
num-secondssuspended	uint32	The amount of time, in seconds, that the replication was suspended.
suspend-count	uint32	The number of times the replication was suspended.
error-count	uint32	The number of times the replication experienced an error.
run-error	string	A message that says whether the replication succeeded or an error occurred.

cs-replication-set

This basetype is used by [show replication-sets on page 405](#) for a virtual replication set.

Table 26: cs-replication-set properties

Name	Type	Description
name	string	The replication set name.
serial-number	string	The replication set serial number.
group	string	<ul style="list-style-type: none">• Yes: The replication set is part of a group.• No: The replication set is not part of a group.
group-numeric	uint32	Numeric equivalents for group values. <ul style="list-style-type: none">• 0: No• 1: Yes
primary-location	string	The location of the primary volume in the replication set: Local or Remote.
primary-location-numeric	uint32	Numeric equivalents for primary-location values. <ul style="list-style-type: none">• 0: Remote• 1: Local
peer-connection-name	string	The name of the peer connection.

Name	Type	Description
peer-connection-serial	string	The serial number of the peer connection.
primary-volume-name	string	The primary volume name. If it is a volume group, it uses the .* notation.
primary-volume-serial	string	The serial number of the primary volume.
secondary-volume-name	string	The secondary volume name. If it is a volume
secondary-volume-serial	string	The serial number of the secondary volume.
sync-job-active	string	<ul style="list-style-type: none"> False: No replication is in progress on the replication set. True: A replication is currently in progress on the replication set.
sync-job-active-numeric	uint32	Numeric equivalents for sync-job-active values. <ul style="list-style-type: none"> 0: False 1: True
status	string	<ul style="list-style-type: none"> Not Ready: The replication set is not ready for replications because the system is still preparing the replication set. Unsynchronized: The primary and secondary volumes are unsynchronized because the system has prepared the replication set, but the initial replication has not run. Running: A replication is in progress. Ready: The replication set is ready for a replication. Suspended: Replications have been suspended. Unknown: This system cannot communicate with the primary system and thus cannot be sure of the current state of the replication set. Check the state of the primary system.
status-numeric	uint32	Numeric equivalents for status values.
last-success-time	string	The date and time when the system took a snapshot of the primary volume in preparation for starting the last successful replication run. The value shows when the primary and secondary volumes were last known to be in sync.

Name	Type	Description
last-success-time-numeric	uint32	Unformatted last-success-time value.
last-success-generation	uint32	The number of times a replication has successfully completed.
last-run-status	string	The status of the last attempted replication. <ul style="list-style-type: none">• N/A: The replication has not yet completed.• Success: The replication completed successfully.• Fail: The replication failed
last-run-status-numeric	uint32	Numeric equivalents for last-run-status values. <ul style="list-style-type: none">• 0: N/A• 1: Success• 2: Fail
estimated-time-completion	string	For the current run, the date and time when the replication is estimated to end. If no replication is in progress, N/A.
estimated-time-completion-numeric	string	Unformatted estimated-time-completion value.
previous-replication-run	Embedded; see cs-replication on page 539 .	
current-replication-run	Embedded; see cs-replication on page 539 .	

debug-log-parameters

This basetype is used by [show debug-log-parameters](#).

Table 27: debug-log-parameters properties

Name	Type	Description
host-dbg	string	Shows whether host interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. • On: Enabled. This is the default.
host-dbg-numeric	uint32	Numeric equivalents for host values. <ul style="list-style-type: none"> • 0: Off • 1: On
disk	string	Shows whether disk interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. • On: Enabled. This is the default.
disk-numeric	uint32	Numeric equivalents for disk values. <ul style="list-style-type: none"> • 0: Off • 1: On
mem	string	Shows whether internal memory debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. This is the default. • On: Enabled.
mem-numeric	uint32	Numeric equivalents for mem values. <ul style="list-style-type: none"> • 0: Off • 1: On
fo	string	Shows whether failover and recovery debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. • On: Enabled. This is the default.
fo-numeric	uint32	Numeric equivalents for fo values. <ul style="list-style-type: none"> • 0: Off • 1: On
msg	string	Shows whether inter-controller message debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. • On: Enabled. This is the default.

Name	Type	Description
msg-numeric	uint32	Numeric equivalents for msg values. <ul style="list-style-type: none"> • 0: Off • 1: On
ioa	string	Shows whether standard debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. • On: Enabled. This is the default.
ioa-numeric	uint32	Numeric equivalents for ioa values. <ul style="list-style-type: none"> • 0: Off • 1: On
iob	string	Shows whether resource-count debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. This is the default. • On: Enabled.
iob-numeric	uint32	Numeric equivalents for iob values. <ul style="list-style-type: none"> • 0: Off • 1: On
ioc	string	Shows whether upper-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. This is the default. • On: Enabled.
ioc-numeric	uint32	Numeric equivalents for ioc values. <ul style="list-style-type: none"> • 0: Off • 1: On
iod	string	Shows whether lower-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> • Off: Disabled. This is the default. • On: Enabled.
iod-numeric	uint32	Numeric equivalents for iod values. <ul style="list-style-type: none"> • 0: Off • 1: On

Name	Type	Description
<code>misc</code>	<code>string</code>	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• <code>Off</code>: Disabled.• <code>On</code>: Enabled. This is the default.
<code>misc-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>misc</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Off</code>• <code>1</code>: <code>On</code>
<code>rcm</code>	<code>string</code>	Shows whether removable-component manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• <code>Off</code>: Disabled. This is the default.• <code>On</code>: Enabled.
<code>rcm-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>rcm</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Off</code>• <code>1</code>: <code>On</code>
<code>raid</code>	<code>string</code>	Shows whether RAID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• <code>Off</code>: Disabled.• <code>On</code>: Enabled. This is the default.
<code>raid-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>raid</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Off</code>• <code>1</code>: <code>On</code>
<code>cache</code>	<code>string</code>	Shows whether cache debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• <code>Off</code>: Disabled.• <code>On</code>: Enabled. This is the default.
<code>cache-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>cache</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Off</code>• <code>1</code>: <code>On</code>
<code>emp</code>	<code>string</code>	Shows whether Enclosure Management Processor debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• <code>Off</code>: Disabled.• <code>On</code>: Enabled. This is the default.

Name	Type	Description
emp-numeric	uint32	Numeric equivalents for <code>emp</code> values. <ul style="list-style-type: none">• 0: Off• 1: On
capi	string	Shows whether Internal Configuration API debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled. This is the default.
capi-numeric	uint32	Numeric equivalents for <code>capi</code> values. <ul style="list-style-type: none">• 0: Off• 1: On
mui	string	Shows whether internal service interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled. This is the default.
mui-numeric	uint32	Numeric equivalents for <code>mui</code> values. <ul style="list-style-type: none">• 0: Off• 1: On
bkcfg	string	Shows whether internal configuration debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled. This is the default.
bkcfg-numeric	uint32	Numeric equivalents for <code>bkcfg</code> values. <ul style="list-style-type: none">• 0: Off• 1: On
awt	string	Shows whether debug messages for auto-write-through cache triggers are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled. This is the default.• On: Enabled.
awt-numeric	uint32	Numeric equivalents for <code>awt</code> values. <ul style="list-style-type: none">• 0: Off• 1: On

Name	Type	Description
res2	string	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. This is the default. On: Enabled.
res2-numeric	uint32	Numeric equivalents for res2 values. <ul style="list-style-type: none"> 0: Off 1: On
capi2	string	Shows whether Internal Configuration API tracing messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. This is the default. On: Enabled.
capi2-numeric	uint32	Numeric equivalents for capi2 values. <ul style="list-style-type: none"> 0: Off 1: On
dms	string	Shows whether Snapshot feature debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled. This is the default.
dms	string	Not used.
dms-numeric	uint32	Numeric equivalents for dms values. <ul style="list-style-type: none"> 0: Off 1: On
fruid	string	Shows whether FRU ID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. On: Enabled. This is the default.
fruid-numeric	uint32	Numeric equivalents for fruid values. <ul style="list-style-type: none"> 0: Off 1: On
resmgr	string	Shows whether Reservation Manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> Off: Disabled. This is the default. On: Enabled.

Name	Type	Description
resmgr-numeric	uint32	Numeric equivalents for <code>resmgr</code> values. <ul style="list-style-type: none">• 0: Off• 1: On
init	string	Not used.
init-numeric	uint32	Not used.
ps	string	Shows whether paged storage debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none">• Off: Disabled.• On: Enabled. This is the default.
ps	string	Not used.
ps-numeric	uint32	Numeric equivalents for <code>ps</code> values. <ul style="list-style-type: none">• 0: Off• 1: On
hb	string	Not used.
hb-numeric	uint32	Not used.

disk-groups

This basetype is used by [show configuration on page 307](#), [show disk-groups on page 317](#), and [show pools on page 378](#).

Table 28: disk-groups properties

Name	Type	Description
name	string	The name of the disk group.
size	uint64	The capacity of the disk group, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted <code>size</code> value in 512-byte blocks.

Name	Type	Description
freespace	uint64	The amount of free space in the disk group, formatted to use the current base, precision, and units.
freespace-numeric	uint32	Unformatted <code>freespace</code> value in 512-byte blocks.
raw-size	string	The raw capacity of the disks in the disk group, irrespective of space reserved for RAID overhead and so forth, formatted to use the current base, precision, and units.
raw-size-numeric	uint64	Unformatted <code>raw-size</code> value in 512-byte blocks.
storage-type	string	<ul style="list-style-type: none"> Linear: The disk group acts as a linear pool. Virtual: The disk group is in a virtual pool.
storage-type-numeric	uint32	Numeric equivalents for <code>storage-type</code> values. <ul style="list-style-type: none"> 0: Linear 1: Virtual
pool	string	The name of the pool that contains the disk group.
pool-serial-number	string	The serial number of the pool that contains the disk group.
storage-tier	string	<ul style="list-style-type: none"> Archive: The disk group is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity). Performance: The disk group is in the highest storage tier, which uses SSDs (high speed, low capacity). Read Cache: The disk is an SSD providing high-speed read cache for a storage pool. Standard: The disk group is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
storage-tier-numeric	uint32	Numeric equivalents for <code>storage-tier</code> values. <ul style="list-style-type: none"> 0: N/A 1: Performance 2: Standard 4: Archive 8: Read Cache
total-pages	uint32	For a virtual disk group, the total number of 4-MB pages it contains. For a linear disk group, 0.

Name	Type	Description
allocated-pages	uint32	For a virtual pool, the number of 4-MB pages that are currently in use. For a linear pool, 0.
available-pages	uint32	For a virtual pool, the number of 4-MB pages that are still available to be allocated. For a linear pool, 0.
pool-percentage	uint8	The percentage of pool capacity that the disk group occupies.
performance-rank	uint8	Disk group performance rank within the virtual pool.
owner	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
owner-numeric	uint32	Numeric equivalents for <code>owner</code> values. <ul style="list-style-type: none"> • 0: B • 1: A
preferred-owner	string	Controller that owns the disk group and its volumes during normal operation. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
preferred-owner-numeric	uint32	Numeric equivalents for <code>preferred-owner</code> values. <ul style="list-style-type: none"> • 0: B • 1: A
raidtype	string	The RAID level of the disk group. <ul style="list-style-type: none"> • NRAID • RAID0 • RAID1 • RAID3 • RAID5 • RAID6 • RAID10 • RAID50

Name	Type	Description
<code>raidtype-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>raidtype</code> values. <ul style="list-style-type: none">• 0: RAID0• 1: RAID1• 3: RAID3• 5: RAID5• 6: NRAID• 8: RAID50• 10: RAID10• 11: RAID6
<code>diskcount</code>	<code>uint16</code>	Number of disks in the disk group.
<code>sparecount</code>	<code>uint16</code>	For a linear disk group, the number of spares assigned to the disk group. For a virtual disk group, 0.
<code>chunksize</code>	<code>string</code>	<ul style="list-style-type: none">• For RAID levels except NRAID, RAID 1, and RAID 50, the chunk size for the disk group.• For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).• For RAID 50, the disk-group chunk size calculated as: <i>configured-chunk-size</i> x (<i>subgroup-members</i> - 1). For a disk group configured to use 64-KB chunk size and 4-disk subgroups, the value would be 192k (64KB x 3).

Name	Type	Description
<code>status</code>	<code>string</code>	<ul style="list-style-type: none"> • CRIT: Critical. The disk group is online but isn't fault tolerant because some of its disks are down. • DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged. • FTDN: Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down. • FTOL: Fault tolerant and online. • MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing. • OFFL: Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost. • QTCR: Quarantined critical. The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is <code>QTCR</code> or <code>QTDN</code>, the disk group is automatically dequarantined. • QTDN: Quarantined with a down disk. The RAID-6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the disk group is <code>QTCR</code> or <code>QTDN</code>, the disk group is automatically dequarantined. • QTOF: Quarantined offline. The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 disk group. • STOP: The disk group is stopped. • UNKN: Unknown. • UP: Up. The disk group is online and does not have fault-tolerant attributes.
<code>status-numeric</code>	<code>uint32</code>	<p>Numeric equivalents for <code>status</code> values.</p> <ul style="list-style-type: none"> • 0: FTOL • 1: FTDN • 2: CRIT • 3: OFFL • 4: QTCR • 5: QTOF • 6: QTDN • 7: STOP • 8: MSNG • 9: DMGD • 250: UP • <i>other</i>: UNKN

Name	Type	Description
lun	uint32	Not used.
min-drive-size	uint64	Minimum disk size that can this disk group can use, formatted to use the current base, precision, and units.
min-drive-size-numeric	uint32	Numeric equivalents for <code>min-drive-size</code> values.
create-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the disk group was created.
create-date-numeric	uint32	Unformatted <code>create-date</code> value.
cache-read-ahead	string	The read-ahead size, formatted to use the current base, precision, and units.
cache-read-ahead-numeric	uint64	Unformatted <code>cache-read-ahead</code> value in 512-byte blocks.
cache-flush-period	uint32	Not used.
read-ahead-enabled	string	Shows whether read-ahead cache is enabled or disabled. <ul style="list-style-type: none"> • Disabled • Enabled
read-ahead-enabled-numeric	uint32	Numeric equivalents for <code>read-ahead-enabled</code> values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
write-back-enabled	string	Shows the current, system-wide cache policy as determined by auto-write-through logic. <ul style="list-style-type: none"> • Disabled • Enabled
write-back-enabled-numeric	uint32	Numeric equivalents for <code>write-back-enabled</code> values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
job-running	string	Same as <code>current-job</code> .

Name	Type	Description
current-job	string	<p>Job running on the disk group, if any.</p> <ul style="list-style-type: none"> • CPYBK: The disk group is being used in a copyback operation. • DRSC: A disk is being scrubbed. • EXPD: The disk group is being expanded. • INIT: The disk group is initializing. • RCON: The disk group is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The disk group is being verified. • VRSC: The disk group is being scrubbed. • Blank if no job is running.
current-job-numeric	uint32	<p>Numeric equivalents for current-job values.</p> <ul style="list-style-type: none"> • 0: (blank) • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC • 9: VREMV • 11: CPYBK • 12: VPREP • 13: VDRAIN • 14: VRECV
current-job-completion	string	<ul style="list-style-type: none"> • 0%–99%: Percent complete of running job. • (blank): No job is running (job has completed).
num-array-partitions	uint32	Number of volumes in the disk group.
largest-free-partition-space	uint64	The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.
largest-free-partition-space-numeric	uint32	Unformatted largest-free-partition-space value in 512-byte blocks.

Name	Type	Description
num-drives-per-low-level-array	uint8	<ul style="list-style-type: none"> For a RAID-10 or RAID-50 disk group, the number of disks in each subgroup. For other RAID levels, 1.
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.
new-partition-lba	uint64	Maximum number of 512-byte blocks that could be allocated to a newly created volume. The value is formatted to use the current base, precision, and units. Expanding a volume in the same disk group will reduce this amount.
new-partition-lba-numeric	uint32	Unformatted <code>new-partition-lba</code> value in 512-byte blocks.
array-drive-type	string	Type of disks used in the disk group. <ul style="list-style-type: none"> SAS: Enterprise SAS. SAS MDL: Midline SAS. sSAS: SAS SSD. MIX: Mixture of enterprise SAS and midline SAS disks.
array-drive-type-numeric	uint32	Numeric equivalents for <code>array-drive-type</code> values. <ul style="list-style-type: none"> 1: MIX 4: SAS 8: sSAS 11: SAS MDL
is-job-auto-abortable	string	<ul style="list-style-type: none"> false: The current job must be manually aborted before you can delete the disk group. true: The current job will automatically abort if you delete the disk group.
is-job-auto-abortable-numeric	uint32	Numeric equivalents for <code>is-job-auto-abortable</code> values. <ul style="list-style-type: none"> 0: false 1: true
serial-number	string	Disk group serial number.
blocks	uint64	Unformatted <code>size</code> value in 512-byte blocks.

Name	Type	Description
disk-dsd- enable-vdisk	string	<ul style="list-style-type: none"> • Disabled: DSD is disabled for the disk group. • Enabled - all spinning: DSD is enabled for the disk group. • Partial spin-down: DSD is enabled for the disk group and its disks are partially spun down to conserve power. • Full spin-down: DSD is enabled for the disk group and its disks are fully spun down to conserve power.
disk-dsd- enable-vdisk- numeric	uint32	<p>Numeric equivalents for disk-dsd-enable-vdisk values.</p> <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled - all spinning • 2: Partial spin-down • 3: Full spin-down
disk-dsd- delay-vdisk	uint32	The period of inactivity after which the disk group's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.
disk-dsd- delay-vdisk	uint32	Not applicable.
scrub- duration-goal	uint16	Not applicable.
pool-sector- format	string	<p>The sector format of disks in the disk group.</p> <ul style="list-style-type: none"> • 512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes. • 512e: All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries. • Mixed: The disk group contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).
pool-sector- format-numeric	uint32	<p>Numeric equivalents for pool-sector-format values.</p> <ul style="list-style-type: none"> • 0: 512n • 1: 512e • 3: Mixed

Name	Type	Description
health	string	<ul style="list-style-type: none">• OK• Degraded• Fault• Unknown• N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component		Embedded; see unhealthy-component on page 706 .

disk-group-statistics

This basetype is used by [show disk-group-statistics on page 321](#).

Table 29: disk-group-statistics properties

Name	Type	Description
serial-number	string	The serial number of the disk group.
name	string	The name of the disk group.
time-since-reset	uint32	The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.
time-since-sample	uint32	The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.
number-of-reads	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.

Name	Type	Description
number-of-writes	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
bytes-per-second	uint64	The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	uint32	Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.
disk-group-statistics-paged	Embedded; see disk-group-statistics-paged on the next page.	

disk-group-statistics-paged

This basetype is used by [show disk-group-statistics on page 321](#) for a virtual disk group.

Table 30: disk-group-statistics-paged properties

Name	Type	Description
serial-number	string	The serial number of the disk group.
pages-alloc-per-minute	uint32	The rate, in pages per minute, at which pages are allocated to volumes in the disk group because they need more space to store data.
pages-dealloc-per-minute	uint32	The rate, in pages per minute, at which pages are deallocated from volumes in the disk group because they no longer need the space to store data.
pages-reclaimed	uint32	The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).
num-pages-unmap-per-minute	uint32	The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host.

disk-hist-statistics

This basetype is used by [show disk-statistics on page 332](#) when the `historical` parameter is specified.

Table 31: disk-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	Total number of read and write operations since the last sampling time.
number-of-reads	uint64	Number of read operations since the last sampling time.

Name	Type	Description
number-of-writes	uint64	Number of write operations since the last sampling time.
total-data-transferred	uint64	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
data-read	uint64	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted data-written value.
total-iops	uint64	Total number of read and write operations per second since the last sampling time.
read-iops	uint64	Number of read operations per second since the last sampling time.
write-iops	uint64	Number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	Total data transfer rate, in bytes per second, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted total-bytes-per-second value.
read-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted read-bytes-per-second value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.

Name	Type	Description
queue-depth	uint64	Average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.
avg-rsp-time	uint64	Average response time, in microseconds, for read and write operations since the last sampling time.
avg-read-rsp-time	uint64	Average response time, in microseconds, for read operations since the last sampling time.
avg-write-rsp-time	uint64	Average response time, in microseconds, for write operations since the last sampling time.
avg-io-size	uint64	Average data size of read and write operations since the last sampling time.
avg-io-size-numeric	uint64	Unformatted <code>avg-io-size</code> value.
avg-read-io-size	uint64	Average data size of read operations since the last sampling time.
avg-read-io-size-numeric	uint64	Unformatted <code>avg-read-io-size</code> value.
avg-write-io-size	uint64	Average data size of write operations since the last sampling time.
avg-write-io-size-numeric	uint64	Unformatted <code>avg-write-io-size</code> value.
number-of-disk-errors	uint64	Total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted <code>sample-time</code> value.

disk-statistics

This basetype is used by [show disk-statistics on page 332](#) when the `historical` parameter is omitted.

Table 32: disk-statistics properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Disk ID in the form <code>disk_enclosure-number.disk-number</code> .
<code>location</code>	<code>string</code>	The disk location in the format <code>disk_enclosure-number.disk-number</code> .
<code>serial-number</code>	<code>string</code>	Disk serial number.
<code>power-on-hours</code>	<code>uint32</code>	The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.
<code>bytes-per-second</code>	<code>uint64</code>	The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
<code>bytes-per-second-numeric</code>	<code>uint64</code>	Unformatted <code>bytes-per-second</code> value.
<code>iops</code>	<code>uint32</code>	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
<code>number-of-reads</code>	<code>uint64</code>	Number of read operations since these statistics were last reset or since the controller was restarted.
<code>number-of-writes</code>	<code>uint64</code>	Number of write operations since these statistics were last reset or since the controller was restarted.
<code>data-read</code>	<code>uint64</code>	Amount of data read since these statistics were last reset or since the controller was restarted.
<code>data-read-numeric</code>	<code>uint64</code>	Unformatted <code>data-read</code> value.
<code>data-written</code>	<code>uint64</code>	Amount of data written since these statistics were last reset or since the controller was restarted.
<code>data-written-numeric</code>	<code>uint64</code>	Unformatted <code>data-written</code> value.

Name	Type	Description
queue-depth	uint32	Number of pending I/O operations currently being serviced.
lifetime-data-read	uint64	The amount of data read from the disk in its lifetime.
lifetime-data-read-numeric	uint64	Unformatted lifetime-data-read value.
lifetime-data-written	uint64	The amount of data written to the disk in its lifetime.
lifetime-data-written-numeric	uint64	Unformatted lifetime-data-written value.
reset-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted reset-time value.
start-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <i>iops</i> and <i>bytes-per-second</i> values.
start-sample-time-numeric	uint32	Unformatted start-sample-time value.
stop-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the <i>iops</i> and <i>bytes-per-second</i> values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.
smart-count-1	uint32	For port 1, the number of SMART events recorded.

Name	Type	Description
io-timeout-count-1	uint32	For port 1, the number of timeouts accessing the disk.
no-response-count-1	uint32	For port 1, the number of times the disk did not respond.
spinup-retry-count-1	uint32	For port 1, the number of attempts by the storage system to spin up the disk.
number-of-media-errors-1	uint32	For port 1, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-nonmedia-errors-1	uint32	For port 1, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-block-reassigns-1	uint32	For port 1, the number of times blocks were reassigned to alternate locations.
number-of-bad-blocks-1	uint32	For port 1, the number of bad blocks encountered.
smart-count-2	uint32	For port 2, the number of pending I/O operations currently being serviced.
io-timeout-count-2	uint32	For port 2, the number of SMART events recorded.
no-response-count-2	uint32	For port 2, the number of timeouts accessing the disk.
spinup-retry-count-2	uint32	For port 2, the number of times the disk did not respond.
number-of-media-errors-2	uint32	For port 2, the number of attempts by the storage system to spin up the disk.

Name	Type	Description
number-of-nonmedia-errors-2	uint32	For port 2, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-block-reassigns-2	uint32	For port 2, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-bad-blocks-2	uint32	For port 2, the number of times blocks were reassigned to alternate locations.

drawer-sensors

This basetype is used by [show sensor-status on page 418](#).

Table 33: drawer-sensors properties

Name	Type	Description
durable-id	string	Sensor ID. For example: <code>sensor_temp_drawer-ID.sensor-number</code> .
drawer-id (2U48 enclosure)	uint32	<ul style="list-style-type: none">• 0: Left• 1: Middle• 2: Right
drawer-id (4U56 enclosure)	uint32	<ul style="list-style-type: none">• 0: Left• 1: Right
sensor-name	string	Sensor name and location.
value	string	<ul style="list-style-type: none">• For a sensor, its value.• For overall unit status, one of the status values below.

Name	Type	Description
status	string	<ul style="list-style-type: none"> • OK: The sensor is present and detects no error condition. • Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds. • Critical: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold. • Unavailable: The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup. • Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor. • Unknown: The sensor is present but status is not available. • Not Installed: The sensor is not present. • Unsupported: Status detection is not implemented.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: Unsupported • 1: OK • 2: Critical • 3: Warning • 4: Unrecoverable • 5: Not Installed • 6: Unknown • 7: Unavailable
sensor-location	uint32	Deprecated; sensor location now shown by container property.
container	string	<p>Hardware component that contains the sensor.</p> <ul style="list-style-type: none"> • controllers • drawer • enclosures • fan • iom • midplane • power-supplies

Name	Type	Description
container-numeric	uint32	Numeric equivalents for container values. <ul style="list-style-type: none"> • 17: enclosures • 18: midplane • 19: controllers • 20: iom • 21: power-supplies • 22: fan • 31: drawer
sensor-type	string	<ul style="list-style-type: none"> • Temperature • Voltage • Current • Charge Capacity • Unknown Type
sensor-type-numeric	uint32	Numeric equivalents for sensor-type values. <ul style="list-style-type: none"> • 0: Temperature • 1: Current • 2: Voltage • 3: Charge capacity • 4: Unknown Type

drawers

This basetype is used by [show enclosures on page 338](#).

Table 34: drawers properties

Name	Type	Description
durable-id	string	Drawer ID in the form <code>drawer_<number></code> .
drawer-id (2U48 enclosure)	uint8	<ul style="list-style-type: none"> • 0: Left • 1: Middle • 2: Right
drawer-id (4U56 enclosure)	uint8	<ul style="list-style-type: none"> • 0: Left • 1: Right
drawer-wwn	string	Drawer WWN.

Name	Type	Description
part-number	string	Drawer part number.
name	string	Drawer name.
position	string	The drawer position in the enclosure, as viewed from the front. <ul style="list-style-type: none"> • Left • Right • Middle
position-numeric	string	Numeric equivalents for the <code>position</code> property: <ul style="list-style-type: none"> • 0: Left • 1: Right • 4: Middle
rows	uint8	Number of rows of disk slots.
columns	uint8	Number of columns of disk slots.
slots	uint8	Number of disk slots in drawer.
number-of-disks	uint8	Number of disk slots (not installed disks) in drawer.
emp-a-busid	string	SCSI channel ID of the Enclosure Management Processor (EMP) A in a drawer's Expander Controller.
emp-a-targetid	string	SCSI target ID of the Enclosure Management Processor (EMP) A in a drawer's Expander Controller.
emp-a-rev	string	Firmware revision for the Enclosure Management Processor (EMP) A in a drawer's Expander Controller.
emp-b-busid	string	SCSI channel ID of the Enclosure Management Processor (EMP) B in a drawer's Expander Controller.
emp-b-targetid	string	SCSI target ID of the Enclosure Management Processor (EMP) B in a drawer's Expander Controller.
emp-b-rev	string	Firmware revision for the Enclosure Management Processor (EMP) B in a drawer's Expander Controller.
emp-a	string	Shows the field name <code>EMP A</code> in console format.
emp-a-ch-id-rev	string	Channel ID and firmware revision of the Enclosure Management Processor A in a drawer's Expander Controller
emp-b	string	Shows the field name <code>EMP B</code> in console format.

Name	Type	Description
emp-b-ch-id-rev	string	Channel ID and firmware revision of the Enclosure Management Processor B in a drawer's Expander Controller
locator-led	string	Shows the state of the locator LED on a drawer: <ul style="list-style-type: none"> • Off • On
locator-led-numeric	uint32	Numeric equivalents for the locator-led property. <ul style="list-style-type: none"> • 0: Off • 1: On
status	string	Drawer status: <ul style="list-style-type: none"> • Up • Error • Warning • Not Present • Unknown • Unavailable
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> • 1: Up • 2: Error • 3: Warning • 5: Not Present • 6: Unknown • 7: Unavailable
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

Name	Type	Description
<code>unhealthy-component</code>	Embedded;	see unhealthy-component on page 706 .

drive-parameters

This basetype is used by [show disk-parameters on page 323](#).

Table 35: drive-parameters properties

Name	Type	Description
<code>smart</code>	<code>string</code>	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none">• <code>Detect-Only</code>: Each disk in the system retains its individual SMART setting, as will new disks added to the system.• <code>Enabled</code>: SMART is enabled for all disks in the system and will be enabled for new disks added to the system. This is the default.• <code>Disabled</code>: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.
<code>smart-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>smart</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Detect-Only</code>• <code>1</code>: <code>Enabled</code>• <code>2</code>: <code>Disabled</code>
<code>drive-write-back-cache</code>	<code>string</code>	<ul style="list-style-type: none">• <code>Disabled</code>: Disk write-back cache is disabled for all disks in the system and will be enabled for new disks added to the system. This parameter cannot be changed.
<code>drive-write-back-cache-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>drive-write-back-cache</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Detect-Only</code>• <code>1</code>: <code>Enabled</code>• <code>2</code>: <code>Disabled</code>
<code>drive-timeout-retry-max</code>	<code>uint8</code>	Maximum number of times a timed-out I/O operation can be retried before the operation is failed.
<code>drive-attempt-timeout</code>	<code>uint8</code>	Number of seconds before an I/O operation is aborted and possibly retried.

Name	Type	Description
drive- overall- timeout	uint8	Total time in seconds before an I/O operation is failed regardless of the <code>drive-attempt-timeout</code> and <code>drive-timeout-retry-max</code> settings.
disk-dsd- enable	string	Shows whether available disks and global spares will spin down after a period of inactivity shown by the <code>disk-dsd-delay</code> property. <ul style="list-style-type: none">• Disabled: Drive spin down for available disks and global spares is disabled. This is the default.• Enabled: Drive spin down for available disks and global spares is enabled.
disk-dsd- enable- numeric	uint32	Numeric equivalents for <code>disk-dsd-enable</code> values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
disk-dsd- enable-pool	string	Not applicable.
disk-dsd- delay	uint16	Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. The default is 15 minutes.

drive-summary

This basetype is used by [show disk-statistics on page 332](#) when the `historical` parameter is specified.

Table 36: drive-summary properties

Name	Type	Description
durable-id	string	Disk ID in the form <code>disk_enclosure-number.disk-number</code> .
serial-number	string	Disk serial number.
disk-hist- statistics		Embedded; see disk-hist-statistics on page 560 .

drives

This basetype is used by [show configuration on page 307](#) and [show disks on page 325](#).

Table 37: drives properties

Name	Type	Description
durable-id	string	Disk ID in the form <code>disk_enclosure-ID.slot-number</code> .
enclosure-id	uint32	Enclosure ID.
drawer-id (2U48 enclosure)	uint8	<ul style="list-style-type: none">• 0: Left• 1: Middle• 2: Right
drawer-id (4U56 enclosure)	uint8	<ul style="list-style-type: none">• 0: Left• 1: Right
drawer-id	uint8	Not applicable.
slot	uint32	Disk slot number.
location	string	Disk's enclosure ID and slot number.
port	uint32	For internal use only.
scsi-id	uint32	SCSI ID assigned to this disk for the primary channel.
blocks	uint64	Unformatted <code>size</code> value in 512-byte blocks.
serial-number	string	Disk serial number.
vendor	string	Disk vendor.
model	string	Disk model.
revision	string	Disk firmware revision level.
secondary-channel	uint32	SCSI ID assigned to this disk for the secondary channel.
container-index	uint32	Container index.
member-index	uint32	Index for this disk in the disk group list.

Name	Type	Description
description	string	Disk description. <ul style="list-style-type: none"> • SAS: Enterprise SAS. • SAS MDL: Midline SAS. • sSAS: SAS SSD.
description-numeric	uint32	Numeric equivalents for description values. <ul style="list-style-type: none"> • 4: SAS • 8: sSAS • 11: SAS MDL
architecture	string	Disk architecture. <ul style="list-style-type: none"> • HDD • SSD
architecture-numeric	uint32	Numeric equivalents for architecture values. <ul style="list-style-type: none"> • 0: SSD • 1: HDD
interface	string	Disk interface. <ul style="list-style-type: none"> • SAS
interface-numeric	uint32	Numeric equivalents for interface values. <ul style="list-style-type: none"> • 0: SAS
single-ported	string	<ul style="list-style-type: none"> • Disabled: The disk has a dual-port connection to the midplane. • Enabled: The disk has a single-port connection to the midplane.
single-ported-numeric	uint32	Numeric equivalents for single-ported values. <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
type	string	Type of disk. <ul style="list-style-type: none"> • SAS: Enterprise SAS. • SAS MDL: Midline SAS. • sSAS: SAS SSD.
type-numeric	uint32	Numeric equivalents for type values. <ul style="list-style-type: none"> • 4: SAS • 8: sSAS • 11: SAS MDL

Name	Type	Description
usage	string	<p>Shows the disk's usage.</p> <ul style="list-style-type: none">• AVAIL: The disk is available.• DEDICATED SP: The disk is a spare assigned to a linear disk group.• FAILED: The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.• GLOBAL SP: The disk is a global spare.• LEFTOVR: The disk is a leftover.• LINEAR POOL: The disk is a member of a vdisk.• UNUSABLE: The disk cannot be used in a disk group because the system is secured, the disk is locked to data access, or the disk is from a unsupported vendor.• UNUSABLE: The disk cannot be used because it is from an unsupported vendor.• VDISK: The disk is a member of a vdisk.• VDISK SP: The disk is a spare assigned to a vdisk.• VIRTUAL POOL: The disk is a member of a disk group in a storage pool.
usage-numeric	uint32	<p>Numeric equivalents for usage values.</p> <ul style="list-style-type: none">• 0: AVAIL• 1: VDISK or LINEAR POOL• 2: VDISK SP or DEDICATED SP• 3: GLOBAL SP• 5: LEFTOVR• 7: FAILED• 8: UNUSABLE• 9: VIRTUAL POOL

Name	Type	Description
job-running	string	<p>Job running on the disk, if any.</p> <ul style="list-style-type: none"> • (blank): None. • CPYBK: The disk group is being used in a copyback operation. • DRSC: The disk group is being scrubbed. • EXPD: The disk group is being expanded. • INIT: The disk group is being initialized. • RCON: The disk group is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The disk group is being verified. • VRSC: The disk group is being scrubbed.
job-running-numeric	uint32	<p>Numeric equivalents for job-running values.</p> <ul style="list-style-type: none"> • 0: None • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC • 9: VREMV • 11: CPYBK • 12: VPREP • 13: VDRAIN • 14: VRECV
state	string	Shows the disk's usage value.
current-job-completion	string	<ul style="list-style-type: none"> • 0%–99%: Percent complete of running job. • (blank): No job is running (job has completed).
blink	uint32	Deprecated; locator LED status now shown by locator-led property.
locator-led	string	<p>Shows the state of the locator LED on a disk.</p> <ul style="list-style-type: none"> • Off • On

Name	Type	Description
locator-led-numeric	uint32	Numeric equivalents for the <code>locator-led</code> property. <ul style="list-style-type: none"> 0: Off 1: On
speed	uint32	Not used.
smart	string	<ul style="list-style-type: none"> Disabled: SMART is disabled for this disk. Enabled: SMART is enabled for this disk.
smart-numeric	string	Numeric equivalents for <code>smart</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
dual-port	uint32	<ul style="list-style-type: none"> 0: Single-ported disk. 1: Dual-ported disk.
error	uint32	Not used.
fc-p1-channel	uint32	Port 1 channel ID.
fc-p1-device-id	uint32	Port 1 device ID.
fc-p1-node-wwn	string	Port 1 WWNN.
fc-p1-port-wwn	string	Port 1 WWPN.
fc-p1-unit-number	uint32	Port 1 unit number.
fc-p2-channel	uint32	Port 2 channel number.
fc-p2-device-id	uint32	Port 2 device ID.
fc-p2-node-wwn	string	Port 2 WWNN.
fc-p2-port-wwn	string	Port 2 WWPN.
fc-p2-unit-number	uint32	Port 2 unit number.
drive-down-code	uint8	Numeric code indicating why the disk is down.

Name	Type	Description
owner	string	Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> • 0: B • 1: A
index	uint32	For internal use only.
rpm	uint32	The speed of a spinning disk, in thousands of revolutions per minute, as specified by the disk vendor. For an SSD, 0 is shown.
size	string	Disk capacity, formatted to use the current base, precision, and units.
size-numeric	uint64	Unformatted size value in 512-byte blocks.
sector-format	string	The disk sector format. <ul style="list-style-type: none"> • 512n: The disk uses 512-byte native sector size. Each logical block and physical block is 512 bytes. • 512e: The disk uses 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.
sector-format-numeric	string	Numeric equivalents for sector-numeric values. <ul style="list-style-type: none"> • 0: 512n • 1: 512e • 3: Mixed
transfer-rate	string	Disk data transfer rate in Gbit/s. It is normal behavior for the rate to vary. <ul style="list-style-type: none"> • 1.5 • 3.0 • 6.0 <p>Some 6-Gbit/s disks might not consistently support a 6-Gbit/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3 Gbit/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.</p>

Name	Type	Description
transfer-rate-numeric	uint32	For internal use only.
attributes	string	Shows which controller a single-ported disk is connected to. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
attributes-numeric	uint32	For internal use only.
enclosure-wwn	string	Enclosure WWN.
status	string	Disk status. <ul style="list-style-type: none"> • Up: The disk is present and is properly communicating with the expander. • Spun Down: The disk is present and has been spun down by the drive spin down feature. • Warning: The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in <code>Error</code> status. • Error: The disk is present but is not detected by the expander. • Unknown: Initial status when the disk is first detected or powered on. • Not Present: The disk slot indicates that no disk is present. • Unrecoverable: The disk is present but has unrecoverable errors. • Unavailable: The disk is present but cannot communicate with the expander. • Unsupported: The disk is present but is an unsupported type.
recon-state	string	The state of the disk (source or destination) if it is involved in a reconstruct operation. <ul style="list-style-type: none"> • From: This disk is being used as the source of a reconstruct operation. • To: This disk is being used as the target of a reconstruct operation. • N/A: This disk is not being used in a reconstruct operation.
recon-state-numeric	uint32	Numeric equivalents for <code>recon-state</code> values. <ul style="list-style-type: none"> • 0: N/A • 1: From • 2: To
copyback-state	string	Not applicable.

Name	Type	Description
copyback-state-numeric	uint32	Not applicable.
virtual-disk-serial	string	If the disk is in a linear disk group, the vdisk name. Otherwise, blank. Not applicable.
disk-group	string	If the disk is in a linear or virtual disk group, the disk group name. Otherwise, blank.
storage-pool-name	string	If the disk is in a linear or virtual pool, the pool name. Otherwise, blank.
storage-tier	string	<ul style="list-style-type: none"> • Archive: The disk is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity). • N/A: Not applicable. • Performance: The disk is in the highest storage tier, which uses SSDs (high speed, low capacity). • Read Cache: The disk is an SSD providing high-speed read cache for a storage pool. • Standard: The disk is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
storage-tier-numeric	uint32	Numeric equivalents for <code>storage-tier</code> values. <ul style="list-style-type: none"> • 0: N/A • 1: Performance • 2: Standard • 4: Archive • 8: Read Cache
ssd-life-left	string	<ul style="list-style-type: none"> • 100%-0%: For an SSD, this value shows the percentage of disk life remaining. This value is polled every 5 minutes. When the value decreases to 20%, event 502 is logged with Informational severity. Event 502 is logged again with Warning severity when the value decreases to 5%, 2% or 1%, and 0%. If a disk crosses more than one percentage threshold during a polling period, only the lowest percentage will be reported. • N/A: The disk is not an SSD. Not supported.
ssd-life-left-numeric	uint32	Numeric equivalents for <code>ssd-life-left</code> values. <ul style="list-style-type: none"> • 0-100 • 255: N/A

Name	Type	Description
led-status	string	<p>Disk LED status.</p> <ul style="list-style-type: none"> • Rebuild: The disk's disk group is being reconstructed. • Fault: The disk has a fault. • ID: The locator LED is illuminated to identify the disk. • Remove: The disk is ready to be removed from the enclosure. • Blank if the disk is not part of a disk group or is spun down.
led-status-numeric	string	<p>Numeric equivalents for led-status values.</p> <ul style="list-style-type: none"> • 1: Online • 2: Rebuild • 4: Fault • 8: Pred Fail • 16: ID • 32: Remove
disk-dsd-count	uint32	Number of times the DSD feature has spun down this disk.
spun-down	uint32	<p>Shows whether the disk is spun down by the DSD feature.</p> <ul style="list-style-type: none"> • 0: Not spun down. • 1: Spun down.
number-of-ios	uint64	Total number of I/O operations (reads and writes).
total-data-transferred	uint64	The total number of bytes transferred.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
avg-rsp-time	uint64	Average I/O response time in microseconds.
fde-state	string	<p>The FDE state of the disk.</p> <ul style="list-style-type: none"> • Unknown: The FDE state is unknown. • Not FDE Capable: The disk is not FDE-capable. • Not Secured: The disk is not secured. • Secured, Unlocked: The system is secured and the disk is unlocked. • Secured, Locked: The system is secured and the disk is locked to data access, preventing its use. • FDE Protocol Failure: A temporary state that can occur while the system is securing the disk.

Name	Type	Description
fde-state-numeric	uint32	Numeric equivalents for fde-state values. <ul style="list-style-type: none"> • 0: Not FDE Capable • 1: Not Secured • 2: Secured, Unlocked • 3: Secure, Locked • 4: FDE Protocol Failure • 5: Unknown
lock-key-id	string	Current lock ID, or 00000000 if not set.
import-lock-key-id	string	Import lock ID, or 00000000 if not set.
fde-config-time	string	If the system is secured, the time at which the current lock ID was set in the format <i>year-month-day hour:minutes:seconds</i> (UTC).
fde-config-time-numeric	uint32	Unformatted fde-config-time value.
temperature	string	Temperature of the disk.
temperature-numeric	uint32	Numeric equivalent for the temperature value.
temperature-status	string	<ul style="list-style-type: none"> • OK: The disk sensor is present and detects no error condition. • Warning: The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds. • Critical: The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold. • Unknown: The disk sensor is present but status is not available.
temperature-status-numeric	uint32	Numeric equivalents for temperature-status values. <ul style="list-style-type: none"> • 1: OK • 2: Critical • 3: Warning • other: Unknown
pi-formatted	string	<ul style="list-style-type: none"> • No: Not formatted for PI operation. • Yes: Formatted for PI operation. • Unsupported: Cannot support PI operation.
pi-formatted	string	Not supported.

Name	Type	Description
pi-formatted-numeric	uint32	Numeric equivalents for pi-formatted values. <ul style="list-style-type: none">• 0: No• 2: Yes• 4: Unsupported
pi-formatted-numeric	uint32	Not supported.
power-on-hours	uint32	The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.
health	string	Disk health. <ul style="list-style-type: none">• OK• Degraded• Fault• Unknown• N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

email-parameters

This basetype is used by [show email-parameters on page 337](#).

Table 38: email-parameters properties

Name	Type	Description
email-notification	string	Shows whether email (SMTP) notification of events is enabled. <ul style="list-style-type: none"> Disabled: Email notification is disabled. This is the default. Enabled: Email notification is enabled.
email-notification-numeric	uint32	Numeric equivalents for email-notification values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
email-notification-filter	string	The minimum severity for which the system should send notifications: <ul style="list-style-type: none"> crit: Sends notifications for Critical events only. error: Sends notifications for Error and Critical events. warn: Sends notifications for Warning, Error, and Critical events. info: Sends notifications for all events. none: Disables email notification. This is the default. This parameter does not apply to managed-logs notifications.
email-notification-filter-numeric	uint32	Numeric equivalents for email-notification-filter values. <ul style="list-style-type: none"> 8: crit 4: error 2: warn 1: info 0: none
email-notify-address-1	string	Up to three email addresses for recipients of event notifications.
email-notify-address-2	string	
email-notify-address-3	string	
email-notify-address-4	string	Shows the email address for the log-collection system used by the log-management feature.
email-server	string	The IP address of the SMTP mail server to use for the email messages.
email-domain	string	The domain name that, with the sender name, forms the “from” address for remote notification.
email-sender	string	The sender name that, with the domain name, forms the “from” address for remote notification.

Name	Type	Description
<code>persistent-alerts</code>	<code>string</code>	Not applicable.
<code>persistent-alerts-numeric</code>	<code>uint32</code>	Not applicable.
<code>include-logs</code>	<code>string</code>	Shows whether system log files will automatically be attached for email notification messages generated by the log-management feature. This is the “push” mode of log management. This option is disabled by default.
<code>include-logs-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>include-logs</code> values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled

enclosure-fru

This basetype is used by [show configuration on page 307](#) and [show frus on page 352](#).

Table 39: enclosure-fru properties

Name	Type	Description
<code>name</code>	<code>string</code>	FRU name. <ul style="list-style-type: none">• <code>CHASSIS_MIDPLANE</code>: Chassis and midplane circuit board• <code>RAID_IOM</code>: Controller module• <code>BOD_IOM</code>: Expansion module• <code>POWER_SUPPLY</code>: Power supply module• <code>DRAWER</code>: Enclosure disk drawer• <code>FAN</code>: Fan module• <code>MEMORY_CARD</code>: CompactFlash card
<code>description</code>	<code>string</code>	FRU long description.
<code>part-number</code>	<code>string</code>	FRU part number.
<code>serial-number</code>	<code>string</code>	FRU serial number.
<code>revision</code>	<code>string</code>	FRU hardware revision level.
<code>dash-level</code>	<code>string</code>	FRU template revision number.

Name	Type	Description
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when a PCBA was programmed or a power supply module was manufactured.
mfg-date-numeric	uint32	Unformatted <code>mfg-date</code> value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID (global manufacturing code) of the FRU manufacturer.

Name	Type	Description
fru-location	string	<p>Location of the FRU in the enclosure.</p> <ul style="list-style-type: none">• MID-PLANE SLOT: Chassis midplane.• UPPER IOM SLOT: Controller module or expansion module A.• LOWER IOM SLOT: Controller module or expansion module B.• LEFT IOM SLOT: Controller module or expansion module B, in the left slot as viewed from the back.• RIGHT IOM SLOT: Controller module or expansion module A, in the right slot as viewed from the back.• LEFT PSU SLOT: Power supply module on the left, as viewed from the back.• RIGHT PSU SLOT: Power supply module on the right, as viewed from the back.• LEFT DRAWER SLOT: Drawer on the left, as viewed from the front.• MIDDLE DRAWER SLOT: Drawer on the middle, as viewed from the front.• RIGHT DRAWER SLOT: Drawer on the right, as viewed from the front.• LEFT FAN SLOT: Fan module on the left, as viewed from the back.• RIGHT FAN SLOT: Fan module on the right, as viewed from the back.• CONTROLLER A: Controller module A.• CONTROLLER B: Controller module B.• UPPER IOM MEMORY CARD SLOT: Memory card slot in controller module A.• LOWER IOM MEMORY CARD SLOT: Memory card slot in controller module B.• LEFT IOM MEMORY CARD SLOT: Memory card slot in controller module B.• RIGHT IOM MEMORY CARD SLOT: Memory card slot in controller module A.
configuration-serialnumber	string	<p>Configuration serial number.</p>

Name	Type	Description
fru-status	string	<ul style="list-style-type: none">• Absent: The FRU is not present.• Fault: The FRU's health is Degraded or Fault.• Invalid Data: The FRU ID data is invalid. The FRU's EEPROM is improperly programmed.• OK: The FRU is operating normally.• Power OFF: The FRU is powered off.
original-serialnumber	string	For a power supply module, the original manufacturer serial number. Otherwise, N/A.
original-partnumber	string	For a power supply module, the original manufacturer part number. Otherwise, N/A.
original-revision	string	For a power supply module, the original manufacturer hardware revision. Otherwise, N/A.
enclosure-id	uint32	Enclosure ID.

enclosure-list

This basetype is used by [show configuration on page 307](#), and by [show disks on page 325](#) when the enc1 parameter is specified.

Table 40: enclosure-list properties

Name	Type	Description
status	string	<p>Disk slot status.</p> <ul style="list-style-type: none"> • <code>Up</code>: The disk is present and is properly communicating with the expander. • <code>Spun Down</code>: The disk is present and has been spun down by the drive spin down feature. • <code>Warning</code>: The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in <code>Error</code> status. • <code>Error</code>: The disk is present but is not detected by the expander. • <code>Unknown</code>: Initial status when the disk is first detected or powered on. • <code>Not Present</code>: The disk slot indicates that no disk is present. • <code>Unrecoverable</code>: The disk is present but has unrecoverable errors. • <code>Unavailable</code>: The disk is present but cannot communicate with the expander. • <code>Unsupported</code>: The disk is present but is an unsupported type.
status-numeric	uint32	<p>Numeric equivalents for <code>status</code> values.</p> <ul style="list-style-type: none"> • 0: <code>Unsupported</code> • 1: <code>Up</code> • 2: <code>Error</code> • 3: <code>Warning</code> • 4: <code>Unrecoverable</code> • 5: <code>Not Present</code> • 6: <code>Unknown</code> • 7: <code>Unavailable</code> • 20: <code>Spun Down</code>
enclosure-id	uint32	Enclosure ID.
slot	uint32	Disk slot number.
vendor	string	Disk vendor.
model	string	Disk model.
serial-number	string	Disk serial number.
size	string	Disk capacity, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted <code>size</code> value in 512-byte blocks.

enclosures

This basetype is used by [show configuration on page 307](#) and [show enclosures on page 338](#).

Table 41: enclosures properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Enclosure ID in the form <code>enclosure_</code> <i>number</i> .
<code>enclosure-id</code>	<code>uint8</code>	Enclosure ID.
<code>enclosure-wwn</code>	<code>string</code>	Enclosure WWN.
<code>name</code>	<code>string</code>	Enclosure name.
<code>type</code>	<code>string</code>	Internal name for the enclosure type.
<code>type-numeric</code>	<code>string</code>	Numeric equivalents for <code>type</code> values.
<code>iom-type</code>	<code>string</code>	I/O module type.
<code>iom-type-numeric</code>	<code>string</code>	Numeric equivalents for <code>iom-type</code> values.
<code>location</code>	<code>string</code>	Enclosure location, or blank if not set.
<code>rack-number</code>	<code>uint8</code>	Number of the rack that contains the enclosure.
<code>rack-position</code>	<code>uint8</code>	Position of the enclosure in the rack.
<code>number-of-coolings-elements</code>	<code>uint8</code>	Number of fan units in the enclosure.
<code>number-of-disks</code>	<code>uint8</code>	Number of disk slots (not installed disks) in the enclosure.
<code>number-of-power-supplies</code>	<code>uint8</code>	Number of power supplies in the enclosure.

Name	Type	Description
status	string	Disk slot status. <ul style="list-style-type: none"> • Unsupported • Up • Error • Warning • Unrecoverable • Not Present • Unknown • Unavailable • Spun Down
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> • 0: Unsupported • 1: Up • 2: Error • 3: Warning • 4: Unrecoverable • 5: Not Present • 6: Unknown • 7: Unavailable • 20: Spun Down
midplane-serial-number	string	Midplane serial number.
vendor	string	Enclosure vendor.
model	string	Enclosure model.
fru-shortname	string	FRU short description.
fru-location	string	FRU location. <ul style="list-style-type: none"> • MID-PLANE SLOT: Chassis midplane. • (blank): Not applicable.
part-number	string	FRU part number.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when a PCBA was programmed or a power supply module was manufactured.
mfg-date-numeric	string	Unformatted mfg-date value.

Name	Type	Description
mfg-location	string	City, state/province, and country where the FRU was manufactured.
description	string	FRU long description.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
emp-a-rev	string	Firmware revision of controller A's EMP.
emp-b-rev	string	Firmware revision of controller B's EMP.
rows	uint8	Number of rows of disk slots.
columns	uint8	Number of columns of disk slots.
slots	uint8	Number of disk slots in this enclosure
locator-led	string	Shows the state of the locator LED on an enclosure. <ul style="list-style-type: none"> Off On
locator-led-numeric	uint32	Numeric equivalents for locator-led values. <ul style="list-style-type: none"> 0: Off 1: On
drive-orientation	string	<ul style="list-style-type: none"> vertical: Disks are oriented vertically. horizontal: Disks are oriented horizontally.
drive-orientation-numeric	uint32	Numeric equivalents for drive-orientation values. <ul style="list-style-type: none"> 0: vertical 1: horizontal
enclosure-arrangement	string	<ul style="list-style-type: none"> vertical: Disks are numbered vertically (by column from top to bottom, proceeding rightward). horizontal: Disks are numbered horizontally (by row from left to right, proceeding downward).
enclosure-arrangement-numeric	uint32	Numeric equivalents for enclosure-arrangement values. <ul style="list-style-type: none"> 0: vertical 1: horizontal
emp-a-busid	string	SCSI channel ID of controller A's EMP.
emp-a-targetid	string	SCSI target ID of controller A's EMP.

Name	Type	Description
emp-b-busid	string	SCSI channel ID of controller B's EMP.
emp-b-targetid	string	SCSI target ID of controller B's EMP.
emp-a	string	Shows the field name EMP A in console format.
emp-a-ch-id-rev	string	SCSI address and firmware revision of controller A's EMP.
emp-b	string	Shows the field name EMP B in console format.
emp-b-ch-id-rev	string	SCSI address and firmware revision of controller B's EMP.
midplane-type	string	Enclosure midplane type. <ul style="list-style-type: none"> 4U56-6G: Midplane for 4U, 56-disk enclosure with 6-Gbit/s maximum data rate to disks 2U48-6G: Midplane for 2U, 48-disk enclosure with 6-Gbit/s maximum data rate to disks 2U24-6Gv2: Midplane for 2U, reduced-depth, 24-disk enclosure with 6-Gbit/s maximum data rate to disks 2U24-6G: Midplane for 2U, 24-disk enclosure with 6-Gbit/s maximum data rate to disks 2U12-6Gv2: Midplane for 2U, reduced-depth, 12-disk enclosure with 6-Gbit/s maximum data rate to disks 2U12-6G: Midplane for 2U, 12-disk enclosure with 6-Gbit/s maximum data rate to disks N/A: Other type of midplane
midplane-type-numeric	uint32	Numeric equivalents for midplane-type values. <ul style="list-style-type: none"> 0: 2U12-3G 1: 2U24-3G 2: 2U12-6G 3: 2U24-6G 5, 9, 13: 2U24-6Gv2 6, 10: 2U12-6Gv2 8: 2U48-6G 11: 4U56-6G
midplane-rev	uint8	Midplane revision number.
enclosure-power	string	Enclosure power in watts.

Name	Type	Description
pcie2-capable	string	<ul style="list-style-type: none">False: Enclosure is not capable of using PCI Express version 2.True: Enclosure is capable of using PCI Express version 2.
pcie2-capable-numeric	uint32	Numeric equivalents for <code>pcie2-capable</code> values. <ul style="list-style-type: none">0: False1: True
health	string	<ul style="list-style-type: none">OKDegradedFaultUnknownN/A
health-numeric	uint32	Numeric equivalents for <code>health</code> values. <ul style="list-style-type: none">0: OK1: Degraded2: Fault3: Unknown4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component	Embedded; see unhealthy-component on page 706 .	
drawer	Embedded; see drawers on page 568 .	
controllers	Embedded; see controllers on page 530 , io-modules on page 612 .	
power-supplies	Embedded; see power-supplies on page 642 .	
fan-details	Embedded; see fan on page 599 .	

events

This basetype is used by [show events on page 341](#).

Table 42: events properties

Name	Type	Description
time-stamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when this event was detected.
time-stamp-numeric	uint32	Unformatted time-stamp value.
event-code	string	Event code. For event-code descriptions, see the Event Descriptions Reference Guide.
event-id	string	Event ID.
model	string	Controller model.
serial-number	string	Controller serial number.
controller	string	<ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"> • 0: B • 1: A
severity	string	Event severity. <ul style="list-style-type: none"> • CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem <i>immediately</i>. • ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible. • WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary. • INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required. • RESOLVED: A condition that caused an event to be logged has been resolved.
severity-numeric	uint32	Numeric equivalents for severity values. <ul style="list-style-type: none"> • 0: INFORMATIONAL • 1: WARNING • 2: ERROR • 3: CRITICAL • 4: RESOLVED
message	string	Brief description of the event that occurred. For some events, the message includes data about affected components.

Name	Type	Description
additional-information	string	Shows additional information, if available, about the event.
recommended-action	string	Recommends actions to take, if any, to resolve the issue reported by the event.

eventsLogs

This basetype is used by [show events on page 341](#) when the logs parameter is specified.

Table 43: eventsLogs properties

Name	Type	Description
event-id	string	Event ID prefaced by A or B to identify the controller that logged the event.
time-stamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when this event was detected.
time-stamp-numeric	string	Unformatted <code>time-stamp</code> value.
event-code	string	Event code identifying the type of event to help diagnose problems.
severity	string	Event severity. <ul style="list-style-type: none">• CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem immediately.• ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.• WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.• INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.• RESOLVED: A condition that caused an event to be logged has been resolved.

Name	Type	Description
severity-numeric	string	Numeric equivalents for severity values. <ul style="list-style-type: none">• 0: INFORMATIONAL• 1: WARNING• 2: ERROR• 3: CRITICAL• 4: RESOLVED
message	string	Message giving details about the event.

expander-ports

This basetype is used by [show sas-link-health on page 415](#).

Table 44: expander-ports properties

Name	Type	Description
durable-id	string	Expander port ID.
enclosure-id	uint32	Enclosure ID.
controller	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none">• 0: B• 1: A
sas-port-type	string	<ul style="list-style-type: none">• Drawer Port Egress• Drawer Port Ingress• Expansion Port Egress• Expansion Port Ingress
sas-port-type-numeric	uint32	Numeric equivalents for sas-port-type values. <ul style="list-style-type: none">• 1: Drawer Port Egress• 2: Drawer Port Ingress• 3: Expansion Port Egress• 4: Expansion Port Ingress

Name	Type	Description
<code>sas-port-index</code>	<code>uint32</code>	The expander port index. For an IOM with two expansion ports, this value differentiates the two egress ports (0–1) and two ingress ports (0–1) for each path A and B. This value is appended to the port's <code>durable-id</code> value.
<code>name</code>	<code>string</code>	<ul style="list-style-type: none"> • Out Port: Egress (expansion) port on controller module or an expansion module. Can be connected to an ingress port in an expansion module. • In Port: Ingress port on an expansion module. Can be connected to an egress (expansion) port in a controller module or an expansion module.
<code>name-numeric</code>	<code>uint32</code>	<ul style="list-style-type: none"> • 2: In Port • 3: Out Port
<code>status</code>	<code>string</code>	<p>Expander port status.</p> <ul style="list-style-type: none"> • Up: The port is cabled and has an I/O link. • Warning: Not all of the port's PHYs are up. • Error: The port is reporting an error condition. • Not Present: The controller module is not installed or is down. • Disconnected: Either no I/O link is detected or the port is not cabled.
<code>status-numeric</code>	<code>uint32</code>	<p>Numeric equivalents for <code>status</code> values.</p> <ul style="list-style-type: none"> • 0: Up • 1: Warning • 2: Error • 3: Not Present • 4: Unknown • 6: Disconnected
<code>health</code>	<code>string</code>	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
<code>health-numeric</code>	<code>uint32</code>	<p>Numeric equivalents for <code>health</code> values.</p> <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A

Name	Type	Description
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

fan

This basetype is used by [show fans on page 346](#) and [show power-supplies on page 390](#).

Table 45: fan properties

Name	Type	Description
durable-id	string	Fan unit ID in the form <code>fan_ enclosure-ID.fan-number</code> .
name	string	Fan unit name in the form <code>Fan loc:position-PSU power-supply-ID</code> . The position is as viewed from the back of the enclosure.
location	string	Fan location in the form <code>Enclosure enclosure-ID - position</code> . The position is as viewed from the back of the enclosure.
status-ses	string	Fan status. <ul style="list-style-type: none">• Unsupported• OK• Critical• Warning• Unrecoverable• Not Installed• Unknown• Unavailable
status-ses-numeric	uint32	Numeric equivalents for <code>status-ses</code> values. <ul style="list-style-type: none">• 0: Unsupported• 1: OK• 2: Critical• 3: Warning• 4: Unrecoverable• 5: Not Installed• 6: Unknown• 7: Unavailable

Name	Type	Description
extended-status	uint32	<p>A numeric value that provides additional information to supplement the standard SES status shown by the <code>status</code> and <code>status-numeric</code> properties. The <code>extended-status</code> value is a bitwise value computed from the values of five status bits, and may be one of the following values or a combination of these values.</p> <ul style="list-style-type: none"> • 1: The fan has reported a failure. • 2: The fan is off. • 4: The fan FRU is not installed. • 8: The fan status cannot be determined. • 16: The fan is requested to be on (not off). This is the default status and represents normal operation. • 17: Fan has failed. • 18: Fan is off. • 19: Fan has failed and is off. • 24: Fan status is unknown, which could represent an I²C communication issue.
status	string	<p>Fan unit status.</p> <ul style="list-style-type: none"> • Up • Error • Off • Missing
status-numeric	uint32	<p>Numeric equivalents for <code>status</code> values.</p> <ul style="list-style-type: none"> • 0: Up • 1: Error • 2: Off • 3: Missing
speed	uint32	Fan speed (revolutions per minute).
position	string	<p>Fan position, as viewed from the back of the enclosure.</p> <ul style="list-style-type: none"> • Left • Right
position-numeric	uint32	<p>Numeric equivalents for <code>position</code> values.</p> <ul style="list-style-type: none"> • 0: Left • 1: Right
serial-number	string	<ul style="list-style-type: none"> • (blank): Not applicable.
fw-revision	string	<ul style="list-style-type: none"> • (blank): Not applicable. • Firmware revision of a fan FRU.

Name	Type	Description
hw-revision	string	<ul style="list-style-type: none">• (blank): Not applicable.
locator-led	string	Shows the state of the locator LED on a fan unit. <ul style="list-style-type: none">• Off• On
locator-led-numeric	uint32	Numeric equivalents for the <code>locator-led</code> property. <ul style="list-style-type: none">• 0: Off• 1: On
health	string	<ul style="list-style-type: none">• OK• Degraded• Fault• N/A• Unknown
health-numeric	uint32	Numeric equivalents for <code>health</code> values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: N/A• 4: Unknown
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

fc-port

This basetype is used by [show ports on page 386](#) for a Fibre Channel port.

Table 46: fc-port properties

Name	Type	Description
configured-topology	string	Configured topology. <ul style="list-style-type: none">• Loop: Fibre Channel arbitrated loop (public or private).• PTP: Fibre Channel point-to-point.• Auto: Loop preferred, otherwise point-to-point, based on the detected connection type.

Name	Type	Description
primary-loop-id	string	If the port is using loop topology and the port status is Up, this field shows the primary loop ID. If the port is not using loop topology or the port status is not Up, this field shows N/A.
sfp-status	string	SFP status: <ul style="list-style-type: none">• OK• Not present: No SFP is inserted in this port.• Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.• Incorrect protocol: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.
sfp-present	string	Shows whether the port contains an SFP. <ul style="list-style-type: none">• Not Present• Present
sfp-present-numeric	uint32	Numeric equivalents for sfp-present values. <ul style="list-style-type: none">• 0: Not Present• 1: Present
sfp-vendor	string	The SFP vendor.
sfp-part-number	string	The SFP part number.
sfp-revision	string	The SFP revision.
sfp-supported-speeds	string	The link speeds that the SFP supports.

fde-state (QXS-4 and QXS-6 Series)

This basetype is used by [show fde-state \(QXS-4 and QXS-6 Series\) on page 348](#).

Table 47: fde-state properties

Name	Type	Description
fde-security-status	string	Shows whether the system is secured or unsecured: <ul style="list-style-type: none">• Unsecured: The system has not been secured with a passphrase.• Secured: The system has been secured with a passphrase.• Secured, Lock Ready: The system has been secured and lock keys are clear. The system will become locked after the next power cycle.• Secured, Locked: The system is secured and the disks are locked to data access, preventing their use.
fde-security-status-numeric	uint32	Numeric equivalents for fde-security-status values. <ul style="list-style-type: none">• 1: Unsecured• 2: Secured• 3: Secured, Lock Ready• 4: Secured, Locked
lock-key-id	string	Current lock ID.
import-lock-key-id	string	The previous or import lock ID.
fde-config-time	string	If the system is secured, the time at which the current lock ID was set in the format <i>year-month-day hour:minutes:seconds</i> (UTC).
fde-config-time-numeric	uint32	Unformatted fde-config-time value.

host

This basetype is used by [show host-groups](#) on page 354.

Table 48: host properties

Name	Type	Description
durable-id	string	Host ID.

Name	Type	Description
name	string	The name of the host.
serial-number	string	The serial number of the host.
member-count	uint32	The number of initiators in the host.
host-group	string	If the host is a member of a host group, the serial number of the host group. Otherwise, UNGROUPEDHOSTS.
group-key	string	If the host is a member of a host group, the durable ID of the host group. Otherwise, HGU.
initiator	Embedded; see initiator on page 609 .	

host-group

This basetype is used by [show host-groups on page 354](#).

Table 49: host-group properties

Name	Type	Description
durable-id	string	Host group ID.
name	string	The name of the host group.
serial-number	string	The serial number of the host group.
member-count	uint32	The number of hosts in the host group.
host	Embedded; see host on the previous page .	

host-group-view

This basetype is used by [show maps on page 368](#) when the initiator parameter is specified.

Table 50: host-group-view properties

Name	Type	Description
durable-id	string	Host group ID.
serial-number	string	The serial number of the host group.
group-name	string	The name of the host group in the format <i>host-group.*.*</i> , where the first * represents all hosts in the group and the second * represents all initiators in those hosts.
host-view-mappings	Embedded;	see host-view-mappings on page 609 .

host-port-statistics

This basetype is used by [show host-port-statistics on page 358](#).

Table 51: host-port-statistics properties

Name	Type	Description
durable-id	string	Host port ID in the form <code>hostport_controller-ID-and-port-number</code> .
bytes-per-second	uint64	The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted <code>bytes-per-second</code> value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint32	Number of read operations since these statistics were last reset or since the controller was restarted.

Name	Type	Description
number-of-writes	uint32	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
queue-depth	uint32	The number of pending I/O operations currently being serviced.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time, in microseconds, for all read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	uint32	Average response time, in microseconds, for all write operations, calculated over the interval since these statistics were last requested or reset.
reset-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted reset-time value.
start-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.

Name	Type	Description
start-sample-time-numeric	uint32	Unformatted start-sample-time value.
stop-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.

hosts

This basetype is used by [show hosts \(Deprecated\)](#) on page 360.

Table 52: hosts properties

Name	Type	Description
host-id	string	FC or SAS host port WWN, or iSCSI host initiator node name (typically the IQN).
host-name	string	User-defined name of the host port, or blank.
host-discovered	string	<ul style="list-style-type: none"> Yes: The host was discovered and its entry was automatically created. No: The host entry was manually created.
host-mapped	string	<ul style="list-style-type: none"> Yes: At least one volume is explicitly mapped to the host. No: No volumes are explicitly mapped to the host.
host-profile	string	<ul style="list-style-type: none"> Standard: Default profile. HP-UX: The host uses Flat Space Addressing.
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none"> 0: Standard 1: HP-UX

Name	Type	Description
host-bus-type	string	<ul style="list-style-type: none">If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.If the host entry was manually created: Undefined.
host-bus-type-numeric	uint32	Numeric equivalents of host-bus-type values. <ul style="list-style-type: none">0: UNKNOWN6: FC8: SAS9: iSCSI
host-port-bits-a	uint32	For internal use only.
host-port-bits-b	uint32	For internal use only.

host-view

This basetype is used by [show host-maps \(Deprecated\)](#) on page 356.

Table 53: host-view properties

Name	Type	Description
id	string	FC or SAS host port WWN, or iSCSI host initiator node name (typically the IQN).
hba-nickname	string	User-defined name of the host port, or blank.
host-profile	string	<ul style="list-style-type: none">Standard: Default profile.HP-UX: The host uses Flat Space Addressing.
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none">0: Standard1: HP-UX
host-view-mapping	Embedded;	see host-view-mappings on the next page.

host-view-mappings

This basetype is used by [show maps on page 368](#) when the `initiator` parameter is specified, and [show host-maps \(Deprecated\) on page 356](#).

Table 54: host-view-mappings properties

Name	Type	Description
<code>volume-name</code>	<code>string</code>	Volume name.
<code>volume-serial</code>	<code>string</code>	Volume serial number.
<code>lun</code>	<code>string</code>	LUN assigned to the mapping.
<code>access</code>	<code>string</code>	Type of host access to the volume. <ul style="list-style-type: none">• <code>read-write</code>: Read and write.• <code>read-only</code>: Read only.• <code>no-access</code>: No access (masked).• <code>not-mapped</code>: Not mapped.
<code>access-numeric</code>	<code>uint32</code>	Numeric equivalents of <code>access</code> values. <ul style="list-style-type: none">• 0: <code>not-mapped</code>• 1: <code>no-access</code>• 2: <code>read-only</code>• 3: <code>read-write</code>
<code>ports</code>	<code>string</code>	Controller host ports assigned to the mapping.

initiator

This basetype is used by [show hosts \(Deprecated\) on page 360](#).

Table 55: initiator properties

Name	Type	Description
<code>durable-id</code>	<code>string</code>	Initiator ID.
<code>nickname</code>	<code>string</code>	The nickname of the initiator, or blank.

Name	Type	Description
discovered	string	<ul style="list-style-type: none">• Yes: The initiator was discovered and its entry was automatically created.• No: The initiator was manually created.
mapped	string	<ul style="list-style-type: none">• Yes: At least one volume is explicitly mapped to the initiator.• No: No volumes are explicitly mapped to the initiator.
profile	string	<ul style="list-style-type: none">• Standard: Default profile.• HP-UX: The host uses Flat Space Addressing.
profile-numeric	uint32	Numeric equivalents of profile values. <ul style="list-style-type: none">• 0: Standard• 1: HP-UX
host-bus-type	string	<ul style="list-style-type: none">• If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.• If the host entry was manually created: Undefined.
host-bus-type-numeric	uint32	Numeric equivalents of host-bus-type values. <ul style="list-style-type: none">• 6: FC• 8: SAS• 9: iSCSI
id	string	<ul style="list-style-type: none">• For an FC initiator, its WWPN.• For a SAS initiator, its WWPN.• For an iSCSI initiator, its node name (typically the IQN).
host-id	string	If the initiator is a member of a host, the serial number of the host. Otherwise, NOHOST.
host-key	string	If the initiator is a member of a host, the durable ID of the host. Otherwise, HU.
host-port-bits-a	uint32	For internal use only.
host-port-bits-b	uint32	For internal use only.

initiator-view

This basetype is used by [show maps](#) [on page 368](#) when the initiator parameter is specified.

Table 56: initiator-view properties

Name	Type	Description
id	string	<ul style="list-style-type: none">For an FC initiator, its WWPN.For a SAS initiator, its WWPN.For an iSCSI initiator, its node name (typically the IQN).
hba-nickname	string	The nickname of the initiator.
host-profile	string	<ul style="list-style-type: none">Standard: Default profile.HP-UX: The host uses Flat Space Addressing.
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none">0: Standard1: HP-UX
host-view-mappings	Embedded; see host-view-mappings on page 609 .	

inquiry

This basetype is used by [show inquiry on page 362](#).

Table 57: inquiry properties

Name	Type	Description
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
sc-fw	string	Storage Controller firmware version.
sc-loader	string	Storage Controller loader firmware version.
serial-number	string	Controller serial number.
mac-address	string	Controller network port MAC address.
ip-address	string	Controller network port IP address.
nvrn-defaults	string	For internal use only.

io-modules

This basetype is used by [show enclosures on page 338](#) for an expansion module.

Table 58: io-modules properties

Name	Type	Description
durable-id	string	Expansion module ID.
controller-id	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none">• 0: B• 1: A
name	string	FRU name.
description	string	FRU long description.
part-number	string	FRU part number.
serial-number	string	FRU serial number.
revision	string	FRU hardware revision level.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the controller's PCBA was programmed or a power supply module was manufactured.
mfg-date-numeric	uint32	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
position	string	FRU position, as viewed from the back of the enclosure. <ul style="list-style-type: none">• Left• Right• Top• Bottom

Name	Type	Description
position-numeric	uint32	<p>Numeric equivalents for position values.</p> <ul style="list-style-type: none"> • 0: Left • 1: Right • 2: Top • 3: Bottom
configuration-serialnumber	string	<p>Configuration serial number.</p>
phy-isolation	string	<p>Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller.</p> <ul style="list-style-type: none"> • Enabled: PHY fault isolation is enabled. • Disabled: PHY fault isolation is disabled.
phy-isolation-numeric	uint32	<p>Numeric equivalents for phy-isolation values.</p> <ul style="list-style-type: none"> • 0: Enabled • 1: Disabled
locator-led	string	<p>Shows the state of the locator LED on an expansion module.</p> <ul style="list-style-type: none"> • Off • On
locator-led-numeric	uint32	<p>Numeric equivalents for the locator-led property.</p> <ul style="list-style-type: none"> • 0: Off • 1: On
status	string	<ul style="list-style-type: none"> • Operational • Down • Not installed • Unknown
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: Operational • 1: Down • 2: Not installed • 3: Unknown
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended action to take to resolve the health issue.
unhealthy-component	Embedded; see unhealthy-component on page 706 .	
enclosure-id	Embedded; see expander-ports on page 597 .	

iscsi-parameters

This basetype is shown by [show iscsi-parameters on page 363](#).

Table 59: iscsi-parameters properties

Name	Type	Description
chap	string	Shows whether Challenge-Handshake Authentication Protocol (CHAP) is enabled. <ul style="list-style-type: none">• Enabled: CHAP is enabled.• Disabled: CHAP is disabled. This is the default.
chap-numeric	uint32	Numeric equivalents for chap values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled
jumbo-frames	string	Shows whether support for jumbo frames is enabled. <ul style="list-style-type: none">• Enabled: Jumbo-frame support is enabled.• Disabled: Jumbo-frame support is disabled. This is the default.
jumbo-frames-numeric	uint32	Numeric equivalents for jumbo-frames values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled

Name	Type	Description
<code>isns</code>	<code>string</code>	Shows whether support for Internet Storage Name Service (iSNS) is enabled. <ul style="list-style-type: none"> Enabled: iSNS is enabled. Disabled: iSNS is disabled. This is the default.
<code>isns-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>isns</code> values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
<code>isns-ip</code>	<code>string</code>	Address of the iSNS server. The default address is all zeroes.
<code>isns-alt-ip</code>	<code>string</code>	Address of the alternate iSNS server. The default address is all zeroes.
<code>iscsi-speed</code>	<code>string</code>	iSCSI host port link speed. <ul style="list-style-type: none"> <code>auto</code>: The proper speed is auto-negotiated. This is the default. <code>1Gbps</code>: The speed is forced to 1 Gbit/s, overriding a downshift that can occur during auto-negotiation with 1-Gbit/s HBAs. This setting does not apply to 10-Gbit/s HBAs.
<code>iscsi-speed-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>iscsi-speed</code> values. <ul style="list-style-type: none"> 0: <code>auto</code> 1: <code>1Gbps</code>
<code>iscsi-ip-version</code>	<code>uint8</code>	iSCSI IP version. <ul style="list-style-type: none"> 4: iSCSI host port addresses use IPv4 format. This is the default. 6: iSCSI host port addresses use IPv6 format.

iscsi-port

This basetype is used by `show ports` [on page 386](#) for an iSCSI host port.

Table 60: iscsi-port properties

Name	Type	Description
<code>ip-version</code>	<code>string</code>	iSCSI IP version. <ul style="list-style-type: none"> <code>IPv4</code>: iSCSI host port addresses use IPv4 format. <code>IPv6</code>: iSCSI host port addresses use IPv6 format.
<code>ip-address</code>	<code>string</code>	Assigned port IP address.

Name	Type	Description
gateway	string	For IPv4, gateway IP address for assigned IP address.
netmask	string	For IPv4, subnet mask for assigned IP address.
default-router	string	For IPv6, default router for the assigned IP address.
link-local-address	string	For IPv6, the link-local address that is automatically generated from the MAC address and assigned to the port.
mac-address	string	Unique Media Access Control (MAC) hardware address, also called the physical address.
sfp-status	string	SFP status: <ul style="list-style-type: none"> OK Not present: No SFP is inserted in this port. Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged. Incorrect protocol: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.
sfp-present	string	Shows whether the port contains an SFP. <ul style="list-style-type: none"> Not Present Present
sfp-present-numeric	uint32	Numeric equivalents for <code>sfp-present</code> values. <ul style="list-style-type: none"> 0: Not Present 1: Present
sfp-vendor	string	The SFP vendor.
sfp-part-number	string	The SFP part number.
sfp-revision	string	The SFP revision.
sfp-10G-compliance	string	The SFP's 10G compliance code, if supported, or No Support.
sfp-ethernet-compliance	string	The SFP's Ethernet compliance code, if supported, or No Support.
sfp-cable-technology	string	Shows whether the SFP supports active or passive cable technology.
sfp-cable-length	uint8	The link length (in meters) that is supported by the SFP while operating in compliance with applicable standards for the cable type.

license

This basetype is used by [show license on page 365](#).

Table 61: license properties

Name	Type	Description
license-key	string	<ul style="list-style-type: none">• <i>key</i>: License is installed and valid.• <i>not installed</i>: License is invalid or is not installed.
license-serial-number	string	The serial number to use when requesting a license.
platform-max-snapshots	uint32	Maximum number of snapshots that the highest-level license allows.
base-max-snapshots	uint32	Maximum number of snapshots allowed without an installed license.
max-snapshots	uint32	Maximum number of snapshots allowed by the installed license.
in-use-snapshots	uint32	Number of existing licensed snapshots.
max-snapshots-expiry	string	License status of the Snapshot feature. <ul style="list-style-type: none">• <i>Never</i>: License is purchased and doesn't expire.• <i>days</i>: Number of days remaining for a temporary license.• <i>Expired</i>: Temporary license has expired and cannot be renewed.• <i>Expired/Renewable</i>: Temporary license has expired and can be renewed.• <i>N/A</i>: No license installed.
max-snapshots-expiry-numeric	uint32	Numeric equivalents for <code>max-snapshots-expiry</code> values. <ul style="list-style-type: none">• <code>0</code>: <i>Never</i>• <code>254</code>: <i>Expired/Renewable</i>• <code>255</code>: <i>Expired</i>• <i>days</i>: Number of days remaining
virtualization	string	Shows whether the capability to create and manage virtual pools is enabled or disabled. <ul style="list-style-type: none">• <i>Disabled</i>: Virtualization is disabled.• <i>Enabled</i>: Virtualization is enabled.

Name	Type	Description
virtualization-numeric	uint32	Numeric equivalents for virtualization values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
virtualization-expiry	string	Shows when the Virtualization license will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire.
virtualization-expiry-numeric	uint32	Numeric equivalents for virtualization-expiry values. <ul style="list-style-type: none"> 0: Never
performance-tier	string	Shows whether the Performance Tier feature is enabled. <ul style="list-style-type: none"> Disabled: Performance Tier is disabled. Enabled: Performance Tier is enabled.
performance-tier-numeric	uint32	Numeric equivalents for performance-tier values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
performance-tier-expiry	string	Shows when the Performance Tier license will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
performance-tier-expiry-numeric	uint32	Numeric equivalents for performance-tier-expiry values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining

Name	Type	Description
volume-copy	string	Shows whether the Volume Copy feature is enabled. <ul style="list-style-type: none"> Disabled: Volume Copy is disabled. Enabled: Volume Copy is enabled.
volume-copy-numeric	uint32	Numeric equivalents for volume-copy values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
volume-copy-expiry	string	Shows when the Volume Copy license will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
volume-copy-expiry-numeric	uint32	Numeric equivalents for volume-copy-expiry values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
remote-snapshot-replication	string	Shows whether the AssuredRemote feature is enabled. <ul style="list-style-type: none"> Disabled: AssuredRemote is disabled. Enabled: AssuredRemote is enabled.
remote-snapshot-replication-numeric	uint32	Numeric equivalents for remote-snapshot-replication values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Name	Type	Description
remote-snapshot-replication-expiry	string	Shows when the AssuredRemote feature will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
remote-snapshot-replication-expiry-numeric	uint32	Numeric equivalents for remote-snapshot-replication values. <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
vds	string	Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled. <ul style="list-style-type: none"> Disabled: VDS is disabled. Enabled: VDS is enabled.
vds-numeric	uint32	Numeric equivalents for vds values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
vds-expiry	string	Shows when the VDS (Virtual Disk Service) Hardware Provider will expire. <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.

Name	Type	Description
vds-expiry-numeric	uint32	<p>Numeric equivalents for vds-expiry values.</p> <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
vss	string	<p>Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is enabled.</p> <ul style="list-style-type: none"> Disabled: VSS is disabled. Enabled: VSS is enabled.
vss-numeric	uint32	<p>Numeric equivalents for vss values.</p> <ul style="list-style-type: none"> 0: Disabled 1: Enabled
vss-expiry	string	<p>Shows when the VSS (Volume Shadow Copy Service) Hardware Provider will expire.</p> <ul style="list-style-type: none"> Never: License is purchased and doesn't expire. days: Number of days remaining for a temporary license. Expired: Temporary license has expired and cannot be renewed. Expired/Renewable: Temporary license has expired and can be renewed. N/A: No license installed.
vss-expiry-numeric	uint32	<p>Numeric equivalents for vss-expiry values.</p> <ul style="list-style-type: none"> 0: Never 254: Expired/Renewable 255: Expired days: Number of days remaining
dsd	string	<p>Shows whether the Drive Spin Down (DSD) feature is enabled.</p> <ul style="list-style-type: none"> Disabled: DSD is disabled. Enabled: DSD is enabled.
dsd-numeric	uint32	<p>Numeric equivalents for dsd values.</p> <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Name	Type	Description
<code>dsd-expiry</code>	<code>string</code>	Shows when the Drive Spin Down (DSD) feature will expire. <ul style="list-style-type: none">• <code>Never</code>: Always enabled and doesn't expire.
<code>dsd-expiry-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>dsd-expiry</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Never</code>
<code>sra</code>	<code>string</code>	Shows whether Storage Replication Adapter (SRA) support is enabled. <ul style="list-style-type: none">• <code>Disabled</code>: SRA is disabled.• <code>Enabled</code>: SRA is enabled.
<code>sra-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>sra</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Disabled</code>• <code>1</code>: <code>Enabled</code>
<code>sra-expiry</code>	<code>string</code>	Shows when the SRA feature will expire. <ul style="list-style-type: none">• <code>Never</code>: and doesn't expire.
<code>sra-expiry-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>sra-expiry</code> values. <ul style="list-style-type: none">• <code>0</code>: <code>Never</code>

local-ports

This basetype is used by [show peer-connections on page 376](#).

Table 62: local-ports properties

Name	Type	Description
<code>local-host-port</code>	<code>string</code>	The ID of the port in the local system.
<code>port-address</code>	<code>string</code>	The assigned port IP address.

local-ports-detail

This basetype is used by [show peer-connections on page 376](#) when the `verify-links` parameter is specified.

Table 63: local-ports-detail properties

Name	Type	Description
local-host-port	string	The ID of the port in the local system.
port-address	string	The assigned port IP address.
remote-links	string	The IDs of linked ports in the remote system.

log-header-table

This basetype is used in the log file downloaded from the system by using the Disk Management Utility or FTP.

Table 64: log-header-table properties

Name	Type	Description
log-contact	string	Contact person's name, if specified in the Disk Management Utility Save Logs panel.
log-email	string	Contact's email address, if specified in the Disk Management Utility Save Logs panel.
log-phone	string	Contact's phone number, if specified in the Disk Management Utility Save Logs panel.
log-comments	string	Comments describing the problem and specifying the date and time when the problem occurred, if specified in the Disk Management Utility Save Logs panel.
log-content	uint32	For internal use only.
log-timestamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when log content was saved to the file.
log-timestamp-numeric	uint32	Unformatted log-timestamp value.

master-volumes

This basetype is shown by [show master-volumes on page 371](#).

Table 65: master-volumes properties

Name	Type	Description
virtual-disk-name	string	Vdisk name.
serial-number	string	Master volume serial number.
name	string	Master volume name.
size	string	Master volume size, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted <code>size</code> value in 512-byte blocks.
status	string	Master volume status. <ul style="list-style-type: none">• Available: The master volume is available.• Unavailable: The master volume is not available.
status-reason	string	More information about the <code>status</code> value. <ul style="list-style-type: none">• MV Not Accessible: Master volume is not accessible.• MV Not Found: Master volume is not found.• RV: Replication volume (either a primary volume or a secondary volume).• RV Prepared: Replication-prepared volume, which could become a secondary volume in a replication set.• SP Not Accessible: Snap pool is not accessible.• SP Not Found: Snap pool is not found.• ---: The master volume is available.• Unknown Reason
snap-pool-name	string	Snap-pool name.
snapshots	string	Number of snapshots that exist for the master volume.
snap-data	string	Amount of snap-pool space occupied by this master volume for its associated snapshots (preserved and write data).
snap-data-numeric	uint32	Unformatted <code>snap-data</code> value in 512-byte blocks.

Name	Type	Description
rollback	string	<ul style="list-style-type: none"> • <i>value</i>: Percent complete if a rollback is in progress. • ---: No rollback is in progress.

network-parameters

This basetype is used by [show network-parameters on page 373](#).

Table 66: network-parameters properties

Name	Type	Description
durable-id	string	Controller network port ID in the form <code>mgmtport_<i>controller-ID.</code>
active-version	uint32	The configured network port IP version. <ul style="list-style-type: none"> • 4: IPv4 • 6: IPv6
ip-address	string	Controller network port IP address.
gateway	string	Controller network port gateway IP address
subnet-mask	string	Controller network port IP subnet mask
mac-address	string	Controller network port MAC address.
addressing-mode	string	<ul style="list-style-type: none"> • Manual: Network settings are set manually (statically). • DHCP: DHCP is used to set network parameters.
addressing-mode-numeric	uint32	Numeric equivalents for <code>addressing-mode</code> values. <ul style="list-style-type: none"> • 1: Manual • 2: DHCP
link-speed	string	<ul style="list-style-type: none"> • Unknown: For a system operating in Single Controller mode, this controller module is not present. • 10mbps: The network port link speed is set to 10 Mb/s. • 100mbps: The network port link speed is set to 100 Mb/s. • 1000mbps: The network port link speed is set to 1000 Mb/s.
link-speed-numeric	uint32	Numeric equivalents for <code>link-speed</code> values. <ul style="list-style-type: none"> • 0: 10mbps • 1: 100mbps • 2: 1000mbps

Name	Type	Description
duplex-mode	string	<ul style="list-style-type: none"> Undefined: For a system operating in Single Controller mode, this controller module is not present. Half: The network port duplex mode is set to half duplex. Full: The network port duplex mode is set to full duplex.
duplex-mode-numeric	uint32	<p>Numeric equivalents for duplex-mode values.</p> <ul style="list-style-type: none"> 0: full 1: half 2: Undefined
auto-negotiation	string	Not applicable.
auto-negotiation-numeric	uint32	Not applicable.
health	string	<p>The health of the network connection.</p> <ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
health-numeric	uint32	<p>Numeric equivalents for health values.</p> <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
ping-broadcast	string	<ul style="list-style-type: none"> Enabled: The system will respond to a broadcast ping. Disabled: The system will not respond to a broadcast ping.
ping-broadcast-numeric	uint32	<p>Numeric equivalents for ping-broadcast values.</p> <ul style="list-style-type: none"> 0: Disabled 1: Enabled

ntp-status

This basetype is used by [show ntp-status on page 375](#).

Table 67: ntp-status properties

Name	Type	Description
ntp-status	string	Shows whether use of Network Time Protocol (NTP) is enabled. <ul style="list-style-type: none">activated: NTP is enabled.deactivated: NTP is disabled. This is the default.
ntp-server-address	string	<ul style="list-style-type: none">The current NTP server IP address if NTP is enabled.The last-set NTP server IP address if NTP was enabled and has been disabled.0.0.0.0 if the NTP server IP address has not been set.
ntp-contact-time	string	<ul style="list-style-type: none">Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), of the last message received from the NTP server.none: No contact.

peer-connection-info

This basetype is used by [query peer-connection on page 151](#).

Table 68: peer-connection-info properties

Name	Type	Description
system-name	string	The name of the system. The default is Uninitialized Name.
system-contact	string	The name of the person who administers the system. The default is Uninitialized Contact.
system-location	string	The location of the system. The default is Uninitialized Location.
system-information	string	A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.
midplane-serial-number	string	The serial number of the controller enclosure midplane.

Name	Type	Description
vendor-name	string	The vendor name.
product-id	string	The product model identifier.
product-key through sra-expiry	See license on page 617 .	
peer-controllers	Embedded; see peer-controllers on the next page .	

peer-connections

This basetype is used by [show peer-connections on page 376](#).

Table 69: peer-connections properties

Name	Type	Description
peer-connection-name	string	The name of the peer connection.
serial-number	string	The serial number of the peer connection.
connection-type	string	The type of ports being used for the peer connection: <ul style="list-style-type: none">• iSCSI
connection-type-numeric	uint32	Numeric equivalents for connection-type values. <ul style="list-style-type: none">• 2: iSCSI
connection-status	string	<ul style="list-style-type: none">• Online: The systems have a valid connection.• Offline: No connection is available to the remote system.
connection-status-numeric	uint32	Numeric equivalents for connection-status values.
health	string	<ul style="list-style-type: none">• OK• Fault• Unknown

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, this field shows the reason for the health state.
health-recommendation	string	If Health is not OK, this field shows recommended actions to take to resolve the health issue.
local-ports	Embedded; see local-ports on page 622 .	
remote-ports	Embedded; see remote-ports on page 652 .	

peer-controllers

This basetype is used by [query peer-connection on page 151](#).

Table 70: peer-controllers properties

Name	Type	Description
controller	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
sc-fw	string	Storage Controller firmware version.
sc-loader	string	Storage Controller loader firmware version.
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
ec-fw	string	Controller firmware version.
pld-rev	string	Programmable Logic Device (CPLD) firmware version.
hw-rev	string	Controller hardware version.

Name	Type	Description
ip-address	string	Controller network port IP address.
local-ports	Embedded; see peer-ports below .	

peer-ports

This basetype is used by [query peer-connection on page 151](#).

Table 71: peer-ports properties

Name	Type	Description
local-host-port	string	The ID of the port in the local system.
connection-type	string	The type of ports being used for the peer connection: <ul style="list-style-type: none">• iSCSI
host-port-health	string	<ul style="list-style-type: none">• OK• Degraded• Fault• N/A
port-address	string	The assigned port IP address.
local-links	string	The IDs of linked ports in the local system.

policy-threshold

This basetype is used by [show snap-pools on page 421](#).

Table 72: policy-threshold properties

Name	Type	Description
threshold	string	<p>Snap pool threshold level:</p> <ul style="list-style-type: none"> • Warning: The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator. The default is 75%. • Error: The snap pool is nearly full and unless corrective action is taken, snapshot data loss is probable. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered. The default is 90%. • Critical: The snap pool is 98% full and data loss is imminent. When this threshold is reached, an event is generated to alert the administrator and the associated snap-pool policy is triggered.
percent-usage	string	Percent of snap pool space used that triggers the threshold's policy.
policy	string	<p>Recovery policy to invoke when threshold value is reached:</p> <ul style="list-style-type: none"> • autoexpand: Try to expand the snap pool by the <code>size-to-expand</code> value. If the snap pool's space usage reaches the percentage specified by its error threshold, the system will log Warning event 230 and will try to expand the snap pool by the snap pool's <code>size-to-expand</code> value (below). <ul style="list-style-type: none"> • If the snap pool is successfully expanded, the system will log Informational event 444. • If the snap pool cannot be expanded because there is not enough available space in its vdisk, the system will log Warning event 444 and will automatically delete the oldest snapshot that is not a current sync point. <p>Each time the snap-pool's error threshold is reached and the system cannot auto-expand the vdisk, the oldest remaining snapshot that is not a current sync point will be deleted. This behavior occurs for each snap pool independently, based on its space usage.</p> • deleteoldestsnapshot: Delete the oldest snapshot. • deletesnapshots: Delete all snapshots. • haltwrites: Halt writes to the snap pool. • notifyonly: Generates an event to notify the administrator.
size-to-expand	string	<ul style="list-style-type: none"> • size: For the <code>autoexpand</code> policy, the size (formatted to use the current base, precision, and units) by which to expand the snap pool when the threshold is reached. • N/A: The policy is not set to <code>autoexpand</code>.
size-to-expand-numeric	uint32	Unformatted <code>size-to-expand</code> value in 512-byte blocks.

pool-hist-statistics

This basetype is used by [show pool-statistics on page 381](#) when the `historical` parameter is specified.

Table 73: pool-hist-statistics properties

Name	Type	Description
<code>number-of-ios</code>	<code>uint64</code>	The total number of read and write operations since the last sampling time.
<code>number-of-reads</code>	<code>uint64</code>	The number of read operations since the last sampling time.
<code>number-of-writes</code>	<code>uint64</code>	The number of write operations since the last sampling time.
<code>total-data-transferred</code>	<code>uint64</code>	The total amount of data read and written since the last sampling time.
<code>data-read</code>	<code>uint64</code>	The amount of data read since the last sampling time.
<code>data-read-numeric</code>	<code>uint64</code>	The amount of data written since the last sampling time.
<code>data-written</code>	<code>uint64</code>	The amount of data written since the last sampling time.
<code>data-written-numeric</code>	<code>uint64</code>	The amount of data written since the last sampling time.
<code>total-iops</code>	<code>uint64</code>	The total number of read and write operations per second since the last sampling time.
<code>read-iops</code>	<code>uint64</code>	The number of read operations per second since the last sampling time.
<code>write-iops</code>	<code>uint64</code>	The number of write operations per second since the last sampling time.
<code>total-bytes-per-sec</code>	<code>uint64</code>	The total data transfer rate, in bytes per second, since the last sampling time.
<code>total-bytes-per-sec-numeric</code>	<code>uint64</code>	Unformatted <code>total-bytes-per-second</code> value.
<code>read-bytes-per-sec</code>	<code>uint64</code>	The data transfer rate, in bytes per second, for read operations since the last sampling time.
<code>read-bytes-per-sec-numeric</code>	<code>uint64</code>	Unformatted <code>read-bytes-per-second</code> value.

Name	Type	Description
write-bytes-per-sec	uint64	The data transfer rate, in bytes per second, for write operations since the last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.
number-of-allocated-pages	uint64	The number of 4-MB pages allocated to volumes in the pool.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.

pool-statistics

This basetype is used by [show pool-statistics on page 381](#).

Table 74: pool-statistics properties

Name	Type	Description
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.
serial-number	string	The serial number of the pool.
pool	string	The name of the pool.
pages-alloc-per-minute	uint32	The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.
pages-dealloc-per-minute	uint32	The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data.

Name	Type	Description
num-pages-unmap-per-minute	uint32	The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host.
resettable-statistics	Embedded; see resettable-statistics on page 664 .	
tier-statistics	Embedded; see tier-statistics (QXS-4 and QXS-6 Series Only) on page 702 .	

pool-summary

This basetype is used by [show pool-statistics on page 381](#) when the `historical` parameter is specified.

Table 75: pool-summary properties

Name	Type	Description
serial-number	string	The serial number of the pool.
pool	string	The name of the pool.
pool-hist-statistics	Embedded; see pool-hist-statistics on page 632 .	

pools

This basetype is used by [show configuration on page 307](#) and [show pools on page 378](#).

Table 76: pools properties

Name	Type	Description
name	string	The name of the pool.
serial-number	string	The serial number of the pool.
storage-type	string	<ul style="list-style-type: none">Linear: Linear pool.Virtual: Virtual pool.

Name	Type	Description
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"> 0: Linear 1: Virtual
total-size	string	The total capacity of the pool.
total-size-numeric	unit64	Unformatted total-size value in 512-byte blocks.
total-avail	string	The available capacity in the pool.
total-avail-numeric	unit64	Unformatted total-avail value in 512-byte blocks.
snap-size	string	The pool capacity used by linear snap pools or virtual snapshots.
snap-size-numeric	unit64	Unformatted snap-size value in 512-byte blocks.
allocated-pages	uint32	For a virtual pool, the number of 4-MB pages that are currently in use. For a linear pool, 0.
available-pages	uint32	For a virtual pool, the number of 4-MB pages that are still available to be allocated. For a linear pool, 0.
overcommit	string	<ul style="list-style-type: none"> Disabled: The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool. Enabled: The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool. N/A: Not applicable (linear pool).
overcommit-numeric	uint32	Numeric equivalents for overcommit values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled 2: N/A
over-committed	string	<ul style="list-style-type: none"> True: The pool is overcommitted. False: The pool is not overcommitted.
over-committed-numeric	uint16	Numeric equivalents for over-committed values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Name	Type	Description
disk-groups	uint16	The number of disk groups in the pool.
volumes	uint16	The number of volumes in the pool.
page-size	string	The page size, formatted to use the current base, precision, and units.
page-size-numeric	uint64	Unformatted <code>page-size</code> value in 512-byte blocks.
low-threshold	string	The low threshold for page allocation as a percentage of pool capacity.
middle-threshold	string	The middle threshold for page allocation as a percentage of pool capacity.
high-threshold	string	The high threshold for page allocation as a percentage of pool capacity. The threshold value is automatically calculated based on the available capacity of the pool minus 200 GB of reserved space.
utility-running	string	<p>Job running on the disk, if any.</p> <ul style="list-style-type: none"> • (blank): None. • CPYBK: The disk group is being used in a copyback operation. • DRSC: The disk group is being scrubbed. • EXPD: The disk group is being expanded. • INIT: The disk group is being initialized. • RCON: The disk group is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The disk group is being verified. • VRSC: The disk group is being scrubbed.

Name	Type	Description
utility-running-numeric	uint32	Numeric equivalents for job-running values. <ul style="list-style-type: none"> • 0: None • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC • 9: VREMV • 11: CPYBK • 12: VPREP • 13: VDRAIN • 14: VRECV
preferred-owner	string	Controller that owns the disk group and its volumes during normal operation. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
preferred-owner-numeric	uint32	Numeric equivalents for preferred owner values. <ul style="list-style-type: none"> • 0: B • 1: A
owner	string	Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> • 0: B • 1: A
rebalance	string	For internal use only.
rebalance-numeric	uint32	For internal use only.
migration	string	For internal use only.
migration-numeric	uint32	For internal use only.
zero-scan	string	For internal use only.

Name	Type	Description
zero-scan-numeric	uint32	For internal use only.
idle-page-check	string	For internal use only.
idle-page-check-numeric	uint32	For internal use only.
read-flash-cache	string	For internal use only.
read-flash-cache-numeric	uint32	For internal use only.
metadata-vol-size	string	The size of the pool's metadata volume, formatted to use the current base, precision, and units. This needs to be taken into consideration to account for all pages in the pool that are used.
metadata-vol-size-numeric	uint64	Unformatted <code>metadata-vol-size</code> value in 512-byte blocks.
total-rfc-size	string	The total size in blocks of the read cache in the pool. Not supported.
total-rfc-size-numeric	uint64	Unformatted <code>total-rfc-size</code> value in 512-byte blocks. Not supported.
available-rfc-size	string	The unused read-cache space in blocks that is available for use by the pool. Not supported.
available-rfc-size-numeric	uint64	Unformatted <code>available-rfc-size</code> value in 512-byte blocks. Not supported.
reserved-size	string	The total number of pages that are reserved for virtual volumes in the pool.
reserved-size-numeric	uint64	Unformatted <code>reserved-size</code> value in 512-byte blocks.
reserved-unalloc-size	string	The total number of pages that are reserved, but not yet allocated, for virtual volumes in the pool.
reserved-unalloc-size-numeric	uint64	Unformatted <code>reserved-unalloc-size</code> value in 512-byte blocks.

Name	Type	Description
pool-sector-format	string	<p>The sector format of disks in the disk group.</p> <ul style="list-style-type: none"> 512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes. 512e: All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries. Mixed: The disk group contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).
pool-sector-format-numeric	uint32	<p>Numeric equivalents for pool-sector-numeric values.</p> <ul style="list-style-type: none"> 0: 512n 1: 512e 3: Mixed
health	string	<ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
health-numeric	uint32	<p>Numeric equivalents for health values.</p> <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
disk-groups	Embedded; see disk-groups on page 549 .	
tiers	Embedded; see tiers (QXS-4 and QXS-6 Series Only) on page 703 .	
unhealthy-component	Embedded; see unhealthy-component on page 706 .	

port

This basetype is used by [show configuration on page 307](#) and [show ports on page 386](#).

Table 77: port properties

Name	Type	Description
<code>durable-id</code>	string	Controller host port ID in the form <code>hostport_controller-ID-and-port-number</code> .
<code>controller</code>	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
<code>controller-numeric</code>	uint32	Numeric equivalents for <code>controller</code> values. <ul style="list-style-type: none">• 0: B• 1: A
<code>port</code>	string	Controller ID and port number.
<code>port-type</code>	string	<ul style="list-style-type: none">• FC: Fibre Channel.• iSCSI: Internet SCSI.• SAS: Serial Attached SCSI.
<code>port-type-numeric</code>	uint32	Numeric equivalents for <code>port-type</code> values. <ul style="list-style-type: none">• 6: FC• 8: SAS• 9: iSCSI
<code>media</code>	string	<ul style="list-style-type: none">• FC (P) : Fibre Channel Point-to-Point.• FC (L) : Fibre Channel-Arbitrated Loop (public or private).• FC (-) : Not applicable, as when the port is disconnected.• SAS: Serial Attached SCSI.• iSCSI: Internet SCSI.
<code>target-id</code>	string	Port WWN or IQN.
<code>status</code>	string	Port status. <ul style="list-style-type: none">• Up: The port is cabled and has an I/O link.• Warning: Not all of the port's PHYs are up.• Error: The port is reporting an error condition.• Not Present: The controller module is not installed or is down.• Disconnected: Either no I/O link is detected or the port is not cabled.

Name	Type	Description
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: Up• 1: Warning• 2: Error• 3: Not Present• 6: Disconnected
actual-speed	string	Actual link speed in Mbit/s or Gbit/s. <ul style="list-style-type: none">• 10Mb• 100Mb• 1Gb• 4Gb• 6Gb• 8Gb• 12Gb• 16Gb• (blank): Port is disconnected.
actual-speed-numeric	uint32	Numeric equivalents for actual-speed values. <ul style="list-style-type: none">• 0: 1Gb• 2: 4Gb• 6: 6Gb• 7: 8Gb• 8: 10Mb• 9: 100Mb• 11: 12Gb• 12: 16Gb• 255: Port is disconnected.
configured-speed	string	Configured host-port link speed in Gbit/s. <ul style="list-style-type: none">• Auto• 1Gb• 4Gb• 8Gb• 12Gb• 16Gb

Name	Type	Description
configured-speed-numeric	uint32	Numeric equivalents for configured-speed values. <ul style="list-style-type: none">• 0: 1Gb• 2: 4Gb• 3: Auto• 7: 8Gb• 11: 12Gb• 12: 16Gb
fan-out	uint8	Not applicable.
health	string	<ul style="list-style-type: none">• OK• Degraded• Fault• N/A• Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
port-details	Embedded; see fc-port on page 601 , iscsi-port on page 615 , sas-port on page 666 .	

power-supplies

This basetype is used by [show power-supplies on page 390](#).

Table 78: power-supplies properties

Name	Type	Description
durable-id	string	Power supply ID in the form <code>psu_ enclosure-ID .power-supply-number</code> .
enclosure-id	uint32	Enclosure ID.
serial-number	string	Power supply serial number.
description	string	FRU long description.
name	string	Power supply identifier and location.
fw-revision	string	<ul style="list-style-type: none"> • (blank): Not applicable. • Firmware revision of the power supply.
revision	string	FRU hardware revision level.
model	string	Power supply model.
vendor	string	Power supply vendor.
location	string	Power supply location in the form <code>Enclosure enclosure-ID -position</code> , where the position is as viewed from the back of the enclosure.
position	string	Power supply position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> • Left • Right • Top • Bottom
position-numeric	uint32	Numeric equivalents for <code>position</code> values. <ul style="list-style-type: none"> • 0: Left • 1: Right • 2: Top • 3: Bottom
part-number	string	FRU part number.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), when the power supply module was manufactured.

Name	Type	Description
mfg-date-numeric	uint32	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
configuration-serialnumber	string	Configuration serial number.
dc12v	uint32	Voltage of the 12-volt power supply, in 100th of a volt.
dc5v	uint32	Voltage of the 5-volt power supply, in 100th of a volt.
dc33v	uint32	Voltage of the 3.3-volt power supply, in 100th of a volt.
dc12i	uint32	Voltage of the 12-volt power supply, in 100th of a volt.
dc5i	uint32	Voltage of the 5-volt power supply, in 100th of a volt.
dctemp	uint32	Power supply temperature.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

Name	Type	Description
status	string	Power supply status. <ul style="list-style-type: none">• Up• Warning• Error• Not Present• Unknown
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: Up• 1: Warning• 2: Error• 3: Not Present• 4: Unknown
unhealthy-component	Embedded; see unhealthy-component on page 706 .	
fan-details	Embedded; see fan on page 599 .	

product-info

This basetype is used by [show inquiry on page 362](#).

Table 79: product-info properties

Name	Type	Description
vendor-name	string	Vendor name.
product-id	string	Product model identifier.
scsi-vendor-id	string	Vendor name returned by the SCSI INQUIRY command.

provisioning

This basetype is used by [show provisioning on page 395](#).

Table 80: provisioning properties

Name	Type	Description
volume	string	<ul style="list-style-type: none"> Volume name. Blank if the vdisk or pool does not have a volume.
volume-serial	string	Volume serial number.
wwn	string	<ul style="list-style-type: none"> Volume World Wide Name. Blank if the vdisk or pool does not have a volume.
controller	string	Owning controller of the vdisk or pool. <ul style="list-style-type: none"> A: Controller A. B: Controller B.
controller-numeric	uint32	Numeric equivalents for <code>controller</code> values. <ul style="list-style-type: none"> 0: B 1: A
disk-display	string	Shorthand list of the disks within a vdisk or pool.
disk-display-full	string	List or range of the disks in the vdisk or pool specified by the <code>virtual-disk</code> property.
virtual-disk	string	Name of the vdisk or pool.
virtual-disk-serial	string	Serial number of the vdisk or pool.
health	string	Health of the associated vdisk or pool. <ul style="list-style-type: none"> OK Degraded Fault N/A Unknown
health-numeric	uint32	Numeric equivalents for <code>health</code> values. <ul style="list-style-type: none"> 0: OK 1: Degraded 2: Fault 3: Unknown 4: N/A
mapped	string	<ul style="list-style-type: none"> Yes: The volume is mapped. No: The volume is not mapped.
lun-view	Embedded; see volume-view-mappings on page 741 .	

readcache-hist-statistics

This basetype is used by [show pool-statistics on page 381](#) when the `historical` parameter is specified.

Table 81: readcache-hist-statistics properties

Name	Type	Description
<code>number-of-ios</code>	<code>uint64</code>	The total number of read and write operations since the last sampling time.
<code>number-of-reads</code>	<code>uint64</code>	The number of read operations since the last sampling time.
<code>number-of-writes</code>	<code>uint64</code>	The number of write operations since the last sampling time.
<code>total-data-transferred</code>	<code>uint64</code>	The total amount of data read and written since the last sampling time.
<code>data-read</code>	<code>uint64</code>	The amount of data read since the last sampling time.
<code>data-read-numeric</code>	<code>uint64</code>	The amount of data written since the last sampling time.
<code>data-written</code>	<code>uint64</code>	The amount of data written since the last sampling time.
<code>data-written-numeric</code>	<code>uint64</code>	The amount of data written since the last sampling time.
<code>total-iops</code>	<code>uint64</code>	The total number of read and write operations per second since the last sampling time.
<code>read-iops</code>	<code>uint64</code>	The number of read operations per second since the last sampling time.
<code>write-iops</code>	<code>uint64</code>	The number of write operations per second since the last sampling time.
<code>total-bytes-per-sec</code>	<code>uint64</code>	The total data transfer rate, in bytes per second, since the last sampling time.
<code>total-bytes-per-sec-numeric</code>	<code>uint64</code>	Unformatted <code>total-bytes-per-second</code> value.
<code>read-bytes-per-sec</code>	<code>uint64</code>	The data transfer rate, in bytes per second, for read operations since the last sampling time.
<code>read-bytes-per-sec-numeric</code>	<code>uint64</code>	Unformatted <code>read-bytes-per-second</code> value.

Name	Type	Description
<code>write-bytes-per-sec</code>	<code>uint64</code>	Data transfer rate, in bytes per second, for write operations since the last sampling time.
<code>write-bytes-per-sec-numeric</code>	<code>uint64</code>	Unformatted <code>write-bytes-per-second</code> value.
<code>number-of-allocated-pages</code>	<code>uint64</code>	The number of 4-MB pages allocated to volumes in the pool.
<code>number-of-pages-copied</code>	<code>uint64</code>	The number of pages copied to read cache in the sample time period.
<code>number-of-pages-discarded</code>	<code>uint64</code>	The number of pages discarded from read cache (to make room for new hot data) in the sample time period.
<code>sample-time</code>	<code>string</code>	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.
<code>sample-time-numeric</code>	<code>uint32</code>	Unformatted <code>sample-time</code> value.

redundancy

This basetype is used by `show redundancy-mode` [on page 398](#).

Table 82: redundancy properties

Name	Type	Description
redundancy-mode	string	<p>The system's operating mode, also called the cache redundancy mode.</p> <ul style="list-style-type: none"> • Independent Cache Performance Mode: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. • Active-Active ULP: Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. • Single Controller: The enclosure contains a single controller. • Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. • Down: Both controllers are not operational.
redundancy-mode-numeric	uint32	<p>Numeric equivalents for redundancy-mode values.</p> <ul style="list-style-type: none"> • 1: Independent Cache Performance Mode • 2: Active-Active ULP • 3: Single Controller • 4: Failed Over • 5: Down
redundancy-status	string	<ul style="list-style-type: none"> • Redundant with independent cache: Both controllers are operational but are not mirroring their cache metadata to each other. • Redundant: Both controllers are operational. • Operational but not redundant: In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational. • Down: This controller is not operational. • Unknown: Status information is not available.
redundancy-status-numeric	uint32	<p>Numeric equivalents for redundancy-status values.</p> <ul style="list-style-type: none"> • 0: Redundant with independent cache • 1: Redundant • 3: Operational but not redundant • 4: Down • 5: Unknown
controller-a-status	string	<ul style="list-style-type: none"> • Operational: The controller is operational. • Down: The controller is installed but not operational. • Not Installed: The controller is not installed.

Name	Type	Description
controller-a-status-numeric	uint32	Numeric equivalents for controller-a-status values. <ul style="list-style-type: none">• 0: Operational• 1: Down• 2: Not Installed
controller-a-serial-number	string	<ul style="list-style-type: none">• Controller module serial number• Not Available: The controller is down or not installed.
controller-b-status	string	<ul style="list-style-type: none">• Operational: The controller is operational.• Down: The controller is installed but not operational.• Not Installed: The controller is not installed.
controller-b-status-numeric	uint32	Numeric equivalents for controller-b-status values. <ul style="list-style-type: none">• 0: Operational• 1: Down• 2: Not Installed
controller-b-serial-number	string	<ul style="list-style-type: none">• Controller module serial number• Not Available: The controller is down or not installed.
other-MC-status	string	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none">• Not Communicating• Not Operational• Operational• Unknown
other-MC-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none">• 1524: Not Communicating• 3231: Not Operational• 4749: Operational• 1496: Unknown

refresh-counters

This basetype is used by [show refresh-counters on page 400](#).

Table 83: refresh-counters properties

Name	Type	Description
<code>basetype-name</code>	(Not shown)	Shows when the data represented by the base type was last updated. <ul style="list-style-type: none">• <code>0</code>: The data has never been updated and is not cached.• <code>nonzero-number</code>: A timestamp indicating that the data has been updated. If the value has changed since the last time you called this command then the data has changed.

remote-addresses

This basetype is used by [show replication-volumes on page 411](#).

Table 84: remote-addresses properties

Name	Type	Description
<code>connected-ports</code>	string	<ul style="list-style-type: none">• For a remote primary or secondary volume, this shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller.• For a local primary or secondary volume, this shows N/A.
<code>remote-address</code>	string	The address of each host port in the remote system through which the volume is accessible.

remote-links

This basetype is used by [verify links on page 495](#) and [verify remote-link on page 496](#).

Table 85: remote-links properties

Name	Type	Description
local-host-port	string	Controller host port ID in the local system, in the form <code>hostport_controller-ID-and-port-number</code> .
type	string	<ul style="list-style-type: none">Unknown: Port type is unknown.FC: FC port.iSCSI: iSCSI port.
type-numeric	uint32	Numeric equivalents for <code>type</code> values. <ul style="list-style-type: none">0: Unknown6: FC9: iSCSI
remote-links	string	Controller host port ID of each linked port in the remote system, in the form <code>hostport_controller-ID-and-port-number</code> . Multiple ports are separated by a comma.

remote-ports

This basetype is used by [show peer-connections on page 376](#).

Table 86: remote-ports properties

Name	Type	Description
remote-host-port	string	The ID of the port in the remote system.
port-address	string	The assigned port IP address.

remote-ports-detail

This basetype is used by [show peer-connections on page 376](#) when the `verify-links` parameter is specified.

Table 87: remote-ports-detail properties

Name	Type	Description
remote-host-port	string	The ID of the port in the remote system.
port-address	string	The assigned port IP address.
local-links	string	The IDs of linked ports in the local system.

remote-system

This basetype is used by [show remote-systems on page 401](#).

Table 88: remote-system properties

Name	Type	Description
id	string	Remote system ID.
system-name	string	<ul style="list-style-type: none">The name of the remote system.Uninitialized Name: The default value.
system-contact	string	<ul style="list-style-type: none">The name of the person who administers the remote system.Uninitialized Contact: The default value.
system-location	string	<ul style="list-style-type: none">The location of the remote system.Uninitialized Location: The default value.
system-information	string	<ul style="list-style-type: none">A brief description of the remote system.Uninitialized Info: The default value.
vendor-name	string	The vendor name of the remote system.
product-id	string	The product model identifier of the remote system.
product-brand	string	The brand name of the remote system.
ip-address-a	string	<ul style="list-style-type: none">The IP address of the network port in controller A in the remote system.Not Present

Name	Type	Description
ip-address-b	string	<ul style="list-style-type: none"> The IP address of the network port in controller B in the remote system. Not Present
username	string	The name of a user that is configured in the remote system. This must be a user with the <code>manage</code> role to remotely configure or provision that system.
status	string	<ul style="list-style-type: none"> Uninitialized: This system hasn't communicated with the remote system. Ready: This system has contacted the remote system and it is ready to use. Connected: This system is transferring data to the remote system. Not Connected: The system is not connected to the remote system.
status-numeric	uint32	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none"> 0: Uninitialized 1: Ready 2: Connected
last-connected	string	Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code> , when successful communication was last established between the MC in the local system and the MC in the remote system. This value does not indicate when connection status was last determined, and will not be updated if the remote MC is not accessible or if the connection status is <code>Not Connected</code> .
interfaces	string	<ul style="list-style-type: none"> FC iSCSI SAS Hybrid: FC and iSCSI.
interfaces-numeric	uint32	Numeric equivalents for <code>interfaces</code> values. <ul style="list-style-type: none"> 0: FC 1: iSCSI 2: SAS 3: Hybrid
storage-model	string	<ul style="list-style-type: none"> LINEAR

Name	Type	Description
storage-model-numeric	uint32	Numeric equivalents for storage-model values. <ul style="list-style-type: none">0: LINEAR
isvalid-ip-a	string	<ul style="list-style-type: none">False: The IP address is not valid for controller module A in the remote system.True: The IP address is valid for controller module A in the remote system.
isvalid-ip-a-numeric	uint32	Numeric equivalents for isvalid-ip-a values. <ul style="list-style-type: none">0: False1: True
isvalid-ip-b	string	<ul style="list-style-type: none">False: The IP address is not valid for controller B in the remote system.True: The IP address is valid for controller B in the remote system.
isvalid-ip-b-numeric	uint32	Numeric equivalents for isvalid-ip-b values. <ul style="list-style-type: none">0: False1: True

replicate-volume-tasks

This basetype is used by [show task-details \(Deprecated\) on page 435](#) and [show task-details \(Deprecated\) on page 435](#) for a ReplicateVolume task.

Table 89: replicate-volume-tasks properties

Name	Type	Description
primary-volume-name	string	Primary volume name.
primary-volume-serial	string	Primary volume serial number.
snapshot-prefix	string	A label to identify snapshots created by this task.

Name	Type	Description
replication-mode	string	<ul style="list-style-type: none">new-snapshot: Replicate a new snapshot of the volume to the remote system.last-snapshot: Replicate the last (most recent existing) snapshot of the volume to the remote system.
retention-count	uint32	Number of snapshots to retain with this prefix, from 3 to 32.
last-created	string	<ul style="list-style-type: none">The name of the last snapshot created by the task.Blank if the task has not created a snapshot.
last-used	string	For a task whose replication mode is last-snapshot, the name of the last snapshot used for replication. Otherwise, N/A.
snapshot	Embedded;	see snap-tasks on page 687 .

replication-image

This basetype is used by [show replication-images on page 403](#).

Table 90: replication-image properties

Name	Type	Description
image-key	string	Replication image ID.
replication-volume-serial-number	string	Replication volume serial number.
image-serial-number	string	Replication image serial number.
replication-image-source	string	Name of the source replication image.
snapshot-serial	string	Replication snapshot serial number associated with the image. The replication snapshot is associated with the replication volume specified in the request.
snapshot-name	string	Replication snapshot name associated with the image. For a secondary image, this value is not filled in until the replication is completed.

Name	Type	Description
creation-date-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication image was created on the replication volume.
creation-date-time-numeric	uint32	Unformatted creation-date-time value.
image-details	Embedded; see replication-image-params below .	

replication-image-params

This basetype is used by [show replication-images](#) [on page 403](#).

Table 91: replication-image-params properties

Name	Type	Description
status	string	Replication image status. <ul style="list-style-type: none">• N/A: The image information is not valid.• Queued: The image is known to exist in the primary-view volume but replication has not started.• Replicating: The image is being replicated.• Suspended: The image is being replicated but replication is suspended.• Complete: The image is created, fully replicated, and available.• Create-Snapshot: The image is fully replicated but a snapshot of the image is being created.• Offline: The image has been replicated but is unusable due to an error.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: N/A• 1: Queued• 2: Replicating• 3: Suspended• 4: Create-Snapshot• 5: Complete• 6: Offline

Name	Type	Description
progress	string	The percentage complete if the image is being replicated. Applies only to secondary volumes.
start-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation started on the replication volume.
start-time-numeric	uint32	Unformatted <code>start-time</code> value.
update-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation status was last updated.
update-time-numeric	uint32	Unformatted <code>update-time</code> value.
suspended-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation was suspended or resumed.
suspended-time-numeric	uint32	Unformatted <code>suspended-time</code> value.
est-completion-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the replication operation is estimated to complete.
est-completion-time-numeric	uint32	Unformatted <code>est-completion-time</code> value.
time	string	Total time of replication, in the format <i>hour:minutes:seconds</i> (UTC), including any suspension time.

replication-set

This basetype is used by [show replication-sets](#) on page 405.

Table 92: replication-set properties

Name	Type	Description
name	string	Replication set name.
serial-number	string	Replication set serial number.
primary	Embedded; see replication-volume below .	

replication-volume

This basetype is used by [show replication-volumes on page 411](#).

Table 93: replication-volume properties

Name	Type	Description
name	string	Replication volume name.
serial-number	string	Replication volume serial number.
status	string	Replication volume status. <ul style="list-style-type: none">• Initializing: The initial (full) replication to the volume is in progress.• Online: The volume is online and is consistent with the last replicated image.• Inconsistent: The volume is online but is in an inconsistent state. A full replication is required to initialize it.• Replicating: The volume is online and replication is in progress.• Replicate-delay: The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.• Suspended: The volume is online but the in-progress replication has been suspended.• Offline: The volume cannot be accessed and is unusable due to an error.• Establishing proxy: The volume is establishing a proxy connection to a remote volume. This will occur when a detached secondary volume is reattached and is re-establishing a connection with the primary system in preparation for replication.• Detached: The volume is detached for removal.

Name	Type	Description
status-numeric	uint32	<p>Numeric equivalents for <code>status</code> values.</p> <ul style="list-style-type: none"> • 0: Initializing • 1: Online • 2: Inconsistent • 3: Replicating • 4: Replicate-Delay • 5: Suspended • 6: Offline • 7: Establishing proxy • 8: Detached
status-reason	string	<p>More information about the <code>status</code> value.</p> <ul style="list-style-type: none"> • N/A • Record Missing • Adding Volume • Changing Primary
status-reason-numeric	uint32	<p>Numeric equivalents for <code>status-reason</code> values.</p> <ul style="list-style-type: none"> • 0: N/A • 1: Record Missing • 2: Adding Volume • 4: Changing Primary
monitor	string	<p>Replication volume monitoring status.</p> <ul style="list-style-type: none"> • OK: Communication to the remote volume is successfully occurring on the network. • Failed: Communication to the remote volume has failed because of a communication issue or because the remote volume has gone offline.
monitor-numeric	uint32	<p>Numeric equivalents for <code>monitor</code> values.</p> <ul style="list-style-type: none"> • 2: OK • <i>other</i>: Failed
location	string	<ul style="list-style-type: none"> • Local: The replication volume is in the local system. • Remote: The replication volume is in a remote system.
location-numeric	uint32	<p>Numeric equivalents for <code>location</code> values.</p> <ul style="list-style-type: none"> • 0: Local • 1: Remote
ip-address-a	string	IP address of the network port in controller A in the remote system.
ip-address-b	string	IP address of the network port in controller B in the remote system.

Name	Type	Description
primary-volume-name	string	Primary volume name.
primary-volume-serial	string	Primary volume serial number.
primary-volume-status	string	Primary volume status. <ul style="list-style-type: none"> • Online • Conflict • Offline
primary-volume-status-numeric	uint32	Numeric equivalents for primary-volume-status values. <ul style="list-style-type: none"> • 0: Online • 1: Conflict • 2: Offline
max-queue	uint32	Maximum number of replication images to consider when determining the next image to replicate. Used only if the collision-policy property is set to Oldest.
max-retry-time	uint32	Maximum amount of time in seconds that the replication volume should retry a replication operation on any specific image when errors occur. Used only if the error-policy property is set to Retry.
error-policy	string	Determines the action to take when an error occurs during replication. <ul style="list-style-type: none"> • Retry: Retry the replication for the time specified by the max-retry-time property. • Suspend: Suspend the replication until the error is resolved automatically or through user intervention.
error-policy-numeric	uint32	Numeric equivalents for error-policy values. <ul style="list-style-type: none"> • 0: Retry • 1: Suspend
link-type	string	Type of ports used to link the primary and secondary volumes. <ul style="list-style-type: none"> • FC: FC ports. • iSCSI: iSCSI ports.
link-type-numeric	uint32	Numeric equivalents for link-type values. <ul style="list-style-type: none"> • 8: FC WWNN • 16: FC WWPN • 64: iSCSI IPv4 • 128: iSCSI IPv6

Name	Type	Description
collision-policy	string	<p>Determines the next image to replicate when multiple replication images are queued.</p> <ul style="list-style-type: none"> • Newest: Only the latest replication image should be considered for the next replication operation. • Oldest: Only the latest <i>n</i> replication images should be considered for the next replication operation, where <i>n</i> is defined by the <code>max-queue</code> property and the oldest of these images should be considered first.
collision-policy-numeric	uint32	<p>Numeric equivalents for <code>collision-policy</code> values.</p> <ul style="list-style-type: none"> • 0: Oldest • 1: Newest
monitor-interval	uint32	<p>Interval in seconds at which the primary volume should query the secondary volume.</p>
priority	string	<p>Priority of the replication operation with respect to I/O operations competing for the system's processors.</p> <ul style="list-style-type: none"> • High: Replication has higher priority than host I/O. This can cause heavy I/O to be slower than normal. • Medium: Replication performance is balanced with host I/O performance. • Low: Replication runs at a slower rate with minimal effect on host I/O. Use when streaming data without interruption is more important than data redundancy.
priority-numeric	uint32	<p>Numeric equivalents for <code>priority</code> values.</p> <ul style="list-style-type: none"> • 0: High • 1: Medium • 2: Low
connection-status	string	<ul style="list-style-type: none"> • Not Attempted: Communication has not been attempted to the remote volume. • Online: The volumes in the replication set have a valid connection but communication is not currently active. • Active: Communication is currently active to the remote volume. • Offline: No connection is available to the remote system.
connection-status-numeric	uint32	<p>Numeric equivalents for <code>connection-status</code> values.</p> <ul style="list-style-type: none"> • 0: Not Attempted • 1: Online • 2: Active • 3: Offline

Name	Type	Description
connection-time	string	Date and time of the last communication with the remote volume, or N/A.
connection-time-numeric	uint32	Unformatted connection-time value.
replication-set	string	Replication set serial number.
local-volume-serial-number	string	Local replication volume serial number.
remote-address		Embedded; see remote-addresses on page 651 .
image-details		Embedded; see replication-image on page 656 .

replication-volume-summary

This basetype is used by [show replication-images on page 403](#).

Table 94: replication-volume-summary properties

Name	Type	Description
name	string	Replication volume name.
serial-number	string	Replication volume serial number.
volume-type	string	<ul style="list-style-type: none">Primary Volume: The volume is the primary volume in a replication set.Secondary Volume: The volume is the secondary volume in a replication set.
volume-type-numeric	uint32	Numeric equivalents for volume-type values. <ul style="list-style-type: none">0: Secondary Volume1: Primary Volume
images		Embedded; see replication-image on page 656 .

reset-snapshot-tasks

This basetype is used by [show task-details \(Deprecated\) on page 435](#) and [show task-details \(Deprecated\) on page 435](#) for a ResetSnapshot task.

Table 95: reset-snapshot-tasks properties

Name	Type	Description
snapshot-name	string	Name of the snapshot to reset.
snapshot-serial	string	Serial number of the snapshot to reset.

resettable-statistics

This basetype is used by [show pool-statistics on page 381](#) and [show tier-statistics \(QXS-4 and QXS-6 Series Only\) on page 443](#).

Table 96: resettable-statistics properties

Name	Type	Description
serial-number	string	The serial number of the pool or tier.
time-since-reset	uint32	The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.
time-since-sample	uint32	The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.
number-of-reads	uint64	The number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	The number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	The amount of data read since these statistics were last reset or since the controller was restarted.

Name	Type	Description
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	The amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
bytes-per-second	uint64	The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
avg-rsp-time	uint32	The average response time, in microseconds, for read and write operations since the last sampling time.
avg-read-rsp-time	uint32	The average response time, in microseconds, for read operations since the last sampling time.
avg-write-rsp-time	uint32	The average response time, in microseconds, for write operations since the last sampling time.

sas-host-phy-statistics

This basetype is used by [show host-parameters \(Deprecated\)](#) on page 357.

Table 97: sas-host-phy-statistics properties

Name	Type	Description
port	string	The controller ID and port number.
phy	uint32	The PHY's logical location within a group, based on the PHY type. Logical IDs are 0–3 for host port PHYs. Each SAS host will have multiple PHYs.
disparity-errors	uint32	The number of doublewords containing running disparity errors that have been received by the PHY, not including those received during Link Reset sequences. A running disparity error occurs when positive and negative values in a signal do not alternate.
lost-dwords	uint32	The number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.
invalid-dwords	uint32	The number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.
reset-error-counter	uint32	The number of times the PHY Reset sequence has failed.

sas-port

This basetype is used by [show ports on page 386](#) for a SAS host port.

Table 98: sas-port properties

Name	Type	Description
configured-topology	string	<ul style="list-style-type: none">Direct
width	uint8	Number of PHY lanes in the SAS port.
sas-lanes-expected	uint8	Expected number of PHY lanes in the SAS port.
sas-active-lanes	uint8	Number of active lanes in the SAS port. If the port is connected and fewer lanes are active than are expected, the port status will change to <code>Warning</code> , the health will change to <code>Degraded</code> , and event 354 will be logged.

Name	Type	Description
sas-disabled-lanes	uint8	Number of disabled lanes in the SAS port. If the fan-out setting does not match the type of cable connected to the port, event 569 will report two lanes in the port are disabled. This field can be used to identify those lanes.

sas-status-controller-a

This basetype is used by [show expander-status on page 344](#) for controller A and controller B.

Table 99: sas-status-controller-a properties

Name	Type	Description
enclosure-id	uint32	Enclosure ID.
expander-type	string	The expander type.
expander-type-numeric	string	Numeric equivalents for <code>expander-type</code> values.
drawer-id (2U48 enclosure)	string	<ul style="list-style-type: none">• 0: Left• 1: Middle• 2: Right
drawer-id (4U56 enclosure)	string	<ul style="list-style-type: none">• 0: Left• 1: Right
drawer-id-numeric	uint32	Same as <code>drawer-id</code> .
controller	string	<ul style="list-style-type: none">• A: Controller A.• B: Controller B.
controller-numeric	uint32	Numeric equivalents for <code>controller</code> values. <ul style="list-style-type: none">• 0: B• 1: A
wide-port-index	uint32	The wide-port index.

Name	Type	Description
phy-index	uint32	The PHY index.
wide-port-role	string	The wide-port role. <ul style="list-style-type: none">• Drive• Drawer Egress• Drawer Ingress• Expansion Egress• Expansion Ingress• SC Primary• SC Alternate• Inter Expander• Unused• Unknown
wide-port-role-numeric	string	Numeric equivalents for wide-port-role values. <ul style="list-style-type: none">• 0: Unknown• 1: Drive• 2: Drawer Egress• 3: Drawer Ingress• 4: Expansion Egress• 5: Expansion Ingress• 6: SC Primary• 7: SC Alternate• 8: Inter Expander• 9: Unused
wide-port-num	uint32	The wide-port number.

Name	Type	Description
type	string	<p>The PHY type.</p> <ul style="list-style-type: none"> • Drawer0-Egress: Drawer 0 egress PHY. • Drawer0-Ingress: Drawer 0 ingress PHY. • Drawer1-Egress: Drawer 1 egress PHY. • Drawer1-Ingress: Drawer 1 drawer ingress PHY. • Drawer2-Egress: Drawer 2 egress PHY. • Drawer2-Ingress: Drawer 2 ingress PHY. • Drive: Drive slot PHY. • Egress: Expansion port egress PHY. • Expander-Egress-0: Expansion port 0 egress PHY. • Expander-Egress-1: Expansion port 1 egress PHY. • Expander-Ingress-0: Expansion port 0 ingress PHY. • Expander-Ingress-1: Expansion port 1 ingress PHY. • Ingress: Expansion port ingress PHY. • Inter-Exp: Inter-expander PHY. • SC: Storage Controller PHY. • SC-0: Storage Controller primary PHY. • SC-1: Storage Controller alternate PHY. • SCA-A: Storage Controller A alternate PHY. • SCA-P: Storage Controller A primary PHY. • SCB-A: Storage Controller B alternate PHY. • SCB-P: Storage Controller B primary PHY.
status	string	<p>PHY status.</p> <ul style="list-style-type: none"> • Unavailable: No status information is available. • Enabled - Healthy: The PHY is enabled and healthy. • Enabled - Degraded: The PHY is enabled but degraded. • Disabled: The PHY has been disabled by a user or by the system.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: Unavailable • 1: Enabled - Healthy • 2: Enabled - Degraded • 3: Disabled

Name	Type	Description
elem-status	string	<p>The SES status that corresponds to the PHY status.</p> <ul style="list-style-type: none"> • Disabled: Critical condition is detected. • Error: Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data. • OK: Element is installed and no error conditions are known. • Non-critical: Non-critical condition is detected. • Not Used: Element is not installed in enclosure. • Unknown: Either: <ul style="list-style-type: none"> • Sensor has failed or element status is not available. Appears only if an I/O module indicates it has fewer PHYs than the reporting I/O module, in which case all additional PHYs are reported as unknown. • Element is installed with no known errors, but the element has not been turned on or set into operation.
elem-status-numeric	uint32	<p>Numeric equivalents for elem-status values.</p> <ul style="list-style-type: none"> • 0: Error • 1: OK • 2: Disabled • 3: Non-critical • 4: Error • 5: Not Used • 6: Unknown • 7: Unknown • 8: Unknown
elem-disabled	string	<ul style="list-style-type: none"> • Enabled: PHY is enabled. • Disabled: PHY is disabled.
elem-disabled-numeric	uint32	<p>Numeric equivalents for elem-disabled values.</p> <ul style="list-style-type: none"> • 0: Enabled • 1: Disabled

Name	Type	Description
elem-reason	string	<p>More information about the status value.</p> <ul style="list-style-type: none"> • Blank if elem-status is OK. • Error count interrupts: PHY disabled because of error-count interrupts. • PHY control: PHY disabled by a SES control page as a result of action by a Storage Controller or user. • Not ready: PHY is enabled but not ready. Appears for SC-1 PHYs when the partner I/O module is not installed. Appears for Drive, SC-1, or Ingress PHYs when a connection problem exists such as a broken connector. • Drive removed: PHY disabled because drive slot is empty. • Unused - disabled by default: PHY is disabled by default because it is not used. • Excessive PHY changes: PHY is disabled because of excessive PHY change counts.
elem-reason-numeric	uint32	<p>Numeric equivalents for elem-reason values.</p> <ul style="list-style-type: none"> • 0: (blank) • 32769: Error count interrupts • 32771: PHY control • 32772: Not ready • 32774: Drive removed • 32775: Unused - disabled by default • 32776: Excessive PHY changes
change-counter	uint32	<p>Number of times the PHY originated a BROADCAST (CHANGE). A BROADCAST (CHANGE) is sent if doubleword synchronization is lost or at the end of a Link Reset sequence.</p>
code-violations	uint32	<p>Number of times the PHY received an unrecognized or unexpected signal.</p>
disparity-errors	uint32	<p>Number of doublewords containing running disparity errors that have been received by the PHY, not including those received during Link Reset sequences. A running disparity error occurs when positive and negative values in a signal don't alternate.</p>
crc-errors	uint32	<p>In a sequence of SAS transfers (frames), the data is protected by a cyclic redundancy check (CRC) value. The crc-errors value specifies the number of times the computed CRC does not match the CRC stored in the frame, which indicates that the frame might have been corrupted in transit.</p>
conn-crc-errors	uint32	<p>Number of times the lane between two expanders experienced a communication error.</p>

Name	Type	Description
lost-dwords	uint32	Number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.
invalid-dwords	uint32	Number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.
reset-error-counter	uint32	Number of times the expander performed a reset of error counters.
flag-bits	uint32	PHY status flag bits.

sas-status-drawer

This basetype is used by [show expander-status on page 344](#) and has the same properties as [sas-status-controller-a on page 667](#).

schedules

This basetype is used by [show schedules on page 416](#).

Table 100: schedules properties

Name	Type	Description
name	string	Schedule name.
schedule-specification	string	Schedule settings for running the associated task.

Name	Type	Description
status	string	Schedule status. <ul style="list-style-type: none">• Uninitialized: The schedule is not yet ready to run.• Ready: The schedule is ready to run at the next scheduled time.• Suspended: The schedule had an error and is holding in its current state.• Expired: The schedule has exceeded a constraint and will not run again.• Invalid: The schedule is invalid.• Deleted: The task has been deleted.
next-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the schedule will next run, or N/A if the schedule has expired.
next-time-numeric	uint32	Unformatted next-time value.
task-to-run	string	Name of the task that the schedule runs.
error-message	string	<ul style="list-style-type: none">• If an error occurred while running the schedule, the error message.• Blank if no error occurred.
task	Embedded; see tasks on page 697.	

security-communications-protocols

This basetype is used by [show protocols on page 393](#).

Table 101: security-communications-protocols properties

Name	Type	Description
wbi-http	string	<ul style="list-style-type: none">• Disabled: The standard Disk Management Utility web server is disabled. This is the default.• Enabled: The standard Disk Management Utility web server is enabled.
wbi-http-numeric	uint32	Numeric equivalents for wbi-http values. <ul style="list-style-type: none">• 0: Disabled• 1: Enabled

Name	Type	Description
wbi-https	string	<ul style="list-style-type: none"> Disabled: The secure Disk Management Utility web server is disabled. Enabled: The secure Disk Management Utility web server is enabled. This is the default.
wbi-https-numeric	uint32	Numeric equivalents for wbi-https values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
cli-telnet	string	<ul style="list-style-type: none"> Disabled: The standard CLI is disabled. Enabled: The standard CLI is enabled. This is the default.
cli-telnet-numeric	uint32	Numeric equivalents for cli-telnet values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
cli-ssh	string	<ul style="list-style-type: none"> Disabled: The secure shell CLI is disabled. Enabled: The secure shell CLI is enabled. This is the default.
cli-ssh-numeric	uint32	Numeric equivalents for cli-ssh values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
smis	string	<ul style="list-style-type: none"> Disabled: The secure SMI-S interface is disabled. Enabled: The secure SMI-S interface is enabled. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5989. This is the default.
smis-numeric	uint32	Numeric equivalents for smis values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
usmis	string	<ul style="list-style-type: none"> Disabled: The unsecure SMI-S interface is disabled. This is the default. Enabled: The unsecure SMI-S interface is enabled. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988.
usmis-numeric	uint32	Numeric equivalents for smis values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
ftp	string	<ul style="list-style-type: none"> Disabled: The FTP interface is disabled. Enabled: The FTP interface is enabled. This is the default.

Name	Type	Description
ftp-numeric	uint32	Numeric equivalents for ftp values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
snmp	string	<ul style="list-style-type: none"> Disabled: The SNMP interface is disabled. All SNMP requests to the MIB are disabled and SNMP traps are disabled. Enabled: The SNMP interface is enabled. This is the default.
snmp-numeric	uint32	Numeric equivalents for snmp values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
debug-interface	string	<ul style="list-style-type: none"> Disabled: The Telnet debug port is disabled. This is the default. Enabled: The Telnet debug port is enabled.
debug-interface-numeric	uint32	Numeric equivalents for debug-interface values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
inband-ses	string	<ul style="list-style-type: none"> Disabled: The in-band SES interface is disabled. Enabled: The in-band SES interface is enabled. This is the default.
inband-ses-numeric	uint32	Numeric equivalents for inband-ses values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
activity-progress	string	<ul style="list-style-type: none"> Enabled: Access to the activity progress interface via HTTP port 8081 is enabled. This mechanism reports whether a firmware update or partner firmware update operation is active and shows the progress through each step of the operation. In addition, when the update operation completes, status is presented indicating either the successful completion, or an error indication if the operation failed. Disabled: Access to the activity progress interface via HTTP port 8081 is disabled. This is the default.
activity-progress-numeric	uint32	Numeric equivalents for activity-progress values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled

Name	Type	Description
management-mode	string	The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session. <ul style="list-style-type: none"> v2: Uses terminology that is oriented to managing linear storage. For example, <i>vdisk</i> for disk groups and pools. v3: Uses terminology that is oriented to managing virtual and linear storage. For example, <i>disk group</i> for disk groups and <i>pool</i> for pools.
management-mode-numeric	uint32	Numeric equivalents for management-mode values. <ul style="list-style-type: none"> 2: v2 3: v3

sensors

This basetype is used by [show sensor-status on page 418](#).

Table 102: sensors properties

Name	Type	Description
durable-id	string	Sensor ID. For example: <code>sensor_temp_ctrl_controller-ID.sensor-number</code> and <code>sensor_volt_ctrl_controller-ID.sensor-number</code> .
enclosure-id	uint32	Enclosure ID.
sensor-name	string	Sensor name and location.
value	string	<ul style="list-style-type: none"> For a sensor, its value. For overall unit status, one of the status values below.

Name	Type	Description
status	string	<ul style="list-style-type: none"> • OK: The sensor is present and detects no error condition. • Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds. • Critical: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold. • Unavailable: The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup. • Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor. • Unknown: The sensor is present but status is not available. • Not Installed: The sensor is not present. • Unsupported: Status detection is not implemented.
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> • 0: Unsupported • 1: OK • 2: Critical • 3: Warning • 4: Unrecoverable • 5: Not Installed • 6: Unknown • 7: Unavailable
sensor-location	uint32	Superseded by the container property.
container	string	<p>Hardware component that contains the sensor.</p> <ul style="list-style-type: none"> • controllers • enclosures • fan • iom • midplane • power-supplies
container-numeric	uint32	<p>Numeric equivalents for container values.</p> <ul style="list-style-type: none"> • 17: enclosures • 18: midplane • 19: controllers • 20: iom • 21: power-supplies • 22: fan

Name	Type	Description
sensor-type	string	<ul style="list-style-type: none">• Temperature• Voltage• Current• Charge Capacity• Unknown Type
sensor-type-numeric	uint32	Numeric equivalents for sensor-type values. <ul style="list-style-type: none">• 0: Temperature• 1: Current• 2: Voltage• 3: Charge capacity• 4: Unknown Type

show-other-mc-status

This basetype is used by [show shutdown-status on page 420](#).

Table 103: show-other-mc-status properties

Name	Type	Description
other-mc	string	Other MC Status
other-mc-status	string	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none">• Not Communicating• Not Operational• Operational• Unknown
other-mc-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none">• 1524: Not Communicating• 3231: Not Operational• 4749: Operational• 1496: Unknown

shutdown-status

This basetype is used by [show shutdown-status on page 420](#).

Table 104: shutdown-status properties

Name	Type	Description
controller	string	<ul style="list-style-type: none">A: Controller A.B: Controller B.
status	string	<ul style="list-style-type: none">up: The controller is operational.down: The controller is shut down.not installed: The controller is not installed.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">0: up1: down2: not installed

snap-pools

This basetype is used by [show snap-pools on page 421](#).

Table 105: snap-pools properties

Name	Type	Description
virtual-disk-name	string	Vdisk name.
serial-number	string	Snap pool serial number.
name	string	Snap pool name.
size	string	Snap pool size, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
free	string	Amount of free space in this snap pool, formatted to use the current base, precision, and units.

Name	Type	Description
free-numeric	uint32	Unformatted <code>free</code> value in 512-byte blocks.
free-percent-size	string	Amount of free space in this snap pool as a percentage of total space in the snap pool.
master-volumes	string	Number of master volumes associated with this snap pool.
snapshots	string	Number of snapshots using this snap pool.
status	string	<ul style="list-style-type: none">• <code>Available</code>: The snap pool is available for use.• <code>Offline</code>: The snap pool is not available for use, as in the case where its disks are not present.• <code>Corrupt</code>: The snap pool's data integrity has been compromised. The snap pool can no longer be used.
status-numeric	uint32	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none">• <code>0</code>: Available• Bitmask with second significant digit set: <code>Offline</code>• Bitmask with third significant digit set: <code>Corrupt</code>
policy	Embedded; see policy-threshold on page 630.	

snap-space

This basetype is used by [show snapshot-space](#) on page 424.

Table 106: snap-space properties

Name	Type	Description
pool	string	The pool for which information is displayed (A or B).
serial-number	string	The serial number of the pool.
snap-limit-threshold	string	The percentage of the pool that can be used for snapshots (the snapshot space).
snap-limit-size	uint16	The actual size of the snapshot space.

Name	Type	Description
snap-limit-size-numeric	uint64	Numeric equivalents for snap-limit-size values.
allocated-percent-pool	string	The percentage of the pool currently used by snapshots.
allocated-percent-snap-space	string	The percentage of the snapshot space currently used by snapshots.
allocated-size	uint16	The actual amount of space currently used by snapshots.
allocated-size-numeric	uint64	Numeric equivalents for allocated-size values.
snap-low-threshold	string	A percentage of the snapshot space designated as the low threshold.
snap-middle-threshold	string	A percentage of the snapshot space designated as the middle threshold.
snap-high-threshold	string	A percentage of the snapshot space designated as the high threshold.
limit-policy	string	The limit policy for when the percentage of the pool designated for snapshots is reached. <ul style="list-style-type: none">• <code>notify-only</code>: When the snapshot space is reached an event is generated and logged. This is the default.• <code>delete</code>: When the snapshot space is reached an event is generated and logged and automatic deletion of snapshots occurs.
limit-policy-numeric	uint32	Numeric equivalents for limit-policy values. <ul style="list-style-type: none">• <code>0</code>: <code>notify-only</code>• <code>1</code>: <code>delete</code>

snapshots

This basetype is used by [show snapshots on page 425](#).

Table 107: snapshots properties

Name	Type	Description
durable-id	string	Snapshot ID.
virtual-disk-name	string	The name of the vdisk or pool that contains the snapshot.
storage-pool-name	string	The name of the vdisk or pool that contains the snapshot.
serial-number	string	Snapshot serial number.
name	string	Snapshot name.
creation-date-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the snapshot was prepared or committed.
creation-date-time-numeric	uint32	Unformatted <code>creation-date-time</code> value.
status	string	Snapshot status. <ul style="list-style-type: none"> Available Unavailable: See the <code>status-reason</code> value.
status-numeric	uint32	<ul style="list-style-type: none"> 0: Available Nonzero: Unavailable
status-reason	string	Shows N/A for Available status, or one of the following reasons for Unavailable status: <ul style="list-style-type: none"> snapshot not found snap pool not found master volume not found snapshot pending (not yet committed) snap pool not accessible master volume not accessible Volume copy with modified data is in progress Rollback with modified data is in progress Unknown reason

Name	Type	Description
status-reason-numeric	uint32	<p>Numeric equivalents for status-reason values.</p> <ul style="list-style-type: none"> • 1: snapshot pending (not yet committed) • 3: snap pool not accessible • 4: master volume not accessible • 6: Rollback with modified data is in progress • 7: Volume copy with modified data is in progress • 8: snapshot not found • 9: snap pool not found • 10: master volume not found • 254: N/A • <i>hex-code</i>: Unknown reason
master-volume-name	string	Name of the volume of which the snapshot was taken.
volume-parent	string	The name of the volume of which the snapshot was taken.
base-volume	string	The root of the snapshot tree, if any. A snapshot tree is a series of inter-related snapshots of a volume and can be 254 levels deep.
base-serial-number	string	The serial number of the base volume.
num-children	uint32	The number of child snapshots (snapshots taken of this snapshot).
num-snaps-tree	uint32	The number of snapshots taken of the base volume and its children. This count includes the base volume and all snapshots that share the base volume as their root.
snap-pool-name	string	<ul style="list-style-type: none"> • The name of the snap pool for linear snapshots. • Blank for virtual snapshots.
snap-data	string	The total amount of write data associated with the snapshot.
snap-data-numeric	uint32	Unformatted snap-data value in 512-byte blocks.
uniquedata	string	The amount of write data that is unique to the snapshot.
uniquedata-numeric	uint32	Unformatted uniquedata value in 512-byte blocks.

Name	Type	Description
shareddata	string	The amount of write data that is shared between this snapshot and other snapshots.
shareddata-numeric	uint32	Unformatted shareddata value in 512-byte blocks.
retention-priority	string	<p>The retention priority for the snapshot.</p> <ul style="list-style-type: none"> never-delete: Snapshots will never be deleted. high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted. medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default. low: Snapshots may be deleted. <p>Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.</p>
retention-priority-numeric	uint32	<p>Numeric equivalents for retention-priority values.</p> <ul style="list-style-type: none"> 0: never-delete 1: high 2: medium 3: low
priority-value	string	<p>Retention priority for the snapshot, based on the snapshot attributes and the user-defined retention priority for the snapshot type.</p> <ul style="list-style-type: none"> 0x2000: Queued snapshot. The snapshot was taken for remote replication but is queued, waiting for a previous replication to complete. 0x4000: Replication snapshot. 0x6000: Standard snapshot. 0x8000: Common sync point. The latest snapshot that is copy-complete on all secondary volumes. 0xa000: Volume-copy snapshot. Snapshot that is being used to copy data from a source volume to a destination volume. 0xc000: Replicating snapshot. Snapshot that is being replicated from a primary system to a secondary system. 0xe000: Only sync point. The snapshot is the only sync point that is available on any secondary volume.
user_priority-value	string	User-defined retention priority for the snapshot type.

Name	Type	Description
snapshot-type	string	<p>Snapshot type.</p> <ul style="list-style-type: none">• <code>Standard snapshot</code>: Snapshot of a source volume that consumes a snapshot license.• <code>Standard snapshot (DRM)</code>: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).• <code>Replication snapshot</code>: For a primary or secondary volume, a snapshot that was created by a replication operation but is not a sync point.• <code>Replication snapshot (Replicating)</code>: For a primary volume, a snapshot that is being replicated to a secondary system.• <code>Replication snapshot (Current sync point)</code>: For a primary or secondary volume, the latest snapshot that is copy-complete on any secondary system in the replication set.• <code>Replication snapshot (Common sync point)</code>: For a primary or secondary volume, the latest snapshot that is copy-complete on all secondary systems in the replication set.• <code>Replication snapshot (Old Common sync point)</code>: For a primary or secondary volume, a common sync point that has been superseded by a new common sync point.• <code>Replication snapshot (Only sync point)</code>: For a primary or secondary volume, the only snapshot that is copy-complete on any secondary system in the replication set.• <code>Replication snapshot (Queued)</code>: For a primary volume, a snapshot associated with a replication operation that is waiting for a previous replication operation to complete.• <code>Replication snapshot (Awaiting replicate)</code>: For a primary volume, a snapshot that is waiting to be replicated to a secondary system.

Name	Type	Description
snapshot-type-numeric	string	Numeric equivalents for snapshot-type values. <ul style="list-style-type: none">• 0x00004000: Standard snapshot• 0x0000b000: Standard snapshot (DRM)• 0x00008000: Replication snapshot• 0x00010000: Replication snapshot (Replicating)• 0x00020000: Replication snapshot (Current sync point)• 0x00040000: Replication snapshot (Common sync point)• 0x00080000: Replication snapshot (Only sync point)• 0x00100000: Replication snapshot (Queued)• 0x00200000: Replication snapshot (Awaiting replicate)• 0x00800000: Replication snapshot (Common sync point)• 0x00000000: N/A
storage-type	string	<ul style="list-style-type: none">• Linear: Linear pool.• Virtual: Virtual pool.
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none">• 0: Linear• 1: Virtual
total-size	uint64	The total size of the snapshot.
total-size-numeric	uint64	Unformatted total-size value in 512-byte blocks.

snapshot-with-retention-tasks

This basetype is used by [show task-details \(Deprecated\) on page 435](#) and [show task-details \(Deprecated\) on page 435](#) for a TakeSnapshot task.

Table 108: snapshot-with-retention-tasks properties

Name	Type	Description
master-volume-name	string	Source volume name.
master-volume-serial	string	Source volume serial number.
snapshot-prefix	string	A label to identify snapshots created by this task.
retention-count	uint32	Number of snapshots to retain with this prefix. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.
last-created	string	<ul style="list-style-type: none">• The name of the last snapshot created by the task.• Blank if the task has not created a snapshot.
snapshot	Embedded; see snap-tasks below .	

snap-tasks

This basetype is used by [show schedules on page 416](#), [show schedule-details \(Deprecated\) on page 416](#), [show task-details \(Deprecated\) on page 435](#), and [show task-details \(Deprecated\) on page 435](#) for a task that has created at least one snapshot.

Table 109: snap-tasks properties

Name	Type	Description
snapshot-name	string	Snapshot name.
snapshot-serial	string	Snapshot serial number.

snmp-parameters

This basetype is used by [show snmp-parameters on page 428](#).

Table 110: snmp-parameters properties

Name	Type	Description
snmp-enabled	string	Shows whether the Simple Network Management Protocol (SNMP) interface is enabled or disabled. <ul style="list-style-type: none"> Disabled: SNMP is disabled. Enabled: SNMP is enabled.
snmp-enabled-numeric	uint32	Numeric equivalents for snmp-enabled values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
snmp-filter	string	Minimum level of events to include for SNMP traps. <ul style="list-style-type: none"> crit: Only critical events are sent as traps. error: Error and critical events are sent as traps. warn: Warning, error, and critical events are sent as traps. info: All events are sent as traps. none: No events are sent as traps and traps are disabled.
snmp-filter-numeric	uint32	Numeric equivalents for snmp-filter values. <ul style="list-style-type: none"> 0: none 1: info 2: error 4: warn 8: crit
snmp-trap-host-1	string	Trap host IP address.
snmp-trap-host-2	string	Trap host IP address.
snmp-trap-host-3	string	Trap host IP address.
snmp-read-community	string	The community string for read-only access. The value is obscured for users having only the <code>monitor</code> role and is shown in clear text for users having the <code>manage</code> role.
snmp-write-community	string	The community string for write access. The value is obscured for users having only the <code>monitor</code> role and is shown in clear text for users having the <code>manage</code> role.

status

This basetype is used by all commands except `exit`, `help`, and `meta`. (`exit` does not provide a response; `help` always prints text; `meta` does not use the status object.)

Table 111: status properties

Name	Type	Description
<code>response-type</code>	string	<ul style="list-style-type: none">• Success: The command succeeded.• Error: The command failed.• Info: The command returned an informational message.
<code>response-type-numeric</code>	uint32	<ul style="list-style-type: none">• 0: Success• 1: Error• 2: Info
<code>response</code>	string	A message stating what the command accomplished, why the command failed, or information about the command's progress.
<code>return-code</code>	sint32	<ul style="list-style-type: none">• 0: The command completed.• <code>-nnnnn</code>: The command failed.
<code>component-id</code>	string	Not used.
<code>time-stamp</code>	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), when the command was issued.
<code>time-stamp-numeric</code>	uint32	Unformatted <code>time-stamp</code> value.

syslog-parameters

This basetype is used by `show syslog-parameters` [on page 430](#).

Table 112: syslog-parameters properties

Name	Type	Description
<code>syslog-host-ip</code>	string	The IP address of the remote syslog server to use for the notifications.

Name	Type	Description
<code>syslog-notification-level</code>	<code>string</code>	Shows the minimum severity for which the system sends notifications: <ul style="list-style-type: none">• <code>crit</code>: Sends notifications for Critical events only.• <code>error</code>: Sends notifications for Error and Critical events.• <code>warn</code>: Sends notifications for Warning, Error, and Critical events.• <code>info</code>: Sends notifications for all events.• <code>none</code>: Disables syslog notification and clears the settings.
<code>syslog-notification-level-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>syslog-notification-level</code> values. <ul style="list-style-type: none">• 0: none• 8: crit• 12: error• 14: warn• 15: info
<code>syslog-host-port</code>	<code>uint32</code>	The port on which the remote syslog facility is expected to listen for notifications.

system

This basetype is used by [show configuration on page 307](#) and [show system on page 431](#).

Table 113: system properties

Name	Type	Description
<code>system-name</code>	<code>string</code>	The name of the storage system. The default is Uninitialized Name.
<code>system-contact</code>	<code>string</code>	The name of the person who administers the system. The default is Uninitialized Contact.
<code>system-location</code>	<code>string</code>	The location of the system. The default is Uninitialized Location.
<code>system-information</code>	<code>string</code>	A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.

Name	Type	Description
midplane-serial-number	string	The serial number of the controller enclosure midplane.
vendor-name	string	The vendor name.
product-id	string	The product model identifier.
product-brand	string	The product brand name.
scsi-vendor-id	string	The vendor name returned by the SCSI INQUIRY command.
scsi-product-id	string	The product identifier returned by the SCSI INQUIRY command.
enclosure-count	uint32	The number of enclosures in the system.
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • N/A • Unknown
health-numeric	uint32	Numeric equivalents for <code>health</code> values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
other-MC-status	string	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none"> • Operational • Not Operational • Not Communicating • Unknown

Name	Type	Description
other-MC-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none"> • 1524: Not Communicating • 3231: Not Operational • 4749: Operational • 1496: Unknown
pfuStatus	string	Shows whether partner firmware update is running on the system, or is idle.
supported-locales	string	Supported display languages: Arabic (ar), Portuguese, (br), English (en), Spanish (es), French (fr), German (de), Italian (it), Japanese (jp), Korean (ko), Dutch (nl), Russian (ru), Chinese-Simplified (zh-s), Chinese-Traditional (zh-t).
current-node-wwn	string	Storage system node World Wide Name (WWNN).
fde-security-status	string	<ul style="list-style-type: none"> • Unsecured: The system has not been secured with a passphrase. • Secured: The system has been secured with a passphrase. • Secured, Lock Ready: The system has been secured and lock keys are clear. The system will become locked after the next power cycle. • Secured, Locked: The system is secured and the disks are locked to data access, preventing their use.
fde-security-status-numeric	uint32	Numeric equivalents for fde-security-status values. <ul style="list-style-type: none"> • 1: Unsecured • 2: Secured • 3: Secured, Lock Ready • 4: Secured, Locked
platform-type	string	Platform type.
platform-type-numeric	uint32	Numeric equivalent for the platform-type value.
platform-brand	string	Platform brand.
platform-brand-numeric	uint32	Numeric equivalent for the platform-brand value.
redundancy-mode	Embedded; see redundancy on page 648 .	

Name	Type	Description
unhealthy-component	Embedded;	see unhealthy-component on page 706 .

system-parameters-table

This basetype is used by [show system-parameters on page 433](#).

Table 114: system-parameters-table properties

Name	Type	Description
ulp-enabled	string	Shows <code>true</code> to indicate that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers. The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can choose any available path to access a LUN regardless of disk group ownership. When ULP is in use, the system's operating/cache-redundancy mode is shown as Active-Active ULP. ULP uses the T10 Technical Committee of INCITS Asymmetric Logical Unit Access (ALUA) extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.
profiles-enabled	string	Shows whether host profiles are enabled. <ul style="list-style-type: none"><code>true</code>: Host profiles are enabled.<code>false</code>: Host profiles are disabled.
max-ports	uint32	Number of host-interface ports in the controller enclosure.
max-drives	uint32	Number of disks that the system supports.
max-volumes	uint32	Number of volumes that the system supports.
max-vdisks	uint32	Number of linear disk groups that the system supports. Not supported.
max-luns	uint32	Number of LUNs that the system supports.
max-owned-arrays-per-controller	uint32	Number of linear disk groups that each controller supports. Not supported.

Name	Type	Description
max-storage-pools-per-controller	uint32	The number of virtual pools that each controller supports. Not supported.
max-components-per-storage-pool	uint32	The number of virtual pools that each pool can contain. Not supported.
max-capi-arrays	uint32	Same as max-vdisks.
max-chunk-size	uint32	Maximum chunk size for disk groups.
min-chunk-size	uint32	Minimum chunk size for disk groups.
physical-position-offset	uint32	Starting index for physical components (enclosures, disks, etc.) in the storage system.
backoff-percentage	uint32	Percentage of disk capacity that is reserved to compensate for minor capacity differences between disk drives so they can be used interchangeably. This is not settable by users.
vdisk-metadata-size-perdisk-blocks	uint32	Amount of space reserved on a disk for metadata, in 512-byte blocks.
vdisk-metadata-size-blocks	uint32	Amount of metadata, in blocks, stored on each disk.
max-host-groups	uint32	The number of host groups that the system supports.
max-hosts-per-host-group	uint32	The maximum number of hosts that a host group can contain.
max-initiator	uint32	The maximum number of initiators that a host can contain.

Name	Type	Description
max-volume-groups-per-controller	uint32	The maximum number of volume groups that each controller supports.
max-volumes-per-volume-group	uint32	The maximum number of volumes that a volume group can contain.
max-replication-sets	uint32	Number of replication sets that the system supports.
max-enclosures	uint32	Number of enclosures that the system supports.
local-controller	string	The ID of the controller you are accessing. <ul style="list-style-type: none"> • A: Controller A. • B: Controller B.
local-controller-numeric	uint32	Numeric equivalents for local-controller values. <ul style="list-style-type: none"> • 0: B • 1: A
serial-number	string	Last six digits of the midplane serial number.
external-targetid-control	string	Not used.
external-targetid-control-numeric	uint32	Not used.
lan-heartbeat	string	Not used.
lan-heartbeat-numeric	uint32	Not used.
ip-address-mode	string	<ul style="list-style-type: none"> • CAPI_TWO_IP_ADDRESSES_MODE: Dual controller system has a unique IP address for each controller. • CAPI_ONE_IP_ADDRESS_MODE: Dual controller system has the same IP address for both controllers, only one active at a time.

Name	Type	Description
ip-address-mode-numeric	uint32	Numeric equivalents for lan-heartbeat values. <ul style="list-style-type: none"> 0: CAPI_TWO_IP_ADDRESSES_MODE 1: CAPI_ONE_IP_ADDRESS_MODE
debug-flags	uint32	For use by service personnel.
enclosure-flags	uint32	For internal use only.
num-global-spare	uint32	Number of global-spare disks defined in the storage system.
dynamic-spare-rescan-rate	uint32	Interval at which the system is scanned for disks automatically designated as spares, if the dynamic spares feature is enabled.
performance-tuning-flags	string	For internal use only.
performance-tuning-flags-numeric	uint32	Numeric equivalents for performance-tuning values. <ul style="list-style-type: none"> 0: Disabled 1: Enabled
min-backing-store-size	uint32	Minimum snap-pool size in blocks. Not applicable.
max-fc-speed	string	Maximum FC host-port speed.
max-fc-speed-numeric	uint32	Numeric equivalent for the max-fc-speed value.
max-iscsi-speed	string	Maximum iSCSI host-port speed.
max-iscsi-speed-numeric	uint32	Numeric equivalent for the max-iscsi-speed value.
max-peers-allowed	uint32	The maximum number of peer connections that the system supports.
peers-in-use-count	uint32	The number of peer connections present in the system.

Name	Type	Description
max-ar-vols-allowed	uint32	The maximum number of virtual replication volumes that the system supports.
ar-sets-in-use-count	uint32	The number of virtual replication volumes present in the system.
linear-replication-configured	string	<ul style="list-style-type: none"> • False: No linear replication sets exist on the system. • True: At least one linear replication set exists on the system.
linear-replication-configured-numeric	uint32	Numeric equivalents for linear-replication-configured values. <ul style="list-style-type: none"> • 0: False • 1: True
virtual-replication-configured	string	<ul style="list-style-type: none"> • False: No virtual replication sets exist on the system. • True: At least one virtual replication set exists on the system.
virtual-replication-configured-numeric	uint32	Numeric equivalents for virtual-replication-configured values. <ul style="list-style-type: none"> • 0: False • 1: True

tasks

This basetype is used by [show task-details \(Deprecated\)](#) on page 435.

Table 115: tasks properties

Name	Type	Description
name	string	Task name.
type	string	Type of operation this task performs. <ul style="list-style-type: none"> • TakeSnapshot • ResetSnapshot • VolumeCopy • ReplicateVolume • EnableDSD • DisableDSD

Name	Type	Description
status	string	Task status. <ul style="list-style-type: none">• Uninitialized: Task is not yet ready to run.• Ready: Task is ready to run.• Active: Task is running.• Error: Task has an error.• Invalid: Task is invalid.• Complete: The task is complete.• Deleted: The task has been deleted.
state	string	Current step of the task. <ul style="list-style-type: none">• For a TakeSnapshot task:<ul style="list-style-type: none">◦ Start◦ VerifyVolume◦ ValidateLicensingLimit◦ CreateName◦ CreateSnap◦ VerifySnap◦ InspectRetention◦ FindOldestSnap◦ UnmapSnap◦ ResetSnap◦ RenameSnap• For a ResetSnapshot task:<ul style="list-style-type: none">◦ Start◦ VerifySnap◦ UnmapSnap◦ ResetSnap

Name	Type	Description
		<p>For a VolumeCopy task:</p> <ul style="list-style-type: none"> • Start • VerifyVolume • CreateName • ObtainMap • UnmapVolume • CreateVolume • RemapVolume • VerifyCreatedVolume <hr/> <ul style="list-style-type: none"> • For a ReplicateVolume task: <ul style="list-style-type: none"> ◦ Start ◦ VerifyVolume ◦ CreateName ◦ RepVolume ◦ VerifySnap <hr/> <ul style="list-style-type: none"> • For a Replicate task: <ul style="list-style-type: none"> ◦ Idle ◦ Replicate ◦ VerifyRunning
error-message	string	<ul style="list-style-type: none"> • If an error occurred while processing the task, the error message. • Blank if no error has occurred.
associated-vdisk-serial	string	For a VolumeCopy task, the serial number of the destination vdisk. Not applicable.
task-details	Embedded; see replicate-volume-tasks on page 655 , reset-snapshot-tasks on page 664 , snap-tasks on page 687 , snapshot-with-retention-tasks on page 686 , volume-copy-tasks on page 724 .	

tier-hist-statistics (QXS-4 and QXS-6 Series Only)

This basetype is used by [show pool-statistics on page 381](#) when the historical parameter is specified.

Table 116: tier-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	Total number of read and write operations since the last sampling time.
number-of-reads	uint64	Number of read operations since the last sampling time.
number-of-writes	uint64	Number of write operations since the last sampling time.
total-data-transferred	uint64	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
data-read	uint64	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted data-written value.
total-iops	uint64	Total number of read and write operations per second since the last sampling time.
read-iops	uint64	Number of read operations per second since the last sampling time.
write-iops	uint64	Number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	Total data transfer rate, in bytes per second, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted total-bytes-per-second value.
read-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for read operations since the last sampling time.

Name	Type	Description
read-bytes-per-sec-numeric	uint64	Unformatted read-bytes-per-second value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.
number-of-allocated-pages	uint64	The number of 4-MB pages allocated to volumes in the pool.
number-of-page-moves-in	uint64	The number of pages moved into this tier from a different tier.
number-of-page-moves-out	uint64	The number of pages moved out of this tier to other tiers.
number-of-page-rebalances	uint64	The number of pages moved between disks in this tier to automatically load balance.
number-of-initial-allocations	uint64	The number of 4-MB pages that are allocated as a result of host writes. This number does not include pages allocated as a result of background tiering page movement. (Tiering moves pages from one tier to another, so one tier will see a page deallocated, while another tier will show pages allocated. These background moves are not considered initial allocations.)
number-of-unmaps	uint64	The number of 4-MB pages that are automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).
number-of-rfc-copies	uint64	The number of 4-MB pages copied from spinning disks to SSD read cache (read flash cache). Not supported.
number-of-zero-pages-reclaimed	uint64	The number of empty (zero-filled) pages that were reclaimed during this sample period.
sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when the data sample was taken.

tier-statistics (QXS-4 and QXS-6 Series Only)

This basetype is used by [show tier-statistics \(QXS-4 and QXS-6 Series Only\) on page 443](#) and [show pool-statistics on page 381](#).

Table 117: tier-statistics properties

Name	Type	Description
serial-number	string	The serial number of the tier or pool.
pool	string	The name of the pool.
tier	string	<ul style="list-style-type: none">• Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).• Performance: The highest storage tier, which uses SSDs (high speed, low capacity).• Read Cache: The tier that provides read cache for a storage pool.• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
tier-numeric	uint32	Numeric equivalents for tier values. <ul style="list-style-type: none">• 0: N/A• 1: Performance• 2: Standard• 4: Archive• 8: Read Cache
pages-alloc-per-minute	uint32	The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.
pages-dealloc-per-minute	uint32	The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data.
pages-reclaimed	uint32	The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).
num-pages-unmap-per-minute	uint32	The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host.
resettable-statistics	Embedded; see resettable-statistics on page 664 .	

tier-summary (QXS-4 and QXS-6 Series Only)

This basetype is used by [show pool-statistics on page 381](#) when the `historical` parameter is specified.

Table 118: tier-summary properties

Name	Type	Description
<code>serial-number</code>	<code>string</code>	The serial number of the pool.
<code>pool</code>	<code>string</code>	The name of the pool.
<code>tier</code>	<code>string</code>	<ul style="list-style-type: none">• Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).• Performance: The highest storage tier, which uses SSDs (high speed, low capacity).• Read Cache: The tier that provides read cache for a storage pool.• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
<code>tier-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>tier</code> values. <ul style="list-style-type: none">• 0: N/A• 1: Performance• 2: Standard• 4: Archive• 8: Read Cache
<code>tier-hist-statistics</code>	Embedded; see tier-hist-statistics (QXS-4 and QXS-6 Series Only) on page 699 .	
<code>readcache-hist-statistics</code>	Embedded; see readcache-hist-statistics on page 647 .	

tiers (QXS-4 and QXS-6 Series Only)

This basetype is used by [show pools on page 378](#) and [show tiers \(QXS-4 and QXS-6 Series Only\) on page 442](#).

Table 119: tiers properties

Name	Type	Description
serial-number	string	The serial number of the tier.
pool	string	The name of the pool.
tier	string	<ul style="list-style-type: none"> Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity). Performance: The highest storage tier, which uses SSDs (high speed, low capacity). Read Cache: The tier that provides read cache for a storage pool. Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).
tier-numeric	uint32	Numeric equivalents for <code>tier</code> values. <ul style="list-style-type: none"> 0: N/A 1: Performance 2: Standard 4: Archive 8: Read Cache
pool-percentage	uint8	The percentage of pool capacity that the tier occupies.
diskcount	uint8	The number of disks in the tier.
raw-size	string	The raw capacity of the disks in the tier, irrespective of space reserved for RAID overhead and so forth, formatted to use the current base, precision, and units.
raw-size-numeric	uint64	Unformatted <code>raw-size</code> value in 512-byte blocks.
total-size	string	The total capacity of the tier.
total-size-numeric	uint64	Unformatted <code>total-size</code> value in 512-byte blocks.
allocated-size	string	The amount of space currently allocated to volumes in the tier.
allocated-size-numeric	uint64	Unformatted <code>allocated-size</code> value in 512-byte blocks.

Name	Type	Description
available-size	string	The available capacity in the tier.
available-size-numeric	uint64	Unformatted <code>available-size</code> value in 512-byte blocks.
affinity-size	uint64	The total size of volumes configured to have affinity for that tier.

time-settings-table

This basetype is used by [show controller-date](#) on page 308.

Table 120: time-settings-table properties

Name	Type	Description
date-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), reported by the controller being accessed.
date-time-numeric	uint32	Unformatted <code>date-time</code> value.
time-zone-offset	string	The system's time zone as an offset in hours and minutes from UTC. This is shown only if NTP is enabled.
ntp-state	string	Shows whether Network Time Protocol (NTP) is in use. <ul style="list-style-type: none">• <code>activated</code>: NTP is enabled.• <code>deactivated</code>: NTP is disabled. This is the default.
ntp-address	string	NTP server IP address, or 0.0.0.0 if not set.

unhealthy-component

This basetype is used by all commands that show component health.

Table 121: unhealthy-component properties

Name	Type	Description
component-type	string	Component type. <ul style="list-style-type: none">• super-cap: Supercapacitor pack• MC: Management Controller• port: Host port• controller: Controller module• expansion module: Expansion module• PSU: Power supply unit• disk: Disk• enclosure: Enclosure• vdisk: Vdisk (v2)• disk group: Disk group (v3)• fan• CompactFlash• disk slot• SAS port• sensor• network port• virtual pool• virtual disk group• volume• snap pool• volume: Source volume• snapshot• host• replication image• replication volume• replication set• volume map• system

Name	Type	Description
component-type-numeric	uint32	<p>Numeric equivalents for component-type values.</p> <ul style="list-style-type: none"> • 0: super-cap • 1: MC • 2: port • 3: controller • 4: expansion module • 5: PSU • 6: disk • 7: enclosure • 8: vdisk (v2) or disk group (v3) • 9: fan • 10: CompactFlash • 11: disk slot • 12: SAS port • 13: sensor • 14: network port • 15: virtual pool • 16: virtual disk group • 17: volume • 18: snap pool • 19: volume (source volume) • 20: snapshot • 21: host • 22: replication image • 23: replication volume • 24: replication set • 25: volume map • 26: system
component-id	string	Component identifier, such as A for controller A.
basetype	string	Component basetype.
primary-key	string	Durable ID of the component.
health	string	<p>Component health.</p> <ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

unwritable-cache

This basetype is used by [show unwritable-cache on page 446](#).

Table 122: unwritable-cache properties

Name	Type	Description
unwritable-a-percentage	uint8	The percentage of cache space occupied by unwritable data in controller A.
unwritable-b-percentage	uint8	The percentage of cache space occupied by unwritable data in controller B.

users

This basetype is used by [show users on page 447](#).

Table 123: users properties

Name	Type	Description
username	string	User name.

Name	Type	Description
roles	string	<ul style="list-style-type: none"> • monitor: User can view but not change system settings. • manage: User can view and change system settings. • admin: User can view and change system settings. • diagnostic: User can view and change system settings.
user-type	string	The user's level of technical expertise: Novice, Standard, Advanced, or Diagnostic. This parameter does not affect access to commands. The default is Standard.
user-type-numeric	string	Numeric equivalents for user-type values. <ul style="list-style-type: none"> • 1: Novice • 2: Standard • 3: Advanced • 4: Diagnostic
user-locale	string	Display language for this user. The default is English.
user-locale-numeric	string	Numeric equivalents for user-locale values. <ul style="list-style-type: none"> • 0: English • 1: Spanish • 2: French • 3: German • 4: Italian • 5: Japanese • 6: Netherlands • 7: Simplified Chinese • 8: Traditional Chinese • 9: Korean • 10: Arabic • 11: Portuguese • 12: Russian
interface-access-WBI	string	<ul style="list-style-type: none"> • x: User can use the web-browser interface (the Disk Management Utility). This is the default. • (blank): User cannot access this interface.
interface-access-CLI	string	<ul style="list-style-type: none"> • x: User can use the command-line interface. • (blank): User cannot access this interface. This is the default.
interface-access-FTP	string	<ul style="list-style-type: none"> • x: User can use the FTP interface. • (blank): User cannot access this interface. This is the default.
interface-access-SMIS	string	<ul style="list-style-type: none"> • x: User can use the Storage Management Initiative Specification (SMI-S) interface. • (blank): User cannot access this interface. This is the default.

Name	Type	Description
interface-access-SNMP	string	<ul style="list-style-type: none"> • U: The user can access the SNMPv3 interface and view the MIB. • T: The user can access the SNMPv3 interface and receive trap notifications. • (blank): User cannot access this interface. This is the default.
storage-size-base	uint8	<p>The base for entry and display of storage-space sizes:</p> <ul style="list-style-type: none"> • 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. • 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default. <p>Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.</p>
storage-size-precision	uint8	The number of decimal places (1–10) for display of storage-space sizes. The default is 1.
storage-size-units	string	<p>The unit for display of storage-space sizes.</p> <ul style="list-style-type: none"> • auto: Lets the system determine the proper unit for a size. This is the default. • MB: Megabytes. • GB: Gigabytes. • TB: Terabytes. <p>Based on the precision setting, if the selected unit is too large to meaningfully display a size, the system uses a smaller unit for that size. For example, if units is set to TB, precision is set to 1, and base is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.</p>
temperature-scale	string	<ul style="list-style-type: none"> • Celsius: Use the Celsius scale to display temperature values. This is the default. • Fahrenheit: Use the Fahrenheit scale to display temperature values.
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).
authentication-type	string	<p>For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.</p> <ul style="list-style-type: none"> • none: No authentication. • MD5: MD5 authentication. This is the default. • SHA: SHA (Secure Hash Algorithm) authentication.

Name	Type	Description
privacy-type	string	For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the <code>privacy-password</code> property and the <code>authentication-type</code> property. <ul style="list-style-type: none">• none: No encryption. This is the default.• DES: Data Encryption Standard.• AES: Advanced Encryption Standard.
password	string	User password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password.
privacy-password	string	Encryption password for an SNMPv3 user whose privacy type is set to DES or AES.
trap-destination	string	For an SNMPv3 user whose <code>interface-access-SNMP</code> property is set to <code>snmptarget</code> , this specifies the IP address of the host that will receive SNMP traps.

vdisk-hist-statistics

This basetype is used by `show vdisk-statistics` [on page 453](#) when the `historical` parameter is specified.

Table 124: vdisk-hist-statistics properties

Name	Type	Description
total-data-transferred	uint64	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted <code>total-data-transferred</code> value.
data-read	uint64	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted <code>data-read</code> value.
data-written	uint64	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted <code>data-written</code> value.

Name	Type	Description
total-bytes-per-sec	uint64	Data transfer rate, in bytes per second, since the last sampling time. This is the sum of <code>read-bytes-per-second</code> and <code>write-bytes-per-second</code> .
total-bytes-per-sec-numeric	uint64	Unformatted <code>total-bytes-per-second</code> value.
read-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for read operations since the last sampling time.
read-bytes-per-sec-numeric	uint64	Unformatted <code>read-bytes-per-second</code> value.
write-bytes-per-sec	uint64	Data transfer rate, in bytes per second, for write operations since the last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted <code>write-bytes-per-second</code> value.
sample-time	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when the data sample was taken.
sample-time-numeric	uint32	Unformatted <code>sample-time</code> value.

vdisk-statistics

This basetype is used by `show vdisk-statistics` [on page 453](#) when the `historical` parameter is omitted.

Table 125: vdisk-statistics properties

Name	Type	Description
name	string	Vdisk name.
serial-number	string	Vdisk serial number.

Name	Type	Description
bytes-per-second	uint64	Data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted <code>bytes-per-second</code> value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted <code>data-read</code> value.
data-written	uint64	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted <code>data-written</code> value.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	uint32	Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.
reset-time	string	Date and time, in the format <code>year-month-day hour:minutes:seconds</code> , when these statistics were last reset, either by a user or by a controller restart.

Name	Type	Description
reset-time-numeric	uint32	Unformatted reset-time value.
start-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.
start-sample-time-numeric	uint32	Unformatted start-sample-time value.
stop-sample-time	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.

versions

This basetype is used by [show configuration on page 307](#), [show versions on page 457](#), and [versions \(Deprecated\) on page 499](#).

Table 126: versions properties

Name	Type	Description
sc-cpu-type	string	Storage Controller processor type.
bundle-version	string	Firmware bundle version.
build-date	string	Firmware bundle build date.
sc-fw	string	Storage Controller firmware version.
sc-baselevel	string	Storage Controller firmware base level.
sc-memory	string	Storage Controller memory-controller FPGA firmware version.

Name	Type	Description
sc-loader	string	Storage Controller loader firmware version.
capi-version	string	Configuration API (CAPI) version.
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
fw-default-platform-brand	string	Default platform brand of the MC firmware.
ec-fw	string	Expander Controller firmware version.
pld-rev	string	Complex Programmable Logic Device (CPLD) firmware version.
prm-version	string	CPLD Power Reset Manager (PRM) version.
hw-rev	string	Controller hardware version.
him-rev	string	Host interface module revision.
him-model	string	Host interface module model.
backplane-type	uint8	Backplane type.
host-channel_revision	uint8	Host interface hardware (chip) version.
disk-channel_revision	uint8	Disk interface hardware (chip) version.
mrc-version	string	Memory Reference Code (MRC) version for Storage Controller boot Flash.
ctk-version	string	<ul style="list-style-type: none">version: Customization Toolkit (CTK) version applied to the system.Not present: No CTK version has been applied to this system.

virtual-disk-summary

This basetype is used by [show vdisk-statistics on page 453](#) when the `historical` parameter is specified.

Table 127: virtual-disk-summary properties

Name	Type	Description
name	string	Vdisk name.
serial-number	string	Vdisk serial number.
vdisk-hist-statistics	Embedded; see vdisk-hist-statistics on page 711 .	

virtual-disks

This basetype is used by [show configuration on page 307](#) and [show vdisks on page 449](#).

Table 128: virtual-disks properties

Name	Type	Description
name	string	Vdisk name.
size	string	Vdisk capacity, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted <code>size</code> value in 512-byte blocks.
freespace	string	Amount of free (available) space in the vdisk, formatted to use the current base, precision, and units.
freespace-numeric	uint32	Unformatted <code>freespace</code> value in 512-byte blocks.
owner	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none">• A: Controller A.• B: Controller B.
owner-numeric	uint32	Numeric equivalents for <code>owner</code> values. <ul style="list-style-type: none">• 0: B• 1: A
preferred-owner	string	Controller that owns the vdisk and its volumes during normal operation. <ul style="list-style-type: none">• A: Controller A.• B: Controller B.

Name	Type	Description
preferred-owner-numeric	uint32	Numeric equivalents for preferred-owner values. <ul style="list-style-type: none"> • 0: B • 1: A
raidtype	string	Vdisk RAID level. <ul style="list-style-type: none"> • NRAID • RAID0 • RAID1 • RAID3 • RAID5 • RAID6 • RAID10 • RAID50
raidtype-numeric	uint32	Numeric equivalents for raidtype values. <ul style="list-style-type: none"> • 0: RAID0 • 1: RAID1 • 3: RAID3 • 5: RAID5 • 6: NRAID • 8: RAID50 • 10: RAID10 • 11: RAID6
storage-type	string	<ul style="list-style-type: none"> • Linear: The disk group acts as a linear pool. • Virtual: The disk group is in a virtual pool.
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"> • 0: Linear • 1: Virtual
diskcount	uint16	Number of disks in the vdisk.
sparecount	uint16	Number of spare disks assigned to the vdisk.
chunksize	string	<ul style="list-style-type: none"> • For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk. • For NRAID and RAID 1, chunk size has no meaning and is therefore shown as not applicable (N/A). • For RAID 50, the vdisk chunk size calculated as: <i>configured-chunk-size</i> x (<i>subvdisk-members</i> - 1). For a vdisk configured to use 64-KB chunk size and 4-disk subvdisks, the value would be 192k (64KB x 3).

Name	Type	Description
status	string	Vdisk status. <ul style="list-style-type: none">• CRIT: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.• DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.• FTDN: Fault tolerant with a down disk. The vdisk is online and fault tolerant, but some of its disks are down.• FTOL: Fault tolerant and online.• MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.• OFFL: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost.• QTCR: Quarantined critical. The vdisk is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID-6 vdisk or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined.• QTDN: Quarantined with a down disk. The RAID-6 vdisk has one inaccessible disk. The vdisk is fault tolerant but degraded. If the inaccessible disks come online or if after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined.• QTOF: Quarantined offline. The vdisk is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 vdisk.• STOP: The vdisk is stopped.• UP: Up. The vdisk is online and does not have fault-tolerant attributes.• UNKN: Unknown.
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none">• 0: FTOL• 1: FTDN• 2: CRIT• 3: OFFL• 4: QTCR• 5: QTOF• 6: QTDN• 7: STOP• 8: MSNG• 9: DMGD• 250: UP• <i>other</i>: UNKN

Name	Type	Description
lun	uint32	Not used.
min-drive-size	string	Minimum disk size that can this vdisk can use, formatted to use the current base, precision, and units.
min-drive-size-numeric	uint32	Unformatted <code>min-drive-size</code> value in 512-byte blocks.
create-date	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the vdisk was created.
create-date-numeric	uint32	Unformatted <code>create-date</code> value.
cache-read-ahead	string	Not used.
cache-read-ahead-numeric	uint32	Not used.
cache-flush-period	uint32	Not used.
read-ahead-enabled	string	Not used.
read-ahead-enabled-numeric	uint32	Not used.
write-back-enabled	string	Not used.
write-back-enabled-numeric	uint32	Not used.
job-running	string	Same as <code>current-job</code> .

Name	Type	Description
current-job	string	<p>Job running on the vdisk, if any.</p> <ul style="list-style-type: none"> • (blank): No job is running. • CPYBK: The vdisk is being used in a copyback operation. • DRSC: A disk is being scrubbed. • EXPD: The vdisk is being expanded. • INIT: The vdisk is initializing. • RCON: The vdisk is being reconstructed. • VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group. • VPREP: The virtual disk group is being prepared for use in a virtual pool. • VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool. • VREMV: The disk group and its data are being removed. • VRFY: The vdisk is being verified. • VRSC: The vdisk is being scrubbed.
current-job-numeric	uint32	<p>Numeric equivalents for current-job values.</p> <ul style="list-style-type: none"> • 0: (blank) • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC • 9: VREMV • 11: CPYBK • 12: VPREP • 13: VDRAIN • 14: VRECV
current-job-completion	string	<ul style="list-style-type: none"> • 0%–99%: Percent complete of running job. • (blank): No job is running (job has completed).
num-array-partitions	uint32	Number of volumes in the vdisk.
largest-free-partition-space	string	The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.

Name	Type	Description
largest-free-partition-space-numeric	uint32	Unformatted largest-free-partition-space value in 512-byte blocks.
num-drives-per-low-level-array	uint8	<ul style="list-style-type: none"> For a RAID-10 or RAID-50 vdisk, the number of disks in each sub-vgdisk. For other RAID levels, 1.
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.
new-partition-lba	string	Maximum number of 512-byte blocks that could be allocated to a newly created volume. The value is formatted to use the current base, precision, and units. Expanding a volume in the same vdisk will reduce this amount.
new-partition-lba-numeric	uint32	Unformatted new-partition-lba value in 512-byte blocks.
array-drive-type	string	Type of disks used in the vdisk. <ul style="list-style-type: none"> SAS: Enterprise SAS. SAS MDL: Midline SAS. sSAS: SAS SSD. MIX: Mixture of enterprise SAS and midline SAS disks.
array-drive-type-numeric	uint32	Numeric equivalents for array-drive-type values. <ul style="list-style-type: none"> 1: MIX 4: SAS 8: sSAS 11: SAS MDL
is-job-auto-abortable	string	<ul style="list-style-type: none"> false: The current job must be manually aborted before you can delete the vdisk. true: The current job will automatically abort if you delete the vdisk.
is-job-auto-abortable-numeric	uint32	Numeric equivalents for is-job-auto-abortable values. <ul style="list-style-type: none"> 0: false 1: true
serial-number	string	Vdisk serial number.
blocks	uint64	Unformatted size value in 512-byte blocks.

Name	Type	Description
disk-dsd- enable-vdisk	string	<ul style="list-style-type: none"> • Disabled: DSD is disabled for the vdisk. This is the default. • Enabled - all spinning: DSD is enabled for the vdisk. • Partial spin-down: DSD is enabled for the vdisk and its disks are partially spun down to conserve power. • Full spin-down: DSD is enabled for the vdisk and its disks are fully spun down to conserve power.
disk-dsd- enable-vdisk- numeric	uint32	<p>Numeric equivalents for disk-dsd-enable-vdisk values.</p> <ul style="list-style-type: none"> • 0: Disabled • 1: Enabled - all spinning • 2: Partial spin-down • 3: Full spin-down
disk-dsd- delay-vdisk	uint32	The period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled.
scrub- duration-goal	uint16	The desired duration of a vdisk scrub operation, in hours. A value of 0 indicates that the scrub duration is not intended to be controlled.
scrub- duration-goal	uint16	Not applicable.
pool-sector- format	string	<p>The sector format of disks in the disk group.</p> <ul style="list-style-type: none"> • 512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes. • 512e: All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries. • Mixed: The disk group contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different rotational speed or sector size types (512n, 512e).
pool-sector- format-numeric	uint32	<p>Numeric equivalents for pool-sector-format values.</p> <ul style="list-style-type: none"> • 0: 512n • 1: 512e • 3: Mixed

Name	Type	Description
health	string	<ul style="list-style-type: none">• OK• Degraded• Fault• Unknown• N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none">• 0: OK• 1: Degraded• 2: Fault• 3: Unknown• 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
unhealthy-component		Embedded; see unhealthy-component on page 706 .

volume-copy-status

This basetype is used by [show volumecopy-status on page 458](#).

Table 129: volume-copy-status properties

Name	Type	Description
vc_ volume_ name	string	Destination volume name.
serial- number	string	Destination volume serial number.
pool	string	Pool name.
virtual- disk- name	string	Destination vdisk name.

Name	Type	Description
source-volume	string	Source volume name.
progress	string	Percent complete of the volume copy (0%–99%).
status	string	<ul style="list-style-type: none">VC Online: A volume copy is in progress to the destination volume.VC Offline: The source volume went offline while a volume copy was in progress. When the source volume comes back online, the copy process resumes from the point where it stopped.Unknown: Status is unknown.
status-numeric	uint32	Numeric equivalents for <code>status</code> values. <ul style="list-style-type: none">0: VC Online1: VC Offline2: Unknown
status-reason	string	More information about the <code>status</code> value.

volume-copy-tasks

This basetype is used by [show task-details \(Deprecated\) on page 435](#) and [show task-details \(Deprecated\) on page 435](#) for a VolumeCopy task.

Table 130: volume-copy-tasks properties

Name	Type	Description
source-volume-name	string	Source volume name.
source-volume-serial	string	Source volume serial number.
destination-vdisk-name	string	Destination vdisk name.
destination-pool-name	string	The name of the vdisk or pool in which the new volume will be created.
destination-vdisk-serial	string	Destination vdisk serial number.
destination-pool-serial	string	The serial number of the destination vdisk or pool.

Name	Type	Description
destination-volume-prefix	string	Label that identifies copies created by this task.
include-modified-data	string	<ul style="list-style-type: none">modified: The copy includes modified snapshot data.preserved: The copy excludes modified snapshot data.
last-created	string	<ul style="list-style-type: none">The name of the last snapshot created by the task.Blank if the task has not created a snapshot.

volume-groups

This basetype is used by [show volume-groups on page 461](#).

Table 131: volume-group properties

Name	Type	Description
durable-id	string	Volume group ID.
group-name	string	The name of the volume group in the format <i>volume-group.*</i> , where * represents all volumes in the group.
serial-number	string	The serial number of the volume group.
type	string	The group type, which is <code>Volume</code> .
member-count	uint32	The number of volumes in the volume group.
replication-set-serial	string	The serial number of the replication set.
volumes	Embedded; see volumes on page 729 .	

volume-group-view

This basetype is used by [show maps on page 368](#) if volume groups exist.

Table 132: volume-group-view properties

Name	Type	Description
durable-id	string	Volume group ID.
serial-number	string	The serial number of the volume group.
group-name	string	The name of the volume group in the format <i>volume-group.*</i> , where the * represents all volumes in the group.
volume-view-mappings	Embedded;	see volume-view-mappings on page 741 .

volume-group-view-mappings

This basetype is used by [show maps on page 368](#).

Table 133: volume-group-view-mappings properties

Name	Type	Description
durable-id	string	Mapping ID.
parent-id	string	For a mapping between a volume and an initiator, the volume ID — or if the volume is a member of a volume group, the volume-group ID.
mapped-id	string	The ID of the mapping target, such as an initiator.
ports	string	<ul style="list-style-type: none">• The controller host ports to which the mapping applies.• Blank if not mapped or mapped as <code>no-access</code>.
access	string	Type of host access to the volume. <ul style="list-style-type: none">• <code>read-write</code>: Read and write.• <code>read-only</code>: Read only.• <code>no-access</code>: No access (masked).• <code>not-mapped</code>: Not mapped.
initiator-id	string	<ul style="list-style-type: none">• For an FC initiator, its WWPN.• For a SAS initiator, its WWPN.• For an iSCSI initiator, its node name (typically the IQN).• <code>all other initiators</code>: The volume's default mapping.

Name	Type	Description
nickname	string	<ul style="list-style-type: none">• For a host, its name in the format host-name.*, where the * represents all initiators in the host.• For a host group, its name in the format host-group.*.*, where the first * represents all hosts in the host group and the second * represents all initiators in those hosts.• Blank if not set or for all other initiators.
host-profile	string	<ul style="list-style-type: none">• Standard: Default profile.• HP-UX: The host uses Flat Space Addressing.
lun-view	Embedded;	see volume-view-mappings on page 741 .

volume-names

This basetype is used by [show volume-maps \(Deprecated\) on page 463](#).

Table 134: volume-names properties

Name	Type	Description
volume-name	string	Volume name.
serial-number	string	Volume serial number.

volume-reservations

This basetype is used by [show volume-reservations on page 465](#).

Table 135: volume-reservations properties

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.

Name	Type	Description
reservation-active	string	<ul style="list-style-type: none"> Free: The volume is not reserved. Reserved: The volume has been reserved by a host.
reservation-active-numeric	uint32	Numeric equivalents for reservation-active values. <ul style="list-style-type: none"> 0: Free 1: Reserved
pgr-generation	uint32	The generation of the volume reservation, shown as a hexadecimal value.
host-id	string	Host WWPN or iSCSI node name.
port	string	The controller host-port identifiers.
reserve-key	string	The reservation key, shown as a hexadecimal value.
reserve-scope	string	The reservation scope, Logical Unit.
reserve-scope-numeric	uint32	Numeric equivalents for reserve-scope values. <ul style="list-style-type: none"> 0: Logical Unit
reserve-type	string	The reservation type. <ul style="list-style-type: none"> Undefined: The volume has no persistent reservations. Write Exclusive: Write commands are only allowed for a single reservation holder. Exclusive Access: Certain access (read, write) commands are only allowed for a single reservation holder. Write Exclusive - Registrants Only: Write commands are only allowed for registered hosts. There is a single reservation holder. Exclusive Access - Registrants Only: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder. Write Exclusive - All Registrants: Write commands are only allowed for registered hosts. There is a single reservation holder. Exclusive Access - All Registrants: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.

Name	Type	Description
reserve-type-numeric	uint32	Numeric equivalents for reserve-type values. <ul style="list-style-type: none">• 0: Undefined• 1: Write Exclusive• 3: Exclusive Access• 5: Write Exclusive - Registrants Only• 6: Exclusive Access - Registrants Only• 7: Write Exclusive - All Registrants• 8: Exclusive Access - All Registrants

volumes

This basetype is used by [show volumes on page 467](#) and [show volume-groups on page 461](#).

Table 136: volumes properties

Name	Type	Description
durable-id	string	Volume ID in the form v#, where # starts at 1 and increments for each new volume to uniquely identify it. The value is generated from available data in the current CLI session and may change after an MC restart.
virtual-disk-name	string	The name of the vdisk or pool that contains the volume.
storage-pool-name	string	The name of the vdisk or pool that contains the volume.
volume-name	string	Volume name.
size	string	Volume capacity, formatted to use the current base, precision, and units.
size-numeric	uint32	Unformatted size value in 512-byte blocks.
total-size	string	The total size of the volume.
total-size-numeric	uint32	Unformatted total-size value in 512-byte blocks.
allocated-size	string	The amount of space currently allocated to a virtual volume, or the total size of a linear volume.

Name	Type	Description
<code>allocated-size-numeric</code>	<code>uint32</code>	Unformatted <code>allocated-size</code> value in 512-byte blocks.
<code>storage-type</code>	<code>string</code>	<ul style="list-style-type: none"> <code>Linear</code>: The volume is in a linear pool. <code>Virtual</code>: The volume is in a virtual pool.
<code>storage-type-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>storage-type</code> values. <ul style="list-style-type: none"> <code>0</code>: <code>Linear</code> <code>1</code>: <code>Virtual</code>
<code>preferred-owner</code>	<code>string</code>	Controller that owns the volume during normal operation. <ul style="list-style-type: none"> <code>A</code>: Controller A. <code>B</code>: Controller B.
<code>preferred-owner-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>preferred-owner</code> values. <ul style="list-style-type: none"> <code>0</code>: <code>B</code> <code>1</code>: <code>A</code>
<code>owner</code>	<code>string</code>	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> <code>A</code>: Controller A. <code>B</code>: Controller B.
<code>owner-numeric</code>	<code>uint32</code>	Numeric equivalents for <code>owner</code> values. <ul style="list-style-type: none"> <code>0</code>: <code>B</code> <code>1</code>: <code>A</code>
<code>serial-number</code>	<code>string</code>	Volume serial number.
<code>write-policy</code>	<code>string</code>	<ul style="list-style-type: none"> <code>write-back</code>: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. This is the default. <code>write-through</code>: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

Name	Type	Description
write-policy-numeric	uint32	<p>Numeric equivalents for write-policy values.</p> <ul style="list-style-type: none"> 0: write-through 1: write-back
cache-optimization	string	<ul style="list-style-type: none"> standard: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default. no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost. atomic-write: This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
cache-optimization-numeric	uint32	<p>Numeric equivalents for cache-optimization values.</p> <ul style="list-style-type: none"> 0: standard 2: no-mirror 3: atomic-write
read-ahead-size	string	<p>The volume's read-ahead cache setting.</p> <ul style="list-style-type: none"> Disabled: Read-ahead is disabled. Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload. Stripe: Read-ahead is set to one stripe. The controllers treat NRAID and RAID-1 disk groups internally as if they have a stripe size of 512 KB, even though they are not striped. 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.

Name	Type	Description
read-ahead-size-numeric	uint32	<p>Numeric equivalents for <code>read-ahead-size</code> values.</p> <ul style="list-style-type: none"> -2: Stripe -1: Adaptive 0: Disabled 524288: 512 KB 1048576: 1 MB 2097152: 2 MB 4194304: 4 MB 8388608: 8 MB 16777216: 16 MB 33554432: 32 MB -2147483648: Maximum
volume-type	string	<ul style="list-style-type: none"> base: Base volume standard: Standard volume. standard*: Destination of an in-progress volume copy and cannot be mounted until the copy is complete. snap-pool: Snap-pool volume. master volume: Master volume. snapshot: Snapshot volume. replication source: Source for an in-progress replication to a secondary volume.
volume-type-numeric	uint32	<p>Numeric equivalents for <code>volume-type</code> values.</p> <ul style="list-style-type: none"> 0: standard 1: snap-pool 2: master volume 3: snapshot 4: standard* 8: replication source 15: base
volume-class	string	<ul style="list-style-type: none"> standard: Standard volume, not enabled for snapshots. PTSNAP: Snapshot-related volume such as a master volume, snap pool, or snapshot. Proxy: Destination of an in-progress replication from a remote volume, which when complete will change to type snapshot.
volume-class-numeric	uint32	<p>Numeric equivalents for <code>volume-class</code> values.</p> <ul style="list-style-type: none"> 0: standard 1: PTSNAP 3: Proxy

Name	Type	Description
tier-affinity	string	<ul style="list-style-type: none"> • No Affinity: This setting uses the highest available performing tiers first and only uses the Archive tier when space is exhausted in the other tiers. Volume data will swap into higher performing tiers based on frequency of access and tier space availability. This is the default. • Archive: This setting prioritizes the volume data to the least performing tier available. Volume data can move to higher performing tiers based on frequency of access and available space in the tiers. • Performance: This setting prioritizes volume data to the higher performing tiers. If no space is available, lower performing tier space is used. Performance affinity volume data will swap into higher tiers based upon frequency of access or when space is made available.
tier-affinity-numeric	uint32	<p>Numeric equivalents for tier-affinity values.</p> <ul style="list-style-type: none"> • 0: No Affinity • 1: Archive • 2: Performance
snapshot	string	Shows whether the volume is a snapshot.
snapshot-retention-priority	string	<p>The retention priority for snapshots of the volume.</p> <ul style="list-style-type: none"> • never-delete: Snapshots will never be deleted. • high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted. • medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default. • low: Snapshots may be deleted. <p>Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.</p>
snapshot-retention-priority-numeric	uint32	<p>Numeric equivalents for retention-priority values.</p> <ul style="list-style-type: none"> • 0: never-delete • 1: high • 2: medium • 3: low

Name	Type	Description
volume-qualifier	string	<ul style="list-style-type: none"> • N/A: Non-replication-specific volume such as a standard volume, master volume, snapshot, or snap pool. Not applicable. • RSR: Replication-specific volume, such as a primary volume, secondary volume, replication snapshot, or replication image. • RSR (DRM Promoted Secondary): During an actual site failover (not a test failover), the replication set's primary and secondary volumes are shown as primary volumes with a primary-volume conflict. This qualifier enables host-based Storage Replication Adapter (SRA) software to determine which volume is the failed-over secondary volume for disaster recovery management (DRM). If both systems are online and the communication link between them is up, both systems will show similar information. When the SRA completes a restore-replication or reverse-replication operation, this volume will be shown with the RSR qualifier.
volume-qualifier-numeric	uint32	Numeric equivalents for volume-qualifier values. <ul style="list-style-type: none"> • 0: N/A • 2: RSR • 6: RSR (DRM Promoted Secondary)
blocks	uint64	Unformatted size value in 512-byte blocks.
capabilities	string	For internal use only.
volume-parent	string	Parent volume serial number. For example, the serial number of a snapshot's master volume.
snap-pool	string	Snap pool serial number. Not applicable.
replication-set	string	Replication set serial number. Not applicable.
attributes	string	Shows whether the volume's disks are single pathed.
virtual-disk-serial	string	Disk group serial number.
volume-description	string	<ul style="list-style-type: none"> • For HP-UX, a text value (set in-band by a host application) that identifies the volume. • Blank by default.
wwn	string	World Wide Name of the volume, used by host-based Storage Replication Adapter (SRA) software to identify the volume.
progress	string	For a volume-copy operation, the percent complete (0%–99%).

Name	Type	Description
progress-numeric	uint32	Unformatted <code>progress</code> value.
container-name	string	Name of the vdisk or pool that contains the volume.
container-serial	string	Serial number of the vdisk or pool that contains the volume.
allowed-storage-tiers	string	Not applicable.
allowed-storage-tiers-numeric	uint32	Not applicable.
threshold-percent-of-pool	string	For internal use only.
reserved-size-in-pages	uint32	For internal use only.
allocate-reserved-pages-first	string	For internal use only.
allocate-reserved-pages-first-numeric	uint32	For internal use only.
zero-init-page-on-allocation	string	For internal use only.
zero-init-page-on-allocation-numeric	uint32	For internal use only.

Name	Type	Description
raidtype	string	<p>Disk group RAID level.</p> <ul style="list-style-type: none"> • NRAID • RAID0 • RAID1 • RAID3 • RAID5 • RAID6 • RAID10 • RAID50
raidtype-numeric	string	<p>Numeric equivalents for <code>raidtype</code> values.</p> <ul style="list-style-type: none"> • 0: RAID0 • 1: RAID1 • 3: RAID3 • 5: RAID5 • 6: NRAID • 8: RAID50 • 10: RAID10 • 11: RAID6
pi-format	string	Not applicable.
pi-format-numeric	string	Not applicable.
cs-replication-role	string	<ul style="list-style-type: none"> • Copy Source: The volume is the source for a volume copy operation. • Copy Destination: The volume is the destination for a volume copy operation. • Primary: The volume is the primary volume in a replication set. • Secondary: The volume is the secondary volume in a replication set. • (blank): Not applicable.
cs-copy-dest	string	<ul style="list-style-type: none"> • Off: Not applicable. • On: The volume is the destination for a volume copy operation.
cs-copy-dest-numeric	string	<p>Numeric equivalents for <code>cs-copy-dest</code> values.</p> <ul style="list-style-type: none"> • 0: Off • 1: On
cs-copy-src	string	<ul style="list-style-type: none"> • Off: Not applicable. • On: The volume is the source for a volume copy operation.

Name	Type	Description
cs-copy-src-numeric	string	Numeric equivalents for cs-copy-src values. <ul style="list-style-type: none"> • 0: Off • 1: On
cs-primary	string	<ul style="list-style-type: none"> • Off: Not applicable. • On: The volume is the primary volume in a replication set.
cs-primary-numeric	string	Numeric equivalents for cs-primary values. <ul style="list-style-type: none"> • 0: Off • 1: On
cs-secondary	string	<ul style="list-style-type: none"> • Off: Not applicable. • On: The volume is the secondary volume in a replication set.
cs-secondary-numeric	string	Numeric equivalents for cs-secondary values. <ul style="list-style-type: none"> • 0: Off • 1: On
health	string	<ul style="list-style-type: none"> • OK • Degraded • Fault • Unknown • N/A
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
volume-group	string	If the volume is in a volume group, the name of the group. Otherwise, UNGROUPEDVOLUMES.
group-key	string	If the volume is in a volume group, the durable ID of the volume group. Otherwise, VGU.

volume-statistics

This basetype is used by [show volume-statistics on page 471](#).

Table 137: volume-statistics properties

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.
bytes-per-second	uint64	The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	uint64	Unformatted bytes-per-second value.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	The number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	The number of write operations since these statistics were last reset or since the controller was restarted.
data-read	uint64	The amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	uint64	Unformatted data-read value.
data-written	uint64	The amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	uint64	Unformatted data-written value.
allocated-pages	uint32	The number of pages allocated to the volume.

Name	Type	Description
percent-tier-ssd	uint16	The percentage of volume capacity occupied by data in the Performance tier. Not applicable.
percent-tier-sas	uint16	The percentage of volume capacity occupied by data in the Standard tier.
percent-tier-sata	uint16	The percentage of volume capacity occupied by data in the Archive tier.
percent-allocated-rfc	uint16	The percentage of volume capacity occupied by data in read cache. Not applicable.
pages-alloc-per-minute	uint32	The average number of pages being allocated to the volume each minute.
pages-dealloc-per-minute	uint32	The average number of pages being deallocated from the volume each minute.
shared-pages	uint32	The number of pages that are shared between this volume and any other volumes. This amount of storage will not be deallocated if the volume is deleted.
write-cache-hits	uint64	For the controller that owns the volume, the number of times the block written to is found in cache.
write-cache-misses	uint64	For the controller that owns the volume, the number of times the block written to is not found in cache.
read-cache-hits	uint64	For the controller that owns the volume, the number of times the block to be read is found in cache.
read-cache-misses	uint64	For the controller that owns the volume, the number of times the block to be read is not found in cache.
small-destages	uint64	The number of times flush from cache to disk is not a full stripe.
full-stripe-write-destages	uint64	The number of times flush from cache to disk is a full stripe.

Name	Type	Description
read-ahead-operations	uint64	The number of read pre-fetch or anticipatory-read operations.
write-cache-space	uint16	The cache size used on behalf of this volume.
write-cache-percent	uint32	The percentage of cache used on behalf of this volume.
reset-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	uint32	Unformatted <code>reset-time</code> value.
start-sample-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values.
start-sample-time-numeric	uint32	Unformatted <code>start-sample-time</code> value.
stop-sample-time	string	The date and time, in the format <i>year-month-day hour:minutes:seconds</i> , when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values.
stop-sample-time-numeric	uint32	Unformatted <code>stop-sample-time</code> value.

volume-view

This basetype is used by [show maps on page 368](#) and [show volume-maps \(Deprecated\) on page 463](#).

Table 138: volume-view properties

Name	Type	Description
durable-id	string	Volume ID in the form v#, where # starts at 1 and increments for each new volume to uniquely identify it. The value is generated from available data in the current CLI session and may change after an MC restart.
volume-serial	string	The serial number of the volume.
volume-name	string	Volume name.
volume-view-mappings	Embedded;	see volume-view-mappings below .

volume-view-mappings

This basetype is used by [show maps on page 368](#) and [show volume-maps \(Deprecated\) on page 463](#).

Table 139: volume-view-mappings properties

Name	Type	Description
durable-id	string	Mapping ID.
parent-id	string	For a mapping between a volume and an initiator, the volume ID—or if the volume is a member of a volume group, the volume-group ID.
mapped-id	string	The ID of the mapping target, such as an initiator.
ports	string	<ul style="list-style-type: none">• The controller host ports to which the mapping applies.• Blank if not mapped or mapped as <code>no-access</code>.
lun	string	<ul style="list-style-type: none">• The LUN that identifies the volume to a host.• For a volume group, * means multiple LUNs are represented in the group.• Blank if not mapped or mapped as <code>no-access</code>.

Name	Type	Description
access	string	Type of host access to the volume. <ul style="list-style-type: none"> • read-write: Read and write. This is the default. • read-only: Read only. • no-access: No access (masked). • not-mapped: Not mapped.
access-numeric	uint32	Numeric equivalents of access values. <ul style="list-style-type: none"> • 0: not-mapped • 1: no-access • 2: read-only • 3: read-write
identifier	string	<ul style="list-style-type: none"> • For an FC initiator, its WWPN. • For a SAS initiator, its WWPN. • For an iSCSI initiator, its node name (typically the IQN). • all other initiators: The volume's default mapping.
nickname	string	<ul style="list-style-type: none"> • For a host, its name in the format host-name.*, where the * represents all initiators in the host. • For a host group, its name in the format host-group.*.*, where the first * represents all hosts in the host group and the second * represents all initiators in those hosts. • Blank if not set or for all other initiators.
host-profile	string	<ul style="list-style-type: none"> • Standard: Default profile. • HP-UX: The host uses Flat Space Addressing.
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <p>Table Cell Outside Table:</p> <ul style="list-style-type: none"> • 0: Standard • 1: HP-UX



Chapter 9: Settings Changed By Restore Defaults

This chapter contains the following topics:

Settings Changed By Restore Defaults 743

Settings Changed By Restore Defaults

This appendix summarizes the system settings that result from using the [restore defaults on page 187](#) command.

Table 140: Settings changed by restore defaults

Setting	Value
System information settings:	
• System name	Uninitialized Name
• System contact	• Uninitialized Contact
• System location	• Uninitialized Location
• System information	• Uninitialized Info

Setting	Value
Management protocols settings:	
• CLI/Telnet	• Enabled
• CLI/SSH	• Enabled
• FTP	• Enabled
• SNMP	• Enabled
• WBI/HTTP	• Disabled
• WBI/HTTPS	• Enabled
• SMI-S	• Enabled
• Unsecure SMI-S	• Disabled
• Debug	• Disabled
• In-band SES	• Enabled
• Activity Progress Reporting	• Disabled
Users	All configured users are deleted and replaced with default user definitions and default settings: <ul style="list-style-type: none"> • User: manage; password: !manage • User: monitor; password: !monitor • User: ftp; password: !ftp • Temperature scale: Celsius • Timeout: 30 minutes
CLI/Telnet timeout	30 minutes
Tasks and schedules	(preserved) ¹
Remote system definitions	(preserved) ²
Management Controller debug logs	(preserved) ³
Storage Controller event logs	(preserved)
Time/date and NTP settings	(preserved) ⁴
Network IP settings	(preserved) ⁵

¹Factory default: no tasks or schedules.

²Factory default: no remote system definitions.

³Factory default: MC logs are cleared.

⁴Factory default: NTP is disabled; NTP host IP address is 0.0.0.0; NTP offset is 0.

⁵Factory default: IP address mode is manual; controller A IP is 10.0.0.2; controller B IP is 10.0.0.3; subnet mask is 255.255.255.0; gateway IP is 10.0.0.1.

Setting	Value
SNMP settings:	
• SNMP	• Disabled
• SNMP trap notification level	• none
• SNMP trap host IPs	• 0.0.0.0
• SNMP read community	• public
• SNMP write community	• private
SMTP settings:	
• Email notification	• Disabled
• Email notify filter	• (none)
• Email addresses	• (none)
• Email server	• (none)
• Email domain	• (none)
• Email sender	• (none)
• Log destination	• (none)
• Include logs	• Disabled
SSL/SSH certificates	(preserved) ¹
Licenses	(preserved)
Disk group metadata	(preserved)
Host port settings:	
• FC link speed	• Auto
• FC topology	• Point-to-point
• SAS fan-out cable support	• Disabled
Host names and profiles	(preserved) ²
Drive spin down	Disabled
Advanced settings:	

¹Factory default: certificates are initialized.

²Factory default: host names and profiles are cleared.

Setting	Value
<ul style="list-style-type: none"> • Disk group background scrub (v3) • Disk group background scrub interval (v3) • Vdisk background scrub (v2) • Vdisk background scrub interval (v2) 	<ul style="list-style-type: none"> • Disabled • 24 hours • High • (preserved)¹
<ul style="list-style-type: none"> • Partner firmware upgrade • Utility priority • SMART • Dynamic spare configuration • Enclosure polling rate • Host control of caching • Sync cache mode • Independent Cache mode • Missing LUN response • Controller failure • Supercap failure • CompactFlash failure • Power supply failure • Fan failure • Temperature exceeded • Partner notify • Auto write back • Inactive drive spin down • Inactive drive spin down delay • Disk background scrub • Managed logs • Single controller mode • Auto stall recovery • Restart on CAPI fail • Large pools 	<ul style="list-style-type: none"> • Enabled • 24 hours • Enabled • Disabled • 5 seconds • Disabled • Immediate • Disabled • Not Ready • Disabled • Enabled • Enabled • Disabled • Disabled • Disabled • Disabled • Disabled • Disabled • 15 minutes • Disabled • Disabled • Disabled • Disabled • Enabled • Disabled • Disabled
FDE settings (QXS-4 and QXS-6 Series)	(preserved)

¹Factory default: no action for all disks.



Glossary

2U12	An enclosure that is two rack units in height and can contain 12 disks.
2U24	An enclosure that is two rack units in height and can contain 24 disks.
2U48	An enclosure that is two rack units in height and can contain 48 disks.
4U56	An enclosure that is four rack units in height and can contain 56 disks.
Additional Sense Code/Additional Sense Code Qualifier	See ASC/ASCQ.
Advanced Encryption Standard	See AES.
AES	Advanced Encryption Standard. A specification for the encryption of data using a symmetric-key algorithm.
Air Management Sled	See AMS.
Air Management Solution	See AMS.
allocated page	A page of storage-pool space that has been allocated to a volume to store data.
allocation rate	The rate, in pages per minute, at which a pool is allocating pages to its volumes because they need more space to store data.
ALUA	Asymmetric Logical Unit Access.

AMS	For a 2U12 or 2U24 enclosure, Air Management Sled. A drive blank designed to fill an empty disk slot in an enclosure to maintain optimum airflow through the chassis. For a 2U48 enclosure, Air Management Solution. A plastic insert designed to fill an empty disk bay (four disk slots) within a drawer to maintain optimum airflow through the chassis.
array	See storage system.
ASC/ASCQ	Additional Sense Code/Additional Sense Code Qualifier. Information on sense data returned by a SCSI device.
ATS	Automated tiered storage. A paged-storage feature that automatically uses the appropriate tier of disks to store data based on how frequently the data is accessed. This enables higher-cost, higher-speed disks to be used only for frequently needed data, while infrequently needed data can reside in lower-cost, lower-speed disks.
automated tiered storage	See ATS.
auto-write-through	See AWT.
available disk	A disk that is not a member of a disk group, is not configured as a spare, and is not in the leftover state. It is available to be configured as a part of a disk group or as a spare. See <i>also</i> compatible disk, dedicated spare, dynamic spare, and global spare.
AWT	Auto-write-through. A setting that specifies when the RAID controller cache mode automatically changes from write-back to write-through.
base volume	A virtual volume that is not a snapshot of any other volume, and is the root of a snapshot tree.
CAPI	Configuration Application Programming Interface. A proprietary protocol used for communication between the Storage Controller and the Management Controller in a controller module. CAPI is always enabled.
CHAP	Challenge-Handshake Authentication Protocol.
chassis	The sheetmetal housing of an enclosure.
child volume	The snapshot of a parent volume in a snapshot tree.
chunk size	The amount of contiguous data that is written to a disk group member before moving to the next member of the disk group.
CIM	Common Information Model. The data model for WBEM. It provides a common definition of management information for systems, networks, applications and services, and allows for vendor extensions.
CIM Query Language	See CQL.
CIMOM	Common Information Model Object Manager. A component in CIM that handles the interactions between management applications and providers.
CNC	Converged Network Controller. A controller module whose host ports can be set to operate in FC or iSCSI mode, using qualified SFP and cable options. Changing the host-port mode is also known as changing the ports' personality.
comma separated values	See CSV.
Common Information Model	See CIM.

Common Information Model Object Manager	See CIMOM.
compatible disk	A disk that can be used to replace a failed member disk of a disk group because it both has enough capacity and is of the same type (enterprise SAS, for example) as the disk that failed. See <i>also</i> available disk, dedicated spare, dynamic spare, and global spare.
complex programmable logic device	See CPLD.
Configuration Application Programming Interface	See CAPI.
controller A (or B)	A short way of referring to controller module A (or B).
controller enclosure	An enclosure that contains one or two controller modules.
controller module	A FRU that contains the following subsystems and devices: a Storage Controller processor; a Management Controller processor; a SAS expander and Expander Controller processor; management interfaces; cache protected by a supercapacitor pack and nonvolatile memory (CompactFlash); host, expansion, network, and service ports; and midplane connectivity.
converged network controller	See CNC.
Coordinated Universal Time	See UTC.
CPLD	Complex programmable logic device. An electronic component used to build reconfigurable digital circuits. It can replace large numbers of logic gates.
CQL	CIM Query Language.
CRC	Cyclic Redundancy Check. A mathematical algorithm that, when implemented in software or hardware, can be used to detect errors in data.
CSV	Comma separated values. A format to store tabular data in plain-text form.
Cyclic Redundancy Check	See CRC.
DAS	Direct Attached Storage. A dedicated storage device that connects directly to a host without the use of a switch.
Data Encryption Standard	See DES.
deallocation rate	The rate, in pages per minute, at which a pool is deallocating pages from its volumes because they no longer need the space to store data.
dedicated spare	A disk that is reserved for use by a specific linear disk group to replace a failed disk. See <i>also</i> available disk, compatible disk, dynamic spare, and global spare.
default mapping	Host-access settings that apply to all initiators that are not explicitly mapped to that volume using different settings. See <i>also</i> explicit mapping and masking.
DES	Data Encryption Standard. An algorithm for the encryption of electronic data.

DHCP	Dynamic Host Configuration Protocol. A network configuration protocol for hosts on IP networks.
Direct Attached Storage	See DAS.
disk group	A set of disk drives that is configured to use a specific RAID type and provides storage capacity for a pool. See <i>also</i> linear disk group and virtual disk group.
Distributed Management Task Force	See DMTF.
DMTF	Distributed Management Task Force. An industry organization that develops and maintains standards for system management.
drain	Moving active volume data from a virtual disk group to other disk-group members within the same pool.
drawer	In a 2U48 enclosure, one of three FRUs that each holds up to 16 disks. In a 4U56 enclosure, one of two FRUs that each holds 28 disks.
drive enclosure	See expansion enclosure. See <i>also</i> JBOD.
drive spin down	See DSD.
DRM	Disaster recovery management. Storage-system firmware features that, when the Site Replication Adapter (SRA) feature is enabled, support the use of VMware's Site Recovery Manager to automate disaster-recovery failover and failback tasks. See <i>also</i> SRA.
DSD	Drive spin down. A power-saving feature that monitors disk activity in the storage system and spins down inactive disks based on user-selectable policies. Drive spin down is not applicable to disks in virtual pools.
dual-port disk	A disk that is connected to both controllers so it has two data paths, achieving fault tolerance.
Dynamic Host Configuration Protocol	See DHCP.
dynamic spare	An available compatible disk that is automatically assigned, if the dynamic spares option is enabled, to replace a failed disk in a disk group with a fault-tolerant RAID level. See <i>also</i> available disk, compatible disk, dedicated spare, and global spare.
E2E PI	End-to-End Protection Information. A feature that consists of two discrete processes: host PI and disk PI. Host PI primarily verifies the integrity of data sent from the host server during transport by checking protection field information attached to the data. It also adds protection fields to data requested by the host server, so the host server can perform the process in reverse. Disk PI adds new protection fields to data sent from the host server so that it can check the integrity of the stored data when retrieved. Host and disk PI are separately enabled and operate independently. You can enable one, both, or neither of these processes. See <i>also</i> PI.
EC	Expander Controller. A processor (located in the SAS expander in each controller module and expansion module) that controls the SAS expander and provides SES functionality. See <i>also</i> EMP, MC, and SC.
EMP	Enclosure management processor. An EC subsystem that provides SES data such as temperature, power supply and fan status, and the presence or absence of disks.

Glossary

enclosure	A physical storage device that contains I/O modules, disk drives, and other FRUs.
enclosure management processor	See EMP.
Expander Controller	See EC.
expansion enclosure	An enclosure that contains one or two expansion modules. Expansion enclosures can be connected to a controller enclosure to provide additional storage capacity. See <i>also</i> JBOD.
expansion module	A FRU that contains the following subsystems and devices: a SAS expander and EC processor; host, expansion, and service ports; and midplane connectivity.
explicit mapping	Access settings for an initiator to a volume that override the volume's default mapping. See <i>also</i> default mapping and masking.
fallback	See recovery.
failover	In an active-active configuration, failover is the act of temporarily transferring ownership of controller resources from an offline controller to its partner controller, which remains operational. The resources include pools, volumes, cache data, host ID information, and LUNs and WWNs. See recovery.
fan module	The fan FRU used in 4U56 enclosures. There are two in each enclosure, separate from the PSUs.
FC	Fibre Channel interface protocol.
FC-AL	Fibre Channel Arbitrated Loop. The FC topology in which devices are connected in a one-way loop.
FDE	Full disk encryption. A method by which you can secure the data residing on a system. See <i>also</i> lock key, passphrase, repurpose, and SED.
Fibre Channel Arbitrated Loop	See FC-AL.
field-programmable gate array	See FPGA.
field-replaceable unit	See FRU.
FPGA	Field-programmable gate array. An integrated circuit designed to be configured after manufacturing.
FRU	Field-replaceable unit. A part that can be removed and replaced by the user or support technician without having to send the product to a repair facility.
full disk encryption	See FDE.
global spare	A compatible disk that is reserved for use by any disk group with a fault-tolerant RAID level to replace a failed disk. See <i>also</i> available disk, compatible disk, dedicated spare, and dynamic spare.
HBA	Host bus adapter. A device that facilitates I/O processing and physical connectivity between a host and the storage system. (v3) A user-defined group of initiators that represents a server or switch.
host	(v2) An external port that the storage system is attached to. The external port may be a port in an I/O adapter in a server, or a port in a network switch. Product interfaces use the terms host and initiator interchangeably.

host bus adapter	See HBA.
host group	A user-defined group of hosts for ease of management, such as for mapping operations.
host port	A port on a controller module that interfaces to a host computer, either directly or through a network switch.
image ID	A globally unique serial number that identifies the point-in-time image source for a volume. All volumes that have identical image IDs have identical data content, whether they be snapshots or stand-alone volumes.
initiator	(v3) An external port to which the storage system is connected. The external port may be a port in an I/O adapter in a server, or a port in a network switch. (v2) See host.
I/O Manager	A MIB-specific term for a controller module.
I/O module	See IOM.
IOM	Input/output module. An IOM can be either a controller module or an expansion module.
IQN	iSCSI Qualified Name.
iSCSI	Internet SCSI interface protocol.
iSNS	Internet Storage Name Service.
JBOD	“Just a bunch of disks.” See drive enclosure.
large form factor	See LFF.
LBA	Logical Block Address. The address used for specifying the location of a block of data.
leftover	The state of a disk that the system has excluded from a disk group because the timestamp in the disk’s metadata is older than the timestamp of other disks in the disk group, or because the disk was not detected during a rescan. A leftover disk cannot be used in another disk group until the disk’s metadata is cleared; for information and cautions about doing so, see documentation topics about clearing disk metadata.
LFF	Large form factor.
linear	The storage-class designation for logical components such as volumes that do not use paged-storage technology to virtualize data storage. The linear method stores user data in sequential, fully allocated physical blocks, using a fixed (static) mapping between the logical data presented to hosts and the physical storage where it is stored.
linear disk group	A set of disk drives that is configured to use a specific RAID type. The number of disks that a linear disk group can contain is determined by its RAID level. Any supported RAID level can be used. When a linear disk group is created, a linear pool with the same name is also created to represent the volume-containment properties of the disk group. See <i>also</i> linear pool.
linear pool	A container for volumes that is composed of one linear disk group.
LIP	Loop Initialization Primitive. An FC primitive used to determine the loop ID for a controller.
lock key	A system-generated value that manages the encryption and decryption of data on FDE-capable disks. See <i>also</i> FDE and passphrase.
logical block address	See LBA.
Logical Unit Number	See LUN.
loop	See FC-AL.

Loop Initialization Primitive	See LIP.
LUN	Logical Unit Number. A number that identifies a mapped volume to a host system.
MAC address	Media Access Control Address. A unique identifier assigned to network interfaces for communication on a network.
Management Controller	See MC.
Management Information Base	See MIB.
map/mapping	Settings that specify whether a volume is presented as a storage device to a host system, and how the host system can access the volume. Mapping settings include an access type (read-write, read-only, or no access), controller host ports through which initiators may access the volume, and a LUN that identifies the volume to the host system. See <i>also</i> default mapping, explicit mapping, and masking.
masking	A volume-mapping setting that specifies no access to that volume by hosts. See <i>also</i> default mapping and explicit mapping.
master volume	A volume that is enabled for snapshots and has an associated snap pool.
MC	Management Controller. A processor (located in a controller module) that is responsible for human-computer interfaces, such as the Disk Management Utility, and computer-computer interfaces, such as SNMP, and interacts with the Storage Controller. See <i>also</i> EC and SC.
Media Access Control Address	See MAC address.
metadata	Data in the first sectors of a disk drive that stores all disk-, disk-group-, and volume-specific information including disk group membership or spare identification, disk group ownership, volumes and snapshots in the disk group, host mapping of volumes, and results of the last media scrub.
MIB	Management Information Base. A database used for managing the entities in SNMP.
mount	To enable access to a volume from a host OS. See <i>also</i> host, map/mapping, and volume.
network port	The Ethernet port on a controller module through which its Management Controller is connected to the network.
network time protocol	See NTP.
NTP	Network time protocol.
NV device	Nonvolatile device. The CompactFlash memory card in a controller module.
object identifier	See OID.
OID	Object Identifier. In SNMP, an identifier for an object in a MIB.
orphan data	See unwritable cache data.
overcommit	A setting that controls whether a virtual pool is allowed to have volumes whose total size exceeds the physical capacity of the pool.
overcommitted	The amount of storage capacity that is allocated to volumes exceeds the physical capacity of the storage system.
page	A range of contiguous LBAs in a virtual disk group.

paged storage	A method of mapping logical host requests to physical storage that maps the requests to virtualized “pages” of storage that are in turn mapped to physical storage. This provides more flexibility for expanding capacity and automatically moving data than the traditional, linear method in which requests are directly mapped to storage devices. Paged storage is also called virtual storage.
parent volume	A volume that has snapshots (can be either a base volume or a base snapshot volume). The parent of a snapshot is its immediate ancestor in the snapshot tree.
partner firmware update	See PFU.
passphrase	A user-created password that allows users to manage lock keys in an FDE-capable system. See <i>also</i> FDE and lock key.
PCBA	Printed circuit board assembly.
PFU	Partner firmware update. The automatic update of the partner controller when the user updates firmware on one controller.
PGR	Persistent group reservations.
PHY	One of two hardware components that form a physical connection between devices in a SAS network that enables transmission of data.
physical layer	See PHY.
point-to-point	Fibre Channel Point-to-Point topology in which two ports are directly connected.
pool	See linear pool and virtual pool.
POST	Power-on self test. Tests that run immediately after a device is powered on.
Power-On Self Test	See POST.
power supply unit	See PSU.
primary system	The storage system that contains a replication set’s primary volume. See also replication set, secondary system.
primary volume	The volume that is the source of data in a replication set and that can be mapped to hosts. For disaster recovery purposes, if the primary volume goes offline, a secondary volume can be designated as the primary volume. The primary volume exists in a primary disk group in the primary (or local) storage system.
proxy volume	A virtual volume in the local system that represents a volume in a remote system. Proxy volumes are used internally by the controllers to perform actions such as transferring replication data.
PSU	Power supply unit. The power supply FRU.
quick rebuild	A feature for virtual storage that reduces the time that user data is less than fully fault-tolerant after a disk failure in a disk group. The quick-rebuild process rebuilds only data stripes that contain user data. Data stripes that have not been allocated to user data are rebuilt in the background.
RAID head	See controller enclosure.
read cache	A special disk group using SSDs that can be added to a virtual pool for the purpose of speeding up read access to data stored on spinning disks elsewhere in the pool. Read cache is also referred to as read flash cache.
read flash cache	See read cache.

recovery	In an active-active configuration, recovery is the act of returning ownership of controller resources to a controller (which was offline) from its partner controller. The resources include volumes, cache data, host ID information, and LUNs and WWNs. See <i>also</i> failover.
remote replication	Asynchronous (batch) replication of block-level data from a volume in a primary system to a volume in one or more secondary systems by creating a replication snapshot of the primary volume and copying the snapshot data to the secondary systems via Fibre Channel or iSCSI links. The capability to perform remote replication is a licensed feature (AssuredRemote).
remote syslog support	See syslog.
replication	Asynchronous replication of block-level data from a volume in a primary system to a volume in a secondary system by creating an internal snapshot of the primary volume and copying the snapshot data to the secondary system via Fibre Channel (linear storage only) or iSCSI links. The capability to replicate volumes is a licensed feature.
replication image	A conceptual term for replication snapshots that have the same image ID in primary and secondary systems. These synchronized snapshots contain identical data and can be used for disaster recovery.
replication-prepared volume	A volume created for the purpose of being the secondary volume in a replication set. Replication-prepared volumes are automatically created by the Disk Management Utility Replication Setup Wizard, or they can be created manually in the CLI or the Disk Management Utility.
replication set	Associated primary and secondary volumes that are enabled for replication and that typically reside in two physically or geographically separate storage systems. See primary volume and secondary volume.
replication snapshot	A special type of snapshot, created by the remote replication feature, that preserves the state of data of a replication set's primary volume as it existed when the snapshot was created. For a primary volume, the replication process creates a replication snapshot on both the primary system and, when the replication of primary-volume data to the secondary volume is complete, on the secondary system. Replication snapshots are unmappable and are not counted toward a license limit, although they are counted toward the system's maximum number of volumes. A replication snapshot can be exported to a regular, licensed snapshot. See <i>also</i> replication sync point.
replication sync point	The state of a replication snapshot whose corresponding primary or secondary snapshot exists and contains identical data. For a replication set, four types of sync point are identified: the only replication snapshot that is copy-complete on any secondary system is the "only sync point"; the latest replication snapshot that is copy-complete on any secondary system is the "current sync point"; the latest replication snapshot that is copy-complete on all secondary systems is the "common sync point"; a common sync point that has been superseded by a new common sync point is an "old common sync point."
repurpose	A method by which all data on a system or disk is erased in an FDE-capable system. Repurposing unsecures the system and disks without needing the correct passphrase. See <i>also</i> FDE and passphrase.
RFC	Read flash cache. See read cache.
SAS	Serial Attached SCSI interface protocol or disk-drive architecture.

SC	Storage Controller. A processor (located in a controller module) that is responsible for RAID controller functions. The SC is also referred to as the RAID controller. <i>See also</i> EC and MC.
SCSI Enclosure Services	<i>See</i> SES.
secondary volume	The volume that is the destination for data in a replication set and that is not accessible to hosts. For disaster recovery purposes, if the primary volume goes offline, a secondary volume can be designated as the primary volume. The secondary volume exists in a secondary disk group in a secondary (or remote) storage system. The contents of a secondary volume are in a constant state of flux and are not in a consistent state while a replication is in process. Only snapshots that are associated with a secondary volume are data consistent.
secret	For use with CHAP, a password that is shared between an initiator and a target to enable authentication.
secure hash algorithm	<i>See</i> SHA.
secure shell	<i>See</i> SSH.
Secure Sockets Layer	<i>See</i> SSL.
SED	Self-encrypting drive. A disk drive that provides hardware-based data encryption and supports use of the storage system's Full Disk Encryption feature. <i>See also</i> FDE.
SEEPROM	Serial electrically erasable programmable ROM. A type of nonvolatile (persistent if power removed) computer memory used as FRU ID devices.
Self-Monitoring Analysis and Reporting Technology	<i>See</i> SMART.
serial electrically erasable programmable ROM	<i>See</i> SEEPROM.
Service Location Protocol	<i>See</i> SLP.
SES	SCSI Enclosure Services. The protocol that allows the initiator to communicate with the enclosure using SCSI commands.
SFCB	Small Footprint CIM Broker.
SFF	Small form factor. A type of disk drive.
SHA	Secure Hash Algorithm. A cryptographic hash function.
SLP	Service Location Protocol. Enables computers and other devices to find services in a local area network without prior configuration.
Small Footprint CIM Broker	<i>See</i> SFCB.
small form factor	<i>See</i> SFF.
SMART	Self-Monitoring Analysis and Reporting Technology. A monitoring system for disk drives that monitors reliability indicators for the purpose of anticipating disk failures and reporting those potential failures.

SMC	Storage Management Console, also known as Disk Management Utility. The web application that is embedded in each controller module and is the primary management interface for the storage system.
SMI-S	Storage Management Initiative - Specification. The SNIA standard that enables interoperable management of storage networks and storage devices. The interpretation of CIM for storage. It provides a consistent definition and structure of data, using object-oriented techniques.
snap pool	A volume that stores data that is specific to snapshots of an associated master volume, including copy-on-write data and data written explicitly to the snapshots. A snap pool cannot be mapped.
snapshot	A “virtual” volume that preserves the state of a source volume’s data as it existed when the snapshot was created. Data associated with a snapshot is recorded in both the source volume and in its associated snap pool. A snapshot can be mapped and written to. The capability to create snapshots is a licensed feature (AssuredSnap). Snapshots that can be mapped to hosts are counted against the snapshot-license limit, whereas transient and unmappable snapshots are not.
snapshot tree	A group of virtual volumes that are interrelated due to creation of snapshots. Since snapshots can be taken of existing snapshots, volume inter-relationships can be thought of as a “tree” of volumes. A tree can be 254 levels deep. <i>See also</i> base volume, child volume, parent volume, and source volume.
SNIA	Storage Networking Industry Association. An association regarding storage networking technology and applications.
source volume	A volume that has snapshots. Used as a synonym for parent volume.
sparse snapshot	A type of point-in-time copy that preserves the state of data at an instant in time by storing only those blocks that are different from an already existing full copy of the data.
SRA	Storage Replication Adapter. A host-based software component that allows VMware’s Site Recovery Manager to manage the storage-system firmware’s disaster recovery management (DRM) features, automating disaster-recovery failover and failback tasks. The SRA uses the CLI XML API to control the storage system. <i>See also</i> DRM.
SSD	Solid-state drive.
SSH	Secure Shell. A network protocol for secure data communication.
SSL	Secure Sockets Layer. A cryptographic protocol that provides security over the internet.
standard volume	A volume that can be mapped to initiators and presented as a storage device to a host system, but is not enabled for snapshots.
Storage Controller	<i>See</i> SC.
Storage Management Initiative - Specification	<i>See</i> SMI-S.
Storage Networking Industry Association	<i>See</i> SNIA.
storage system	A controller enclosure with at least one connected drive enclosure. Product documentation and interfaces use the terms storage system and system interchangeably.
syslog	A protocol for sending event messages across an IP network to a logging server.

thin provisioning	<p>A feature that allows actual storage for a virtual volume to be assigned as data is written, rather than storage being assigned immediately for the eventual size of the volume. This allows the storage administrator to overcommit physical storage, which in turn allows the connected host system to operate as though it has more physical storage available than is actually allocated to it. When physical resources fill up, the storage administrator can add storage capacity on demand.</p> <p>A homogeneous set of disk drives, typically of the same capacity and performance level, that comprise one or more disk groups in the same pool. Tiers differ in their performance, capacity, and cost characteristics, which forms the basis for the choices that are made with respect to which data is placed in which tier. The predefined tiers are:</p>
tier	<ul style="list-style-type: none"> • Performance, which uses SAS SSDs (high speed, low capacity) • Standard, which uses enterprise-class spinning SAS disks (lower speed, higher capacity) • Archive, which uses midline spinning SAS disks (low speed, high capacity).
tier migration	The automatic movement of blocks of data, associated with a single volume, between tiers based on the access patterns that are detected for the data on that volume.
tray	See enclosure.
UCS Transformation Format - 8-bit	See UTF-8.
ULP	Unified LUN Presentation. A RAID controller feature that enables a host system to access mapped volumes through any controller host port. ULP incorporates Asymmetric Logical Unit Access (ALUA) extensions.
undercommitted	The amount of storage capacity that is allocated to volumes is less than the physical capacity of the storage system.
Unified LUN Presentation	See ULP.
unmount	To remove access to a volume from a host OS.
unwritable cache data	Cache data that has not been written to disk and is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume's disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host system and disk. Unwritable cache data is also called orphan data.
UTC	Coordinated Universal Time. The primary time standard by which the world regulates clocks and time. It replaces Greenwich Mean Time.
UTF-8	UCS transformation format - 8-bit. A variable-width encoding that can represent every character in the Unicode character set used for the CLI and Disk Management Utility interfaces.
v2	The legacy interface for managing linear storage. This is the default for a system that has been upgraded from a previous release.
v3	The new interface for managing virtual and linear storage. This is the default for a new installation.
vdisk	A virtual disk comprising the capacity of one or more disks. The number of disks that a vdisk can contain is determined by its RAID level. See linear disk group.

Glossary

vdisk spare	See dedicated spare.
virtual	The storage-class designation for logical components such as volumes that use paged-storage technology to virtualize data storage. See paged storage.
virtual disk	See vdisk.
virtual disk group	A set of disk drives that is configured to use a specific RAID type. The number of disks that a linear disk group can contain is determined by its RAID level. A virtual disk group can use RAID 1, 5, 6, or 10. A virtual disk group can be added to a new or existing virtual pool. See <i>also</i> virtual pool.
virtual pool	A container for volumes that is composed of one or more virtual disk groups.
volume	A logical representation of a fixed-size, contiguous span of storage that is presented to host systems for the purpose of storing data.
volume copy	An independent copy of the data in a linear volume. The capability to create volume copies is a licensed feature (AssuredCopy) that makes use of snapshot functionality.
volume group	A user-defined group of volumes for ease of management, such as for mapping operations.
WBEM	Web-Based Enterprise Management. A set of management and internet standard technologies developed to unify the management of enterprise computing environments.
web-based interface/web-browser interface	See WBI.
WBI	Web-browser interface, called Storage Management Console. The primary interface for managing the system. A user can enable the use of HTTP, HTTPS for increased security, or both.
Web-Based Enterprise Management	See WBEM.
World Wide Name	See WWN.
World Wide Node Name	See WWNN.
World Wide Port Name	See WWPN.
WWN	World Wide Name. A globally unique 64-bit number that identifies a device used in storage technology.
WWNN	World Wide Node Name. A globally unique 64-bit number that identifies a device.
WWPN	World Wide Port Name. A globally unique 64-bit number that identifies a port.