



AssuredSAN CLI Reference Guide

For firmware release G222

Abstract

This guide provides information about managing a Dot Hill AssuredSAN storage system by using its command-line interface (CLI).

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About this guide

This guide provides information about managing a Dot Hill AssuredSAN™ storage system by using its command-line interface (CLI).

Intended audience

This guide is intended for storage system administrators.

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 (FC) protocol
- Serial Attached SCSI (SAS) protocol
- Internet SCSI (iSCSI) protocol
- Ethernet protocol

Related documentation

Table 1 Related documentation

For information about	See
Enhancements, known issues, and late-breaking information not included in product documentation	Release Notes
Overview of product shipkit contents and setup tasks	Getting Started*
Regulatory compliance and safety and disposal information	AssuredSAN Product Regulatory Compliance and Safety*
Using a rackmount bracket kit to install an enclosure into a rack	AssuredSAN Rackmount Bracket Kit Installation* or AssuredSAN 2-Post Rackmount Bracket Kit Installation*
Product hardware setup and related troubleshooting	AssuredSAN 6004 Series Setup Guide AssuredSAN 4004 Series Setup Guide AssuredSAN 3004 Series Setup Guide
Obtaining and installing a license to use licensed features	AssuredSAN Obtaining and Installing a License
Using the web interface to configure and manage the product	AssuredSAN Storage Management Guide
Event codes and recommended actions	AssuredSAN Event Descriptions Reference Guide
Identifying and installing or replacing field-replaceable units (FRUs)	AssuredSAN 6004 Series FRU Installation and Replacement Guide AssuredSAN 4004 Series FRU Installation and Replacement Guide AssuredSAN 3004 Series FRU Installation and Replacement Guide

* Printed document included in product shipkit.


For additional information, see Dot Hill's Customer Resource Center web site: <https://crc.dothill.com>.

Document conventions and symbols

Table 2 Document conventions

Convention	Element
Colored text	Cross-reference links
Black, underlined text	Email addresses
<u>Green, underlined</u> text	Website addresses
Bold text	<ul style="list-style-type: none">Keys that are pressedText typed into a GUI element, such as a boxGUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italic</i> text	Text emphasis
Monospace text	<ul style="list-style-type: none">File and directory namesSystem outputCodeCommands, their arguments, and argument values
<i>Monospace, italic</i> text	<ul style="list-style-type: none">Code variablesCommand variables
Monospace, bold text	Emphasis of file and directory names, system output, code, and text typed at the command line

 **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

 **IMPORTANT:** Provides clarifying information or specific instructions.

NOTE: Provides additional information.

 **TIP:** Provides helpful hints and shortcuts.

1 Using the CLI

This chapter introduces the AssuredSAN 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 HTTPS, HTTP, SSH, or Telnet 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 3 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](#) command.

Using 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.

-
- ❗ **IMPORTANT:** 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: 2015-11-07 11:05:12
Time Zone Offset: -07:00

Success: Command completed successfully. (2015-11-07 11:05:12)

# exit
```

Using 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.

Using the XML API

The Management Controller provides access for monitoring and management via the SSH and Telnet 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 4 XML API elements

Element	Description and attributes
RESPONSE	<p>The RESPONSE 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 OBJECT 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 RESPONSE element per issued command.</p>
OBJECT	<p>In general, an OBJECT element describes a storage-system component such as a disk 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. This is also a good field to use to detect the type of the object (e.g., a disk, 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 OBJECT element can contain PROPERTY elements.</p>
PROPERTY	<p>A PROPERTY element provides detail about the attributes of an OBJECT. 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 COMP (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 COMP elements is described in XML API optimization.</p>
ASC	<p>The association element provides a simple association description between two objects in the response.</p> <ul style="list-style-type: none">• <code>A</code>. First object.• <code>B</code>. Second object.

Scripting guidelines

When scripting command input, use CLI syntax as defined in this guide. For use with SSH or Telnet, 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](#) 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](#) 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:

- Disk 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
- Disks are specified without the drawer number, as described below.

## Specifying disks

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

- A disk. Example: 1.4
- A hyphenated range of disks. Example: 1.4-7
- A comma-separated list of individual disks, ranges, or both (with no spaces). Example: 1.4,1.6-9
- A RAID 10 or 50 disk group with disks 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: `dgl, "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 5 Keyboard shortcuts for command completion, editing, and history**

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

## Viewing 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](#) above, enter:

```
help syntax
```

To view the information shown in this topic and in [Command completion, editing, and history](#) 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](#) and [set cli-parameters](#). When entering storage-space sizes only, either base-2 or base-10 units can be specified.

**Table 6** Size representations in base 2 and base 10

Base 2		Base 10	
Unit	Size in bytes	Unit	Size in bytes
KiB (kibibyte)	1,024	KB (kilobyte)	1,000
MiB (mebibyte)	1,024 <sup>2</sup>	MB (megabyte)	1,000 <sup>2</sup>
GiB (gibibyte)	1,024 <sup>3</sup>	GB (gigabyte)	1,000 <sup>3</sup>
TiB (tebibyte)	1,024 <sup>4</sup>	TB (terabyte)	1,000 <sup>4</sup>
PiB (pebibyte)	1,024 <sup>5</sup>	PB (petabyte)	1,000 <sup>5</sup>
EiB (exbibyte)	1,024 <sup>6</sup>	EB (exabyte)	1,000 <sup>6</sup>

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

**Table 7** Decimal (radix) point character by locale

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

## 2 Categorical list of commands

### Current commands by category

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 8 Commands by category**

Category	Commands
CLI and users	<a href="#">create user</a> , <a href="#">delete user</a> , <a href="#">exit</a> , <a href="#">help</a> , <a href="#">set cli-parameters</a> , <a href="#">set password</a> , <a href="#">set prompt</a> , <a href="#">set user</a> , <a href="#">show cli-parameters</a> , <a href="#">show users</a>
Disks, disk groups, pools, tiers, and spares	<a href="#">abort scrub</a> , <a href="#">abort verify</a> , <a href="#">add disk-group</a> , <a href="#">add spares</a> , <a href="#">clear disk-metadata</a> , <a href="#">clear fde-keys (AssuredSAN 4004 only)</a> , <a href="#">create vdisk</a> , <a href="#">delete pools</a> , <a href="#">delete vdisks</a> , <a href="#">dequarantine</a> , <a href="#">expand vdisk</a> , <a href="#">remove spares</a> , <a href="#">rescan</a> , <a href="#">scrub disk-groups</a> , <a href="#">scrub vdisk</a> , <a href="#">set disk (AssuredSAN 4004 only)</a> , <a href="#">set disk-group</a> , <a href="#">set expander-fault-isolation</a> , <a href="#">set fde-import-key (AssuredSAN 4004 only)</a> , <a href="#">set fde-lock-key (AssuredSAN 4004 only)</a> , <a href="#">set fde-state (AssuredSAN 4004 only)</a> , <a href="#">set led</a> , <a href="#">set pool</a> , <a href="#">set vdisk</a> , <a href="#">show disks</a> , <a href="#">show disk-groups</a> , <a href="#">show fde-state (AssuredSAN 4004 only)</a> , <a href="#">show pools</a> , <a href="#">show tiers</a> , <a href="#">show vdisks</a> , <a href="#">trust</a> , <a href="#">verify disk-groups</a> , <a href="#">verify vdisk</a>
Volumes, volume groups, initiators, hosts, host groups, and mapping	<a href="#">add host-group-members</a> , <a href="#">add host-members</a> , <a href="#">add volume-group-members</a> , <a href="#">create host</a> , <a href="#">create host-group</a> , <a href="#">create volume</a> , <a href="#">create volume-group</a> , <a href="#">create volume-set</a> , <a href="#">delete host-groups</a> , <a href="#">delete hosts</a> , <a href="#">delete initiator-nickname</a> , <a href="#">delete volume-groups</a> , <a href="#">delete volumes</a> , <a href="#">expand disk-group</a> , <a href="#">expand volume</a> , <a href="#">map volume</a> , <a href="#">release volume</a> , <a href="#">remove disk-groups</a> , <a href="#">remove host-group-members</a> , <a href="#">remove host-members</a> , <a href="#">remove volume-group-members</a> , <a href="#">scrub volume</a> , <a href="#">set cache-parameters</a> , <a href="#">set host</a> , <a href="#">set host-group</a> , <a href="#">set host-port-mode (AssuredSAN 4004 only)</a> , <a href="#">set initiator</a> , <a href="#">set volume</a> , <a href="#">set volume-group</a> , <a href="#">show cache-parameters</a> , <a href="#">show host-groups</a> , <a href="#">show initiators</a> , <a href="#">show maps</a> , <a href="#">show ports</a> , <a href="#">show unwritable-cache</a> , <a href="#">show volume-groups</a> , <a href="#">show volume-names</a> , <a href="#">show volume-reservations</a> , <a href="#">show volumes</a> , <a href="#">unmap volume</a>
Snapshots, and snap pools	<a href="#">convert master-to-std</a> , <a href="#">convert std-to-master</a> , <a href="#">create master-volume</a> , <a href="#">create snap-pool</a> , <a href="#">create snapshots</a> , <a href="#">delete all-master-volumes</a> , <a href="#">delete all-snapshots</a> , <a href="#">delete snap-pool</a> , <a href="#">delete snapshot</a> , <a href="#">delete snapshot-write-data</a> , <a href="#">expand snap-pool</a> , <a href="#">reset snapshot</a> , <a href="#">rollback volume</a> , <a href="#">set priorities</a> , <a href="#">set snap-pool-policy</a> , <a href="#">set snap-pool-threshold</a> , <a href="#">set snapshot-space</a> , <a href="#">show master-volumes</a> , <a href="#">show priorities</a> , <a href="#">show snap-pools</a> , <a href="#">show snapshot-space</a> , <a href="#">show snapshots</a>
Linear volume copy	<a href="#">abort volumecopy</a> , <a href="#">show volumecopy-status</a> , <a href="#">volumecopy</a>
Virtual volume copy	<a href="#">abort copy</a> , <a href="#">copy volume</a> , <a href="#">show volume-copies</a>
Scheduled tasks	<a href="#">create schedule</a> , <a href="#">create task</a> , <a href="#">delete schedule</a> , <a href="#">delete task</a> , <a href="#">set schedule</a> , <a href="#">set task</a> , <a href="#">show schedules</a> , <a href="#">show tasks</a>
Event notification	<a href="#">set email-parameters</a> , <a href="#">set snmp-parameters</a> , <a href="#">set syslog-parameters</a> , <a href="#">show email-parameters</a> , <a href="#">show events</a> , <a href="#">show snmp-parameters</a> , <a href="#">show syslog-parameters</a> , <a href="#">test</a>
System configuration and utilities	<a href="#">check firmware-upgrade-health</a> , <a href="#">clear cache</a> , <a href="#">create certificate</a> , <a href="#">create chap-record</a> , <a href="#">delete chap-records</a> , <a href="#">ping</a> , <a href="#">reset host-link</a> , <a href="#">restart mc</a> , <a href="#">restart sc</a> , <a href="#">set advanced-settings</a> , <a href="#">set cache-parameters</a> , <a href="#">set chap-record</a> , <a href="#">set controller-date</a> , <a href="#">set disk-parameters</a> , <a href="#">set enclosure</a> , <a href="#">set expander-fault-isolation</a> , <a href="#">set expander-phy</a> , <a href="#">set host-parameters</a> , <a href="#">set host-port-mode (AssuredSAN 4004 only)</a> , <a href="#">set iscsi-parameters</a> , <a href="#">set led</a> , <a href="#">set network-parameters</a> , <a href="#">set ntp-parameters</a> , <a href="#">set protocols</a> , <a href="#">set system</a> , <a href="#">show advanced-settings</a> , <a href="#">show cache-parameters</a> , <a href="#">show certificate</a> , <a href="#">show chap-records</a> , <a href="#">show configuration</a> , <a href="#">show controller-date</a> , <a href="#">show controllers</a> , <a href="#">show disk-parameters</a> , <a href="#">show enclosures</a> , <a href="#">show expander-status</a> , <a href="#">show fans</a> , <a href="#">show frus</a> , <a href="#">show inquiry</a> , <a href="#">show iscsi-parameters</a> , <a href="#">show license</a> , <a href="#">show network-parameters</a> , <a href="#">show ntp-status</a> , <a href="#">show ports</a> , <a href="#">show power-supplies</a> , <a href="#">show provisioning</a> , <a href="#">show protocols</a> , <a href="#">show redundancy-mode</a> , <a href="#">show sas-link-health</a> , <a href="#">show sensor-status</a> , <a href="#">show shutdown-status</a> , <a href="#">show system</a> , <a href="#">show system-parameters</a> , <a href="#">show versions</a> , <a href="#">shutdown</a>

**Table 8 Commands by category (continued)**

Category	Commands
Service utilities	clear events, clear expander-status, fail, reset smis-configuration, restore defaults, set debug-log-parameters, set expander-fault-isolation, set expander-phy, show debug-log-parameters, show expander-status, unfail controller
API specific	meta, show refresh-counters
Remote systems	create remote-system, delete remote-system, remote, set remote-system, show remote-systems, verify links, verify remote-link
Linear volume replication	abort replication, add replication-volume, create replication-set, delete replication-set, detach replication-volume, export snapshot, reattach replication-volume, remove replication-volume, replicate snapshot, replicate volume, resume replication, set replication-primary-volume, set replication-volume-parameters, show replication-images, show replication-sets, show replication-volumes, start vdisk, stop vdisk, suspend replication
Peer connections	create peer-connection, delete peer-connection, query peer-connection, set peer-connection, show peer-connections
Virtual volume replication	abort replication, create replication-set, delete replication-set, replicate, resume replication-set, set replication-set, show replication-sets, suspend replication-set
Statistics	reset all-statistics, reset controller-statistics, reset disk-error-statistics, reset disk-group-statistics, reset disk-statistics, reset host-port-statistics, reset pool-statistics, reset vdisk-statistics, reset volume-statistics, show controller-statistics, show disk-group-statistics, show disk-statistics, show host-phy-statistics, show host-port-statistics, show pool-statistics, show tier-statistics, show vdisk-statistics, show volume-statistics

## 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 9 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

**Table 9   Deprecated commands (continued)**

Deprecated command	Replacement command
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
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 10   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
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



**Table 10 Commands removed in previous releases (continued)**

Removed command	Replacement command
set drive-parameters	set disk-parameters
set host-port-interconnects	None – not applicable
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
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
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
tlInfo	None

## 3 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:

<b>Description</b>	The command's purpose and notes about its usage
<b>Minimum role</b>	The minimum user role required to use the command
<b>Syntax</b>	The command's syntax
<b>Parameters</b>	Descriptions of the command's parameters
<b>Output</b>	Descriptions of fields shown in console format
<b>Examples</b>	One or more examples of the command's usage in console format
<b>Basetypes</b>	References to descriptions of basetype properties shown in XML API format
<b>See also</b>	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 copy
 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](#)  
[show volume-copies](#)  
[show volumes](#)

# 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](#)  
[resume replication-set](#)  
[show replication-sets](#)  
[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 run on the replication set's secondary system.

### Minimum role

manage

### Syntax

```
abort replication
 [set replication-set-ID]
 replication-ID
```

## 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](#)

[suspend replication](#)

[show replication-sets](#)

[show replication-volumes](#)

# 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](#)  
[scrub vdisk](#)  
[scrub volume](#)  
[show disk-groups](#)  
[show vdisks](#)  
[show volumes](#)

# 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](#)  
[show vdisks](#)  
[verify disk-groups](#)  
[verify vdisk](#)

# 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](#)  
[show volumes](#)  
[volumecopy](#)



# add disk-group

## Description


Creates a disk group using specified disks.

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.

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

---


 **TIP:** 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 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.

---

 **TIP:** 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.

---

---

 **TIP:** 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 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 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.

---

**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” \(page 25\)](#).

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 (linear storage only)  
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” \(page 25\)](#). 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.

`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 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.

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](#)
- [remove disk-groups](#)
- [set disk-group](#)
- [show disk-groups](#)
- [show disks](#)

## add global-spare (Deprecated)

Use [add spares](#).

# 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](#)  
[show host-groups](#)  
[show initiators](#)

# 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](#)

[remove host-group-members](#)

[show host-groups](#) (and hosts)

[show initiators](#)

# 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` command's `prepare-replication-volume` parameter.

Secondary volumes serve as the destination for replicated data from the primary volume. When a `replicate snapshot` or `replicate volume` 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 | wwnn=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
- 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|wwnn=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](#)

[show replication-volumes](#)



# 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.

---

 **TIP:** 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 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” \(page 25\)](#).

## 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](#)
- [show disk-groups](#)
- [show disks](#)
- [show vdisks](#)

## add vdisk-spare (Deprecated)

Use [add spares](#).

# 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](#)
- [remove volume-group-members](#)
- [show volume-groups](#)
- [show volumes](#)

# 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 SMC 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

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

One or more vdisks are in a quarantined state.

Code load failure

-----

## Basetypes

[code-load-readiness](#)

[code-load-readiness-reasons](#)

[status](#)

## See also

[show controllers](#)

[show disk-groups](#)

[show disks](#)

[show enclosures](#)

[show fans](#)

[show power-supplies](#)

[show sensor-status](#)

[show system](#)

[show vdisks](#)

# 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](#)

[show volumes](#)

# clear disk-metadata

## Description

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

---

**⚠ 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” \(page 25\)](#).

## Examples

Clear metadata from leftover disk 1.1.

```
clear disk-metadata 1.1
```

## See also

[show disks](#)

# 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](#)



# 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` command.

---

**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

enclosure *ID*

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](#)

## clear fde-keys (AssuredSAN 4004 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-passphrase value*

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 \(AssuredSAN 4004 only\)](#)  
[set fde-lock-key \(AssuredSAN 4004 only\)](#)  
[set fde-state \(AssuredSAN 4004 only\)](#)  
[show fde-state \(AssuredSAN 4004 only\)](#)


# 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](#)  
[show master-volumes](#)

# 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](#)  
[show volumes](#)

# 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 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.

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](#)  
[show pools](#)  
[show volume-copies](#)  
[show volumes](#)

# 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 SMC 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 /C=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](#)

[restart sc](#)

[show certificate](#)



# 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.

---

❗ **IMPORTANT:** 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]
```

## 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. The value can include spaces and printable UTF-8 characters except: " <

*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](#) 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. The value can include spaces and printable UTF-8 characters except: " <

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 ign.1991-05.com.microsoft:myhost.domain secret 123456abcDEF
```

## See also

- [delete chap-records](#)
- [set chap-record](#)
- [show chap-records](#)
- [show iscsi-parameters](#)
- [show ports](#)

# create host

## Description

Creates a host with an associated name.

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` 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 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 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 host](#)  
[set initiator](#)  
[show host-groups](#)  
[show initiators](#)

# 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 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 host group named HostGroup1 that includes hosts Host1 and Host2.

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

## See also

[add host-group-members](#)  
[delete host-groups](#)  
[remove host-group-members](#)  
[set host-group](#)  
[show host-groups](#)

# 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.

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.

*vdisk* *vdisk*

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 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 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](#)

[show snap-pools](#)

[show vdisks](#)

# 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.

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.

---

**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](#)  
[query peer-connection](#)  
[set peer-connection](#)  
[show peer-connections](#)

# 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 of the user specified by the username parameter.

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](#)

[remote](#)

[set remote-system](#)

[show remote-systems](#)

# 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.

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](#)  
[resume replication-set](#)  
[set replication-set](#)  
[show replication-sets](#)  
[suspend replication-set](#)

## For linear storage

### Description

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

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](#) or [replicate volume](#) 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 Management Controllers (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:
  - 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` command to complete the set before you can perform replication.

---

❗ **IMPORTANT:** 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` 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` 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 reverts 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=WWNNs|wwpn=WWPNs]
 [priority low|medium|high]
 [remote-storage-pool pool]
 [remote-system system]
 [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 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 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.

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 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.

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=207000c0ffd52c31,217000c0ffd52 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](#)
- [delete replication-set](#)
- [remove replication-volume](#)
- [replicate snapshot](#)
- [show remote-systems](#)
- [show replication-images](#)
- [show replication-sets](#)
- [show replication-volumes](#)




# create schedule

## Description

Schedules a task to run automatically.

---

 **TIP:** 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.
- `[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 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 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](#)

[set schedule](#)

[show schedules](#)

[show tasks](#)

# 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:

- 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 the 50-GB snap pool SP1 on vdisk VD1.

```
create snap-pool vdisk VD1 size 50GB SP1
```

## See also

[show snap-pools](#)

[show vdisks](#)

# 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 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 snapshots of volumes V1 and V2.

```
create snapshots volumes V1,V2 V1snap,V2snap
```

## See also

[show snapshots](#)  
[show volumes](#)

# create task

## Description

Creates a task that can be scheduled.

You can create a task to:

- 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. 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
```

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 EnableDSD
 name
```

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

```
create task
 type DisabledSD
 name
```

## Parameters

*dest-prefix prefix*

For a VolumeCopy task this specifies 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 26 bytes.
- 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 this 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 a `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 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 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 26 bytes.
- 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 this specifies the name or serial number of the source volume of which to take a snapshot. For a `VolumeCopy` task this specifies the name or serial number of the source volume to copy. For a `ReplicateVolume` task this specifies 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|Replicate|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 linear replication set's primary volume to a remote system.
- `Replicate`: Replicate a virtual replication set's primary volume or volume group to a peer 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 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 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 primary 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 task taskDSDresume to enable or resume spin down.

```
create task type EnabledSD taskDSDresume
```

Create task taskDSDsuspend to disable or suspend spin down.

```
create task type DisabledSD taskDSDsuspend
```

## See also

[create schedule](#)

[delete task](#)

[set task](#)

[show tasks](#)

[show volumes](#)



# create user

## Description

Creates a user account. The system supports 12 user accounts. You can create a general user that can access the SMC, 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]
[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.
- `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. 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.

`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. 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.

`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.

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.
- 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 SMC.

```
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](#)
- [set snmp-parameters](#)
- [set user](#)
- [show users](#)


# 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).

---

 **TIP:** 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 1: 2    | • RAID 5: 3–16 | • RAID 10: 4–16 |
| • RAID 0: 2–16 | • RAID 3: 3–16 | • RAID 6: 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 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 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 having two disks. RAID 50 requires a minimum of two RAID-5 sub-vdisks each having three disks. For disk syntax, see [“Command syntax” \(page 25\)](#).

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” \(page 25\)](#).

*name*

A name for the new vdisk. 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 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](#)

[set vdisk](#)

[show disks](#)

[show vdisks](#)

# 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](#) and [unmap volume](#) 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](#) command.

---

**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]
[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” \(page 25\)](#). 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 size can exceed the physical capacity of the storage pool. To see whether overcommit is enabled, use the [show pools](#) 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 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 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, 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
tier-affinity 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](#)
- [delete volumes](#)
- [set volume](#)
- [show pools](#)
- [show ports](#)
- [show vdisks](#)
- [show volume-groups](#)
- [show volumes](#)

# 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.

## 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 volume-group-members](#)  
[delete volume-groups](#)  
[remove volume-group-members](#)  
[set volume-group](#)  
[show volume-groups](#)  
[show volumes](#)

# 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](#) and [unmap volume](#) 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.

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-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.
- 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” \(page 25\)](#). 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.

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 pools](#) 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`

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 `MyVol-` in pool B and add them to volume group `MyVG`.

```
create volume-set count 2 size 100GB pool b basename MyVol- 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](#)
- [delete volumes](#)
- [map volume](#)
- [set volume](#)
- [show maps](#)
- [show pools](#)
- [show vdisks](#)
- [show volume-groups](#)
- [show volumes](#)
- [unmap volume](#)

# 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](#)  
[show master-volumes](#)  
[show snap-pools](#)

# 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](#)

[show volumes](#)



# 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](#)  
[set chap-record](#)  
[show chap-records](#)  
[show iscsi-parameters](#)

# delete global-spare (Deprecated)

Use [remove spares](#).

## delete host (Deprecated)

Use [delete initiator-nickname](#).

## 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](#)

# 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](#)  
[set host](#)  
[set initiator](#)  
[show host-groups](#)  
[show initiators](#)

## 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](#)  
[set initiator](#)  
[show initiators](#)

## delete master-volume (Deprecated)

Use [delete volumes](#).

# 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](#)

[query peer-connection](#)

[set peer-connection](#)

[show peer-connections](#)

# 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.

---

**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.

---

---

**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](#)  
[remove disk-groups](#)  
[show master-volumes](#)  
[show pools](#)  
[show vdisks](#)

# 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](#)  
[remote](#)  
[set remote-system](#)  
[show remote-systems](#)



# delete replication-set

## Description

Deletes a replication set.

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](#) command. To suspend replication, use the [suspend replication-set](#) command. To abort replication, use the [abort replication](#) 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 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](#)  
[create replication-set](#)  
[resume replication-set](#)  
[set replication-set](#)  
[show replication-sets](#)  
[show replication-volumes](#)  
[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](#)

[set schedule](#)

[show schedules](#)

# 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](#)  
[show snap-pools](#)  
[show volumes](#)

# 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.

---

## 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](#)  
[delete snapshot-write-data](#)  
[show priorities](#)  
[show snapshots](#)


# 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](#)

[show snapshots](#)

# 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](#)  
[delete schedule](#)  
[show schedules](#)  
[show tasks](#)



# 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](#)

[show users](#)

# 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](#)  
[show master-volumes](#)  
[show vdisks](#)

# delete vdisk-spare (Deprecated)

Use [remove spares](#).

# 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.

---

**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](#)

[show volume-groups](#)

# 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](#)

[show volumes](#)

# 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` 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` 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` commands applies to your situation and for assistance to perform it. Also, see the help for the `trust` 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 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.

---

**NOTE:** The only commands allowed for a quarantined disk group are `dequarantine` and `delete vdisks` and `remove disk-groups`. 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 ...

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](#)  
[show vdisks](#)  
[trust](#)

# 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*.

---

**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.

---

---

**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](#)

[show replication-sets](#)

[show replication-volumes](#)

[start vdisk](#)

[stop vdisk](#)

# 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.

**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.

 **TIP:** 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 sector size types (512n, 512e).

The expansion capability for each supported RAID level is:

RAID level	Expansion capability	Maximum disks
Non-RAID	Cannot expand.	1
0, 3, 5, 6	Can add 1–4 disks at a time.	16
1	Cannot expand.	2
10	Can add 2 or 4 disks at a time.	16
50	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.	32

 **IMPORTANT:** 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” \(page 25\)](#).

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](#)

[show disks](#)

[show vdisks](#)

# 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](#).

## 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](#)  
[show vdisks](#)


# 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.

**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.

 **TIP:** 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:

RAID level	Expansion capability	Maximum disks
NRAID	Cannot expand.	1
0, 3, 5, 6	Can add 1–4 disks at a time.	16
1	Cannot expand.	2
10	Can add 2 or 4 disks at a time.	16
50	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.	32

 **IMPORTANT:** 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”](#) (page 25).

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](#)

[show vdisks](#)

# 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.

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](#) command.

If insufficient space is available for expansion on the vdisk, first expand the vdisk by using [expand vdisk](#).

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](#).
2. Convert it to a standard volume by using [convert master-to-std](#).
3. Expand the standard volume by using [expand volume](#).
4. Convert the expanded volume to a master volume by using [convert std-to-master](#).

## 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](#)  
[expand snap-pool](#)  
[expand vdisk](#)  
[show volumes](#)



# 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 [volumeecopy](#) 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 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.

*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](#)  
[show snapshots](#)

# 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 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](#)

# help

See [“Viewing help” \(page 28\)](#).

# load license

## Description

Used by the SMC to install a license file to control use of licensed features.

## See also

[show license](#)

# 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. Create a snapshot of the secondary volume and use the snapshot for mapping and accessing data.

---

---

**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” \(page 25\)](#). 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” \(page 25\)](#). 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” \(page 25\)](#).

## 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](#)

[show initiators](#)

[show maps](#)

[show ports](#)

[show volume-groups](#)

[show volumes](#)

[unmap volume](#)

# 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” \(page 454\)](#).

## Examples

Show all metadata for objects returned by the `show disks` command:

```
meta drives
```

## See also

[set cli-parameters](#)

# 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](#).

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
- 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](#)  
[status](#)

## See also

[create peer-connection](#)  
[delete peer-connection](#)  
[set peer-connection](#)  
[show peer-connections](#)



# 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.
  - 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.

---

**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.

*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](#)

[show replication-sets](#)

[show replication-volumes](#)

[start vdisk](#)

[stop vdisk](#)

# 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](#)  
[show volumes](#)

# 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](#)

# 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.

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 other groups in the same pool. While data is being drained, the group's status will be `VDRAIN`. If the pool does not have 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.

---

**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.

---

---

**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](#)

[delete vdisks](#)

[show disk-groups](#)

[show vdisks](#)

# 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](#)

[show host-groups](#)

[show initiators](#)

# 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](#)

[show initiators](#)



# 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 can run this command on the primary system. You cannot remove the primary volume.

## Minimum role

manage

## Syntax

```
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](#)

[show replication-volumes](#)

# 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” \(page 25\)](#).

## 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](#)

[show disks](#)

# 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.

---

**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 replication-set](#)
- [delete volume-groups](#)
- [show volume-groups](#)
- [show volumes](#)

# 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

Replicate the volumes in replication set RS1.

```
replicate RS1
```

## See also

[abort replication](#)

# 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](#) 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 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.

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](#)  
[show snapshots](#)

# 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](#) command that did not specify to initiate replication.

If the snapshot you want to replicate already exists, use the [replicate snapshot](#) 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 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.

*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](#)


[show replication-volumes](#)

# 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](#)  
[reset disk-error-statistics](#)  
[reset disk-group-statistics](#)  
[reset disk-statistics](#)  
[reset host-port-statistics](#)  
[reset pool-statistics](#)  
[reset vdisk-statistics](#)  
[reset volume-statistics](#)  
[show controller-statistics](#)



# 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](#)  
[reset disk-error-statistics](#)  
[reset disk-group-statistics](#)  
[reset disk-statistics](#)  
[reset host-port-statistics](#)  
[reset pool-statistics](#)  
[reset vdisk-statistics](#)  
[reset volume-statistics](#)  
[show controller-statistics](#)

# 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](#) 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” \(page 25\)](#). 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](#)  
[reset controller-statistics](#)  
[reset disk-group-statistics](#)  
[reset disk-statistics](#)  
[reset host-port-statistics](#)  
[reset pool-statistics](#)  
[reset vdisk-statistics](#)  
[reset volume-statistics](#)  
[show disk-statistics](#)  
[show disks](#)

# 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](#) 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](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [reset volume-statistics](#)
- [show disk-group-statistics](#)
- [show disk-groups](#)

# 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](#) 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](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [reset volume-statistics](#)
- [show disk-statistics](#)

# 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](#)

# 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” \(page 25\)](#). 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](#)  
[reset controller-statistics](#)  
[reset disk-error-statistics](#)  
[reset disk-group-statistics](#)  
[reset disk-statistics](#)  
[reset pool-statistics](#)  
[reset vdisk-statistics](#)  
[reset volume-statistics](#)  
[show host-port-statistics](#)  
[show ports](#)

# 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](#)  
[reset controller-statistics](#)  
[reset disk-error-statistics](#)  
[reset disk-group-statistics](#)  
[reset disk-statistics](#)  
[reset host-port-statistics](#)  
[reset pool-statistics](#)  
[reset vdisk-statistics](#)  
[reset volume-statistics](#)  
[show pool-statistics](#)  
[show pools](#)

# 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:

- 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](#)



# 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](#)

# 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](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset volume-statistics](#)
- [show vdisk-statistics](#)
- [show vdisks](#)

# 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](#)
- [reset controller-statistics](#)
- [reset disk-error-statistics](#)
- [reset disk-group-statistics](#)
- [reset disk-statistics](#)
- [reset host-port-statistics](#)
- [reset pool-statistics](#)
- [reset vdisk-statistics](#)
- [show volume-statistics](#)
- [show volumes](#)

# 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](#)  
[shutdown](#)

# 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:

- o Depending on the mapping configuration, restarting one Storage Controller may cause loss of access to data.
  - o 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](#)  
[shutdown](#)

# 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” \(page 673\)](#). 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](#)  
[restart mc](#)  
[restart sc](#)

# 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](#)

[show replication-sets](#)

[show replication-volumes](#)



# 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 replications in replication set RS1.

```
resume replication-set RS1
```

## See also

[create replication-set](#)  
[delete replication-set](#)  
[set replication-set](#)  
[show replication-sets](#)  
[suspend replication-set](#)

# rollback master-volume (Deprecated)

Use [rollback volume](#).

# 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.

---

---

**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.

---

---

**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.

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](#)

[show volumes](#)

# 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; find mirror mismatches for RAID 1 and 10; and fix 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 find 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](#) 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](#) (with the disk-group parameter)

[set advanced-settings](#)

[show disk-groups](#)

# 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; find mirror mismatches for RAID 1 and 10; and fix 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](#) 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](#) 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](#) (with the vdisk parameter)  
[set advanced-settings](#)  
[show vdisks](#)

# 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; find mirror mismatches for RAID 1 and 10; and fix 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](#) command.

---

**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](#) (with the `volume` parameter)  
[set advanced-settings](#)  
[show volumes](#)

# 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-spares 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-spares 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.

- `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.

---

**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.

---

**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 enabled
```

Disable auto stall recovery.

```
set advanced-settings auto-stall-recovery disabled
```

## See also

[add spares](#)  
[remove spares](#)  
[scrub disk-groups](#)  
[scrub vdisk](#)  
[show advanced-settings](#)

## set auto-write-through-trigger (Deprecated)

Use [set advanced-settings](#).

## set awt (Deprecated)

Use [set advanced-settings](#).

# 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]
 [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

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](#) 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](#)

[show volumes](#)

# 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. The value can include spaces and printable UTF-8 characters except: " <

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](#) 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. The value can include spaces and printable UTF-8 characters except: " <

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 ign.1991-05.com.microsoft:myhost.domain secret 123456abcDEF mutual-name
ign.1995-03.com.acme:01.storage.00c0ffd6000a mutual-secret ABCdef123456(2012-01-21 11:54:33)
```

## See also

[create chap-record](#)  
[delete chap-records](#)  
[show chap-records](#)  
[show iscsi-parameters](#)  
[show ports](#)

# 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|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.

`management-mode v2|v3`

Optional. Sets the management mode for the current CLI session only.

- `v2`: Enables access to linear replication commands and uses linear-storage terminology in command output and system messages. For example, *vdisk* for disk groups and *pools*.
- `v3`: Enables access to virtual replication commands and uses virtual-storage terminology in command output and system messages. For example, *disk group* for disk groups and *pool* for pools.

To change the default management mode for the system, use the [set protocols](#) command.

`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](#)

# 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](#) command.

---

**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](#)

[show controller-date](#)

[show ntp-status](#)

# 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.
- **bkcfg**: 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.
- **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.
- **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 (AssuredSAN 4004 only)

### 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 \(AssuredSAN 4004 only\)](#) command.

---

**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](#) 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” \(page 25\)](#).

### 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 \(AssuredSAN 4004 only\)](#)  
[set fde-state \(AssuredSAN 4004 only\)](#)  
[show disks \(with the fde parameter\)](#)  
[show fde-state \(AssuredSAN 4004 only\)](#)

# set disk-group

## Description

Changes parameters for a specified disk group.

## Minimum role

manage

## Syntax

```
set disk-group
 [name new-name]
 [owner a|b]
 [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.

---

**❗ IMPORTANT:** 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.

---

**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.
- 

**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](#)

# 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](#) 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.

---

**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.

---

**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](#)

# 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](#)

[test](#) (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](#) 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.
- 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.
- 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](#)

# 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
 [encl 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.

encl 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 `encl` 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](#)

[show enclosures](#)

[show expander-status](#)

# 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
 |expander-egress-1|drawer0-egress|drawer1-egress|drawer2-egress
 |drawer0-ingress|drawer1-ingress|drawer2-ingress
 [wnn 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.

encl enclosure-ID

Optional. The enclosure ID of the enclosure containing the PHY. Specify either this parameter or the wnn 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.

*wwn enclosure-**WWN***

Optional. The WWN of the enclosure containing the PHY. Specify either this parameter or the `encl` parameter.

## Examples

Disable the first egress PHY in controller A in enclosure 1.

```
set expander-phy encl 1 controller a type egress phy 0 disabled
```

Enable the PHY for disk 5 in controller B in enclosure 1.

```
set expander-phy encl 1 controller b type drive phy 5 enabled
```

## See also

[set expander-fault-isolation](#)

[show enclosures](#)

[show expander-status](#)

# set fde-import-key (AssuredSAN 4004 only)

## 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: , < > \ (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 \(AssuredSAN 4004 only\)](#)  
[set fde-lock-key \(AssuredSAN 4004 only\)](#)  
[set fde-state \(AssuredSAN 4004 only\)](#)  
[show fde-state \(AssuredSAN 4004 only\)](#)

# set fde-lock-key (AssuredSAN 4004 only)

## 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: , < > \ (Any double-quote characters in the passphrase are automatically removed.)

## 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 \(AssuredSAN 4004 only\)](#)  
[set fde-import-key \(AssuredSAN 4004 only\)](#)  
[set fde-state \(AssuredSAN 4004 only\)](#)  
[show fde-state \(AssuredSAN 4004 only\)](#)

## set fde-state (AssuredSAN 4004 only)

### 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 \(AssuredSAN 4004 only\)](#)

[set fde-import-key \(AssuredSAN 4004 only\)](#)

[set fde-lock-key \(AssuredSAN 4004 only\)](#)

[show fde-state \(AssuredSAN 4004 only\)](#)

## set global-spare (Deprecated)

Use [add spares](#).

# 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 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

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 initiators](#)

# 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 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

*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](#)

# set host-name (Deprecated)

Use [set initiator](#).

# set host-parameters

## Description

Sets controller host-port parameters for communication with attached hosts.

For 3004 SAS: Host ports can be configured to use fan-out SAS cables or standard SAS cables.

For 4004 SAS: No parameters can be set.

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 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 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.

---

❗ **IMPORTANT:**

- 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” \(page 25\)](#).

`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 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](#)  
[restart sc](#)  
[set host-port-mode \(AssuredSAN 4004 only\)](#)  
[set iscsi-parameters](#)  
[show ports](#)

# set host-port-mode (AssuredSAN 4004 only)

## Description

Changes host-interface characteristics for host ports in a CNC 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.

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-parameters](#) command to configure the individual ports.

---

**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-parameters](#)  
[show ports](#)

# 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 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

*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 initiators](#)

# 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.

When CHAP is enabled and the storage system is the recipient of a login request from a known originator (initiator), the system will request a known secret. If the originator supplies the secret, the connection will be allowed.

`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. Allowing for 100 bytes of overhead, a normal frame can contain a 1400-byte payload whereas a jumbo frame can contain a maximum 8900-byte payload 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.
- `1gbps`: 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-parameters](#)

[show iscsi-parameters](#)

## set job-parameters (Deprecated)

Use [set advanced-settings](#).

# 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” \(page 25\)](#). This affects the fault LED.

drawer *ID*

Specifies the drawer to locate. This affects the drawer locator LED. For drawer syntax, see [“Command syntax” \(page 25\)](#).

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” \(page 25\)](#).

## 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.

---

**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.

---

## Minimum role

manage

## Syntax

```
set network-parameters
 [controller a|b]
 [dhcp]
 [gateway gateway]
 [ip address]
 [ipv 4|6]
 [netmask netmask]
 [ping-broadcast enabled|disabled|on|off]
```

## Parameters

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.

`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: Not supported.

---

**NOTE:** IPv6 for controller module network ports is not supported in this release.

---

`netmask netmask`

Optional. An IP subnet mask for the port.

`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.

## 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
```

## See also

[show network-parameters](#)

# 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](#) 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](#)  
[show controller-date](#)  
[show ntp-status](#)

# 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](#)

# 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](#)  
[delete peer-connection](#)  
[query peer-connection](#)  
[show peer-connections](#)

# 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. If the pool's capacity threshold is reached, event 462 is logged with Error severity. When pool usage falls back below any threshold, event 463 is logged with Informational severity.

---

**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](#) 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.

---

**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](#)

[show pools](#)

# 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

[show priorities](#)

[show snap-pools](#)

# 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 SMC web server. This is enabled by default.

https enabled|disabled|on|off

Optional. Enables or disables the secure SMC 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 SMC interface to manage linear storage, to enable access to linear replication commands, 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 SMC interface to manage virtual and linear storage, to enable access to virtual replication commands, 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](#) command. This is enabled by default.

ssh enabled|disabled|on|off

Optional. Enables or disables the secure shell CLI. This is disabled 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](#)

[show protocols](#)

# 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](#)

[delete remote-system](#)

[remote](#)

[show remote-systems](#)

# 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.

*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](#)  
[show replication-volumes](#)  
[show snapshots](#)  
[unmap volume](#)



# 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](#)  
[delete replication-set](#)  
[resume replication-set](#)  
[show replication-sets](#)  
[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](#)


[show replication-volumes](#)

# 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.

---

 **TIP:** 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 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-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.
- [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

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](#)

[show tasks](#)

# 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`.

---

**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](#)

[set snap-pool-threshold](#)

[show snap-pools](#)

# 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](#)

[show snap-pools](#)



# 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).

---

**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](#)

[show pools](#)

# set snmp-parameters

## Description

Sets SNMP parameters for event notification. To enable or disable SNMP requests to the MIB use the [set protocols](#) 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.
- 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.
- 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](#)

[show snmp-parameters](#)

[test](#) (with the `snmp` parameter)

## set spares (Deprecated)

Use [add spares](#) or [remove spares](#).

# 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](#)  
[test](#)

# 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 SMC, 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.
- 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](#)

# 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. For a VolumeCopy task this specifies 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 26 bytes.
- 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. For a VolumeCopy task this specifies 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 this 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 a 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.

`retention-count #`

Optional. For a `TakeSnapshot` task this 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 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. 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 26 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*

The name of the task to change. 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

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
```

## See also

[create task](#)  
[delete task](#)  
[set schedule](#)  
[show schedules](#)  
[show tasks](#)



# 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.

---

**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.
- 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 SMC). 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.

- `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](#)

[show users](#)

# 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]
 [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.

---

**❗ IMPORTANT:** 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.

---

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.

---

**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 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

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](#)

## set vdisk-spare (Deprecated)

Use [add spares](#).

# 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]
[identifying-information description]
[name new-name]
[snapshot-retention-priority never-delete|high|medium|low]
[tier-affinity no-affinity|archive|performance]
volume
```

## Parameters

`access read-write|rw|read-only|ro`

Deprecated—to change mapping settings, use the [map volume](#) command.

`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.
- 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 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.

`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.

`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 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](#)

[show volumes](#)



# 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.

---

**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 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

*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](#)

# 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 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 vdisk 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.

#### 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.

- 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.

#### 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.

#### 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
status
```

**See also**

[set advanced-settings](#)

**show auto-write-through-trigger (Deprecated)**

Use [show advanced-settings](#).

**show awt (Deprecated)**

See [show auto-write-through-trigger \(Deprecated\)](#).

# 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 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: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy. This is the default.
- no-mirror: In this mode of operation, the controller cache performs the same as the standard mode with the exception that the cache metadata is not mirrored to the partner. While this improves the response time of write I/O, it comes at the cost of redundancy. If this option is used, the user can expect higher write performance but is exposed to data loss if a controller fails.

##### 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](#)  
[cache-parameter](#)  
[status](#)

## See also

[set cache-parameters](#)  
[show volumes](#)

# 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](#)  
[status](#)

## See also

[create certificate](#)

# show channels (Deprecated)

Use [show ports](#).

# 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

status

## See also

[create chap-record](#)

[delete chap-records](#)

[set chap-record](#)

[show iscsi-parameters](#)

# 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](#) command.

## Examples

Show current CLI settings.

```
show cli-parameters
```

## Basetypes

[cli-parameters](#)  
[status](#)

## See also

[set cli-parameters](#)  
[show protocols](#)

# show configuration

## Description

Shows system configuration information.

---

**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](#)
- Controller information from [show controllers](#)
- Controller firmware and hardware version information from [show versions](#) with the `detail` parameter
- Host and expansion port information from [show ports](#)
- Disk information from [show disks](#)
- Disk-slot information from [show disks](#) with the `encl` parameter
- Vdisk information from [show vdisks](#)
- Disk-group information from [show disk-groups](#)
- Pool information from [show pools](#)
- Enclosure information from [show enclosures](#)
- Field-replaceable unit (FRU) information from [show frus](#)

Show information about the system configuration.

```
show configuration
```

## Basetypes

[system](#)  
[controllers](#)  
[versions](#)  
[port](#)  
[drives](#)  
[enclosure-list](#)  
[virtual-disks](#)  
[disk-groups](#)  
[pools](#)  
[enclosures](#)  
[enclosure-fru](#)  
[status](#)

# 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](#)  
[status](#)

## See also

[set controller-date](#)  
[set ntp-parameters](#)  
[show ntp-status](#)

# 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

#### 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](#)  
[status](#)

### See also

[show configuration](#)  
[show frus](#)

# 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” \(page 454\)](#).

## 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
status
```

### See also

```
reset all-statistics
reset controller-statistics
```

# show debug-log-parameters

## Description

Shows which debug message types are enabled (On) or disabled (Off) for inclusion in the Storage Controller debug log. For use by or with direction from technical support.

## Minimum role

monitor

## Syntax

```
show debug-log-parameters
```

## Output

- host: Host interface debug messages. Enabled by default.
- disk: Disk interface debug messages. Enabled by default.
- mem: Internal memory debug messages. Disabled by default.
- fo: Failover and recovery debug messages. Enabled by default.
- msg: Inter-controller message debug messages. Enabled by default.
- 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.
- misc: Internal debug messages. Enabled by default.
- rcm: Removable-component manager debug messages. Disabled by default.
- raid: RAID debug messages. Enabled by default.
- cache: Cache debug messages. Enabled by default.
- emp: Enclosure Management Processor debug messages. Enabled by default.
- capi: Internal Configuration API debug messages. Enabled by default.
- mui: Internal service interface debug messages. Enabled by default.
- bkcfg: Internal configuration debug messages. Enabled by default.
- awt: Auto-write-through cache triggers debug messages. Disabled by default.
- res2: Internal debug messages. Disabled by default.
- capi2: Internal Configuration API tracing debug messages. Disabled by default.
- dms: Snapshot feature debug messages. Enabled by default.
- fruid: FRU ID debug messages. Enabled by default.
- resmgr: Reservation Manager debug messages. Disabled by default.
- init: Not used.
- ps: Paged storage. Enabled by default.
- hb: Not used.

## Examples

Show debug log parameters.

```
show debug-log-parameters
```

**Basetypes**

[debug-log-parameters](#)  
[status](#)

**See also**

[set debug-log-parameters](#)

# 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]
 [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.

*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.
- 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.

- 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.

#### 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.

#### 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.



#### 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 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.

#### 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).
- 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](#)  
[status](#)

### See also

[show disks](#)  
[show pools](#)

# 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” \(page 454\)](#).

## 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
status
```

### See also

```
reset all-statistics
reset disk-group-statistics
show disk-groups
show disk-statistics
```

# 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](#)  
[status](#)

## See also

[set disk-parameters](#)

# 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.

---

**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] | [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. You cannot use this parameter with any other parameter.

*fde* (AssuredSAN 4004 only)

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.

*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” \(page 25\)](#).
- `all`: Shows information about all installed disks.
- `free`: Shows information about all disks that are available.

## Output

Properties are described in alphabetical order.

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 (AssuredSAN 4004 only): 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.

Encl

Shown by the `encl` parameter. The number of the enclosure where the disk is located.

FDE State (AssuredSAN 4004 only)

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. If Health is not OK, this field shows the reason for the health state.

#### Health Recommendation

Shown by the `detail` parameter. If Health is not OK, this field shows recommended actions to take to resolve the health issue.

#### I/O Resp Time

Shown by the `perf` parameter. The average time in microseconds to complete I/O.

#### Jobs

Shown by default.

- 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 `encl`. The disk location in the format *enclosure-ID.slot-number*.

#### Lock Key ID (AssuredSAN 4004 only)

Shown by the `fde` parameter. The current lock key ID.

#### Model

Shown by the `encl` parameter. The model number of the disk.

#### Pool

Shown by default. The name of the pool that contains the disk.

#### 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 `encl` 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.
- `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).
- **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` 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.
- `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 `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 detailed information for disk 1.1:

```
show disks 1.1 detail
```

## Basetypes

[drives](#)  
[enclosure-list](#)  
[status](#)

## See also

[show disk-groups](#)  
[show vdisks](#)

# 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” \(page 454\)](#).

## 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.

`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” \(page 25\)](#).

## 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.

#### 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.

#### 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](#) (live)

[drive-summary](#) (historical)

[status](#)

## See also

[reset all-statistics](#)

[reset disk-error-statistics](#)

[reset disk-statistics](#)

[show disk-group-statistics](#)

[show disks](#)

# 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
status
```



## See also

[set email-parameters](#)

# 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

Encl

The enclosure ID.

Encl 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](#)  
[status](#)

#### See also

[set enclosure](#)  
[show sensor-status](#)

# 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.

*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 *MMDDYYhhmmss*. 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 *MMDDYYhhmmss*. 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

eventsLogs

status

**See also**

[clear events](#)

[set snmp-parameters](#)

[show snmp-parameters](#)

# 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

Encl

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.
- 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
sas-status-drawer
status
```

## See also

```
clear expander-status
set expander-fault-isolation
set expander-phy
```



# 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.

Part 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  
status

### See also

[show power-supplies](#)

# show fde-state (AssuredSAN 4004 only)

## 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 (AssuredSAN 4004 only)  
status

## See also

clear fde-keys (AssuredSAN 4004 only)  
set fde-import-key (AssuredSAN 4004 only)  
set fde-lock-key (AssuredSAN 4004 only)  
set fde-state (AssuredSAN 4004 only)

# 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.

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.

#### Original SN

For a power supply module, the original manufacturer serial number. Otherwise, N/A.

#### 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.

#### Enclosure ID

The enclosure number.

### Examples

Show information about all FRUs in the system.

```
show frus
```

### Basetypes

```
enclosure-fru
status
```

# 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  
status

### See also

create host-group  
delete host-groups  
set host-group

## show host-maps (Deprecated)

Use [show maps](#) with the initiator parameter.

## show host-parameters (Deprecated)

Use [show ports](#).

# 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 multiply 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
status
```

## See also

```
show host-port-statistics
```



# 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” \(page 454\)](#).

## 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” \(page 25\)](#). 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](#)

[status](#)

### See also

[reset all-statistics](#)

[reset host-port-statistics](#)

[show ports](#)

## show hosts (Deprecated)

Use [show initiators](#).

# 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.

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](#)

[status](#)

## See also

[delete initiator-nickname](#)

[set initiator](#)

[show host-groups](#) (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](#)  
[status](#)

## See also

[show versions](#)

# 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
status
```

**See also**

[set iscsi-parameters](#)

## **show job-parameters (Deprecated)**

Use [show advanced-settings](#).

# show license

## Description

Shows the status of licensed features in the storage system.

## Minimum role

monitor

## Syntax

```
show license
```

## Output

License Key

- The license key, if a license is installed and valid.
- Blank if a license 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 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 the capability to copy volumes is enabled or disabled.

Volume Copy Expires

- Never. Always enabled and doesn't expire.



## Replication

Shows whether the capability to replicate volumes to a remote system is enabled or disabled.

### Replication 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.

## VDS

Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled or disabled.

### VDS Expires

- Never. License 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 and doesn't expire.
- Number of days remaining for a temporary license.
- Expired. Temporary license has expired and cannot be renewed.

## SRA

Shows whether Storage Replication Adapter (SRA) support is enabled or disabled.

### SRA Expires

- Never. License 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

status

# 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.
- 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](#)

[host-group-view](#)

[host-view-mappings](#)

[volume-group-view](#)

[volume-group-view-mappings](#)

[volume-view](#)

[volume-view-mappings](#)

[status](#)

### See also

[show host-groups](#)

[show initiators](#)

[show volume-groups](#)

[show volumes](#)

# 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.

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](#)

[status](#)

### See also

[convert master-to-std](#)

[create master-volume](#)

[delete all-master-volumes](#)

[delete volumes](#)

[expand volume](#)

[rollback volume](#)

# 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
status
```

### See also

```
set network-parameters
```



# 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.
- 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](#)  
[status](#)

## See also

[set controller-date](#)

# 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](#)

[status](#)

### See also

[create peer-connection](#)

[delete peer-connection](#)

[query peer-connection](#)

[set peer-connection](#)

# 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.

---

**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.

#### 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 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](#)
- [disk-groups](#)
- [tiers](#)
- [status](#)

## See also

- [delete pools](#)
- [set pool](#)
- [show pool-statistics](#)

# 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”](#) (page 454).

## 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-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.

`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” \(page 25\)](#).

## 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.



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` (live)

`resettable-statistics` (live)

`tier-statistics` (live)

`pool-summary` (historical)

`pool-hist-statistics` (historical)

`tier-summary` (historical)

`tier-hist-statistics` (historical)

`readcache-hist-statistics` (historical)

`status`

## See also

[reset all-statistics](#)  
[reset pool-statistics](#)  
[show pools](#)

# 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 in Gbit/s. Not shown for SAS.

- FC: Auto, 16Gb, 8Gb, or 4Gb
- 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.

## 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.

#### 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 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](#)  
[status](#)

### See also

[set host-parameters](#)

# 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.

Part Number

- (blank): Not applicable.

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
fan
status
```

## See also

[show fans](#)  
[show frus](#)



# 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](#) 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](#)  
[status](#)

**See also**

[set priorities](#)  
[show snap-pools](#)

# 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 SMC web server is enabled or disabled. The default is Enabled.

Secure Web Browser Interface (HTTPS)

Shows whether the secure SMC 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 Disabled.

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.

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](#) command.

## Examples

Show the status of service and security protocols.

```
show protocols
```

## Basetypes

```
security-communications-protocols
status
```

## See also

```
set protocols
show cli-parameters
```

# 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” \(page 25\)](#). 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.

*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” \(page 25\)](#). 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](#)  
[status](#)

## See also

[show disk-groups](#)  
[show disks](#)  
[show maps](#)  
[show pools](#)  
[show vdisks](#)

# 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.

Controller ID Status

- Operational: The controller is operational.
- Down: The controller is installed but not operational.
- Not Installed: The controller is not installed.

Controller ID Serial 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
status
```

# 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](#)  
[status](#)

## See also

[set cli-parameters](#)

# 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 Management Controller (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](#)

[status](#)

### See also

[create remote-system](#)

[delete remote-system](#)

[remote](#)

[set remote-system](#)

# 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.
- 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](#)  
[status](#)

### See also

[show replication-sets](#)  
[show replication-volumes](#)

# 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.

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
status
```



## See also

[create replication-set](#)  
[delete replication-set](#)  
[resume replication-set](#)  
[set replication-set](#)  
[suspend replication-set](#)

## For linear storage

### Description

Shows information about replication sets in the local system.

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 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

#### 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.

#### 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  
status

## See also

show replication-images  
show replication-volumes

# 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.

#### 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  
status](#)

#### See also

[set replication-volume-parameters](#)  
[show replication-sets](#)

# 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  
status

## show schedule-details (Deprecated)

Use [show schedules](#).

## 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 tasks](#) command.

### Examples

Show information about all task schedules.

```
show schedules
```

Show information about schedule Sched2.

```
show schedules Sched2
```



## Basetypes

[schedules](#)  
[status](#)

## See also

[create schedule](#)  
[delete schedule](#)  
[set schedule](#)  
[show tasks](#)

# 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

Encl

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
- drawer-sensors
- status

# 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
shutdown-status
status
```

## See also

```
restart mc
restart sc
shutdown
```

# 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.

---

**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]
```

## 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.

## 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
status
```

**See also**

[create snap-pool](#)  
[delete snap-pool](#)  
[expand snap-pool](#)  
[set snap-pool-policy](#)  
[set snap-pool-threshold](#)

# 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
```

## Basetypes

`snap-space`  
`status`

## See also

`set snapshot-space`  
`show pools`



# 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.

#### 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](#)

[status](#)

## See also

[show master-volumes](#)

[show pools](#)

[show snap-pools](#)

[show volumes](#)

# 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`  
`status`

## See also

`set snmp-parameters`  
`set protocols`  
`show protocols`

# 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](#)

[status](#)

## See also

[set syslog-parameters](#)

# 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.

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](#)  
[status](#)

## See also

[set system](#)  
[show system-parameters](#)

# 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 SMC 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 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](#)

[status](#)

### See also

[show system](#)

## show task-details (Deprecated)

Use [show tasks](#).

# show tasks

## Description

Shows information about tasks.

## Minimum role

monitor

## Syntax

```
show tasks
 [task-name]
```

*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.
- Complete: For a TakeSnapshot task only, the task is complete but not yet ready to run again.
- 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
- 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.

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.

**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.
- **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 is expired but this state is not yet synchronized to the partner controller.

##### 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.

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](#)

[status](#)

#### See also

[create schedule](#)

[create task](#)

[delete task](#)

[set task](#)

[show schedules](#)

# show tiers

## 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.

Affinity Size  
The total size of volumes configured to have affinity for that tier.

## Examples

Show information about all tiers.

```
show tiers tier all
```

Show information about the Standard tier.

```
show tiers tier standard
```

## Basetypes

[tiers](#)  
[status](#)

## See also

[show tier-statistics](#)



# show tier-statistics

## 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” \(page 454\)](#).

## 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](#)  
[status](#)

### See also

[reset all-statistics](#)  
[show pools](#)  
[show tiers](#)

# 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](#)  
[status](#)

## See also

[clear cache](#)

# 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.

User Locale

The display language for this user. The default is English.

WBI

- x: The user can access the web-browser interface (the SMC). 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](#)

[status](#)

### See also

[create user](#)

[delete user](#)

[set user](#)

# show vdisks

## Description

Shows information about all or specified vdisks.

## Minimum role

monitor

## Syntax

```
show vdisks
 [vdisk]
```

## Parameters

*vdisk*

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.
- 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.
- 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](#)

[status](#)

### See also

[create vdisk](#)

[delete vdisks](#)

[expand vdisk](#)

[set vdisk](#)



# 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” \(page 454\)](#).

---

**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.

## Output

### 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.

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](#) (live)
- [virtual-disk-summary](#) (historical)
- [vdisk-hist-statistics](#) (historical)
- [status](#)

### See also

- [reset all-statistics](#)
- [reset vdisk-statistics](#)
- [show vdisks](#)

# 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

status

## See also

[show inquiry](#)

# 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  
status

## See also

abort volumecopy  
volumecopy

# 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](#)

[status](#)

## See also

[abort copy](#)

[copy volume](#)

# 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](#)  
[volumes](#)  
[status](#)

### See also

[create volume-group](#)  
[delete volume-groups](#)  
[set volume-group](#)

## show volume-maps (Deprecated)

Use [show maps](#).

# show volume-names

## Description

Shows volume names and serial numbers. This reduced form of the [show volumes](#) 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](#)

[status](#)

## See also

[show maps](#)

[show volumes](#)

# 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](#) 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](#)  
[status](#)

### See also

[release volume](#)  
[show volumes](#)

# 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]
[type all|base|snap-pool|mastervolume|snapshot|standard|primary-volume|secondary-volume|replication-volume]
[vdisk vdisk]
[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.
- *base*: Show only virtual volumes that are not snapshots of any other volume.
- *snap-pool*: Show only snap pools.
- *mastervolume*: Show only master volumes.
- *snapshot*: Show only snapshots.
- *standard*: Show only standard volumes.
- *primary-volume*: Show only primary volumes.
- *secondary-volume*: Show only secondary volumes.
- *replication-volume*: Show only primary volumes and secondary volumes.

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:** This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This is the default.
- **no-mirror:** In this mode of operation, the controller cache performs the same as the standard mode with the exception that the cache metadata is not mirrored to the partner. While this improves the response time of write I/O, it comes at the cost of redundancy. If this option is used, the user can expect higher write performance but is exposed to data loss if a controller fails.

#### 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.

#### Health

- OK
- Degraded
- Fault
- N/A
- Unknown

#### Name

The name of the volume.

#### Pool

The name of the pool that contains the volume.

#### Read Ahead

Shown by the details parameter. The 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.

#### 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 parameter. The serial number of the volume.

#### Size

The total size of the volume.

#### Snap-Pool

Shown by the details parameter. The serial number of the snap pool.

#### 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.

- `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](#)

[status](#)

## See also

[create volume](#)

[delete volumes](#)

[expand volume](#)

[set volume](#)

[show disk-groups](#)

[show maps](#)

[show pools](#)

[show vdisks](#)



# 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” \(page 454\)](#).

## 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.

% 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.

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 volumes.

```
show volume-statistics
```

Show live performance statistics for volume v0001.

```
show volume-statistics v0001
```

### Basetypes

[volume-statistics](#)

[status](#)

### See also

[reset all-statistics](#)

[reset volume-statistics](#)

[show volumes](#)

# 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](#)  
[restart sc](#)  
[show shutdown-status](#)

# 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” \(page 25\)](#).

## Examples

Start drawer 2.1.

```
start drawer 2.1
```

## See also

[show enclosures](#)

[show frus](#)

[stop drawer](#)

# 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.
  - 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.

---

**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](#)  
[reattach replication-volume](#)  
[show vdisks](#)  
[stop vdisk](#)

# 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” \(page 25\)](#).

## Examples

Stop drawer 2.1.

```
stop drawer 2.1
```

## See also

[show enclosures](#)  
[show frus](#)  
[start drawer](#)

# 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.

---

**NOTE:** You cannot stop a vdisk that contains a primary volume.

---

---

**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](#)
- [reattach replication-volume](#)
- [show vdisks](#)
- [start vdisk](#)

# 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](#)

[resume replication](#)

[show replication-sets](#)

[show replication-volumes](#)

# suspend replication-set

## Description

Suspends the replication operations for the specified replication set.

You can run this command on the replication set's primary system.

When you run this command, all replications in progress are paused and no new replications are allowed to start. During the suspension period, you can abort paused replications using the [abort replication](#) command. After you suspend replication, you must resume it using the [resume replication-set](#) command to allow the replication set to resume replications that were in progress and allow new replications to start.

If replications are attempted during the suspended period (including scheduled replications), the replications will fail.

## Minimum role

manage

## Syntax

```
suspend replication-set
[set replication-set-ID]
```

## Parameters

set *replication-set-ID*

Optional. The name or serial number of the replication set for which to suspend replication.

## Examples

Suspend replications in replication set RS1.

```
suspend replication-set RS1
```

## See also

- [abort replication](#)
- [create replication-set](#)
- [delete replication-set](#)
- [resume replication-set](#)
- [set replication-set](#)
- [show replication-sets](#)

# 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)
- 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 Storage Controller log needs to be transferred.

```
test managedlogs region scdebug
```

## See also

[set email-parameters](#)

[set snmp-parameters](#)

# trust

## Description

Enables an offline 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, contact technical support for assistance in determining if the trust operation applies to your situation, and for assistance to perform 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.
  4. Never clear unwritten data cache when a disk group is offline.
  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.
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:
  - o Contact Support for further assistance. This is *recommended*.
  - o 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
- 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 disk-group data_1
```

```
Success: Command completed successfully. (data_1) - Trust operation completed successfully for this 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 disk-group data_1
```

```
Error: The trust operation failed because the 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 disk-group data_1
```

```
Error: Command failed. - The disk group specified contains out-of-sync or partially reconstructed disks that are necessary to restore the 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 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 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 disk group offline.

> **continue**

If you continue with the trust operation, you risk corrupting data in this 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 disk group offline.

> **accept**

```
Success: Command completed successfully. (data_1) - Trust operation completed successfully for this 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 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 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 disk group offline.

> **continue**

If you continue with the trust operation, you risk corrupting data in this 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 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 disk-group.

```
trust disable
```

```
Success: Command completed successfully. - Trust is disabled. (2013-09-17 17:40:01)
```

#### **See also**

[show disk-groups](#)

[show vdisks](#)

[verify disk-groups](#)

[verify vdisk](#)

# unfail controller

## Description

Allows the partner controller module to recover from a simulated failure performed with the [fail](#) 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
```

## See also

[fail](#)  
[show controllers](#)

# 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](#)). 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](#) 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 mapping:

```
unmap volume
 volumes|volume-groups
```

## Parameters

host *hosts*

Deprecated—use the initiator parameter instead.

initiator *initiators*|*hosts*|*host-groups*

A comma-separated list of initiators, hosts, or host groups for which to delete explicit mappings. For initiator, host, and host-group syntax, see [“Command syntax” \(page 25\)](#).

*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](#)  
[show initiators](#)  
[show maps](#)  
[show volumes](#)

# 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, 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.

---

 **TIP:** The `scrub disk-groups` command operates similarly to `verify disk-groups` and can find 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](#)  
[scrub disk-groups](#)  
[show disk-groups](#)

# verify links

## Description

Verifies 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` 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](#)  
[status](#)

**See also**

[show remote-systems](#)  
[verify remote-link](#)



# 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](#) 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 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 AssuredSAN 4004 systems having FC and iSCSI ports.

```
verify remote-link remote-system System2 link-type iSCSI
```

**Basetypes**

[remote-links](#)  
[status](#)

**See also**

[show remote-systems](#)  
[verify links](#)

# 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](#) 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.



**TIP:** The [scrub vdisk](#) command operates similarly to `verify vdisk` and can find 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](#)  
[scrub vdisk](#)  
[show vdisks](#)  
[verify disk-groups](#)

## versions (Deprecated)

Use [show versions](#).

# 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` 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 *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 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

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](#)

[create task](#)

[show vdisks](#)

[show volumecopy-status](#)

[show volumes](#)

## 4 XML API basetype properties

[Chapter 3](#) describes command output that is shown in console format. This chapter describes the basetype properties that CLI commands display in XML API format, and is organized to help you find a basetype by name. This chapter 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 [Table 4 \(page 22\)](#).
- References to embedded or nested basetypes that the output may show.

## advanced-settings-table

This basetype is used by [show advanced-settings](#).

**Table 11** 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 background-scrub-interval parameter. <ul style="list-style-type: none"><li>Disabled: Background disk-group scrub is disabled. This is the default.</li><li>Enabled: Background disk-group scrub is enabled.</li></ul>
background-scrub-numeric	uint32	Numeric equivalents for background-scrub values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
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"><li>Disabled: Partner firmware upgrade is disabled.</li><li>Enabled: Partner firmware upgrade is enabled. This is the default.</li></ul>
partner-firmware-upgrade-numeric	uint32	Numeric equivalents for partner-firmware-upgrade values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
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"><li>High: Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.</li><li>Medium: Utility performance is balanced with host I/O performance.</li><li>Low: Utilities run at a slower rate with minimal effect on host I/O.</li></ul>
utility-priority-numeric	uint32	Numeric equivalents for utility-priority values. <ul style="list-style-type: none"><li>0: High</li><li>1: Medium</li><li>2: Low</li></ul>
smart	string	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none"><li>Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system.</li><li>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.</li><li>Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.</li></ul>

**Table 11 advanced-settings-table properties (continued)**

Name	Type	Description
smart-numeric	uint32	Numeric equivalents for smart values. <ul style="list-style-type: none"> <li>0: Detect-Only</li> <li>1: Enabled</li> <li>2: Disabled</li> </ul>
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"> <li>Disabled: The dynamic spares feature is disabled. This is the default.</li> <li>Enabled: The dynamic spares feature is enabled.</li> </ul>
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 MODE SELECT command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> <li>Disabled: Host control of caching is disabled. This is the default.</li> <li>Enabled: Host control of caching is enabled.</li> </ul>
host-cache-control-numeric	uint32	Numeric equivalents for host-cache-control values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
sync-cache-mode	string	Shows how the SCSI SYNCHRONIZE CACHE command is handled. <ul style="list-style-type: none"> <li>Immediate: Good status is returned immediately and cache content is unchanged. This is the default.</li> <li>Flush To Disk: Good status is returned only after all write-back data for the specified volume is flushed to disk.</li> </ul>
sync-cache-mode-numeric	uint32	Numeric equivalents for sync-cache-mode values. <ul style="list-style-type: none"> <li>0: Immediate</li> <li>1: Flush to Disk</li> </ul>
independent-cache	string	Shows the cache redundancy mode for a dual-controller storage system. <ul style="list-style-type: none"> <li>Disabled: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. This is the default.</li> <li>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.</li> </ul>
independent-cache-numeric	uint32	Numeric equivalents for independent-cache values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>



**Table 11 advanced-settings-table properties (continued)**

Name	Type	Description
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"> <li>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.</li> <li>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.</li> </ul>
missing-lun-response-numeric	uint32	Numeric equivalents for missing-lun-response values. <ul style="list-style-type: none"> <li>0: Not Ready</li> <li>1: Illegal Request</li> </ul>
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"> <li>Disabled: The controller failure trigger is disabled. This is the default.</li> <li>Enabled: The controller failure trigger is enabled.</li> </ul>
controller-failure-numeric	uint32	Numeric equivalents for controller-failure values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: The supercapacitor failure trigger is disabled.</li> <li>Enabled: The supercapacitor failure trigger is enabled. This is the default.</li> </ul>
super-cap-failure-numeric	uint32	Numeric equivalents for super-cap-failure values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: The CompactFlash failure trigger is disabled.</li> <li>Enabled: The CompactFlash failure trigger is enabled. This is the default.</li> </ul>
compact-flash-failure-numeric	uint32	Numeric equivalents for compact-flash-failure values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: The power-supply failure trigger is disabled. This is the default.</li> <li>Enabled: The power-supply failure trigger is enabled.</li> </ul>
power-supply-failure-numeric	uint32	Numeric equivalents for power-supply-failure values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>

**Table 11 advanced-settings-table properties (continued)**

Name	Type	Description
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"> <li>Disabled: The fan failure trigger is disabled. This is the default.</li> <li>Enabled: The fan failure trigger is enabled.</li> </ul>
fan-failure-numeric	uint32	Numeric equivalents for fan-failure values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: The over-temperature trigger is disabled. This is the default.</li> <li>Enabled: The over-temperature trigger is enabled.</li> </ul>
temperature-exceeded-numeric	uint32	Numeric equivalents for temperature-exceeded values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
partner-notify	string	Shows whether the partner controller will be notified when a trigger condition occurs. <ul style="list-style-type: none"> <li>Disabled: Notification is disabled. The partner controller will continue using its current caching mode. This is the default.</li> <li>Enabled: Notification is enabled. The partner controller will change to write-through mode for better data protection.</li> </ul>
partner-notify-numeric	uint32	Numeric equivalents for partner-notify values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: Auto-write-back is disabled.</li> <li>Enabled: Auto-write-back is enabled. This is the default.</li> </ul>
auto-write-back-numeric	uint32	Numeric equivalents for auto-write-back values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: Drive spin down for available disks and global spares is disabled. This is the default.</li> <li>Enabled: Drive spin down for available disks and global spares is enabled.</li> </ul>
disk-dsd-enable-numeric	uint32	Numeric equivalents for disk-dsd-enable values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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.

**Table 11 advanced-settings-table properties (continued)**

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"> <li>Disabled: Background disk scrub is disabled. This is the default.</li> <li>Enabled: Background disk scrub is enabled.</li> </ul>
background-disk-scrub-numeric	uint32	Numeric equivalents for background-disk-scrub values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Disabled: The managed logs feature is disabled. This is the default.</li> <li>Enabled: The managed logs feature is enabled.</li> </ul>
managed-logs-numeric	uint32	Numeric equivalents for managed-logs values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
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"> <li>Enabled: Single Controller mode is enabled.</li> <li>Disabled: Single Controller mode is disabled.</li> </ul>
single-controller-numeric	string	Numeric equivalents for single-controller values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
disk-protection-info	string	Not supported.
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"> <li>Disabled: Auto stall recovery is disabled.</li> <li>Enabled: Auto stall recovery is enabled. This is the default.</li> </ul>
auto-stall-recovery-numeric	uint32	Numeric equivalents for auto-stall-recovery values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>

**Table 11 advanced-settings-table properties (continued)**

Name	Type	Description
restart-on-capi-fail	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-capi-fail-numeric	uint32	Numeric equivalents for restart-on-capi-fail values. <ul style="list-style-type: none"><li>• 0: Disabled</li><li>• 1: Enabled</li></ul>
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"><li>• 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).</li><li>• 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.</li></ul>
large-pools-numeric	uint32	Numeric equivalents for large-pools values. <ul style="list-style-type: none"><li>• 0: Disabled</li><li>• 1: Enabled</li></ul>

## attribute-priorities

This basetype is used by [show priorities](#).

**Table 12** attribute-priorities properties

Name	Type	Description
attribute-name	string	<p>Snapshot retention attribute.</p> <ul style="list-style-type: none"><li>• Standard Snapshot</li><li>• 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.</li><li>• Replication Snapshot</li><li>• 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.</li><li>• 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.</li><li>• 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.</li><li>• Queued Snapshot: A snapshot that was taken for remote replication but is queued waiting for the previous replications to complete.</li><li>• DRM Snapshot: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).</li></ul>
priority-value	string	<p>Retention priority for the corresponding attribute. Values are shown as hexadecimal numbers.</p>

## cache-parameter

This basetype is used by [show cache-parameters](#), when a volume is specified, to show volume cache properties.

**Table 13** 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"><li>• 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.</li><li>• 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.</li></ul>
write-policy-numeric	uint32	Numeric equivalents for write-policy values. <ul style="list-style-type: none"><li>• 0: write-through</li><li>• 1: write-back</li></ul>
cache-optimization	string	If a volume is specified, its cache optimization mode. <ul style="list-style-type: none"><li>• standard: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy. This is the default.</li><li>• no-mirror: In this mode of operation, the controller cache performs the same as the standard mode with the exception that the cache metadata is not mirrored to the partner. While this improves the response time of write I/O, it comes at the cost of redundancy. If this option is used, the user can expect higher write performance but is exposed to data loss if a controller fails.</li></ul>
cache-optimization-numeric	uint32	Numeric equivalents for cache-optimization values. <ul style="list-style-type: none"><li>• 0: standard</li><li>• 2: no-mirror</li></ul>

**Table 13** cache-parameter properties (continued)

Name	Type	Description
read-ahead-size	string	<p>The volume's read-ahead cache setting.</p> <ul style="list-style-type: none"> <li>Disabled: Read-ahead is disabled.</li> <li>Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.</li> <li>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.</li> <li>512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.</li> </ul>
read-ahead-size-numeric	uint32	<p>Numeric equivalents for read-ahead-size values.</p> <ul style="list-style-type: none"> <li>-2: Stripe</li> <li>-1: Adaptive</li> <li>0: Disabled</li> <li>524288: 512 KB</li> <li>1048576: 1 MB</li> <li>2097152: 2 MB</li> <li>4194304: 4 MB</li> <li>8388608: 8 MB</li> <li>16777216: 16 MB</li> <li>33554432: 32 MB</li> </ul>

## cache-settings

This basetype is used by [show cache-parameters](#) to show system cache properties.

**Table 14** cache-settings properties

Name	Type	Description
operation-mode	string	<p>The system's operating mode, also called the cache redundancy mode.</p> <ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• Single Controller: There is only a single controller in the enclosure.</li><li>• Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</li><li>• Down: Both controllers are not operational.</li></ul>
operation-mode-numeric	uint32	<p>Numeric equivalents for operation-mode values.</p> <ul style="list-style-type: none"><li>• 1: Independent Cache Performance Mode</li><li>• 2: Active-Active ULP</li><li>• 3: Single Controller</li><li>• 4: Failed Over</li><li>• 5: Down</li></ul>
controller-cache-parameters	Embedded; see <a href="#">controller-cache-parameters</a> .	



## certificate-status

This basetype is used by [show certificate](#).

**Table 15** certificate-status properties

Name	Type	Description
controller	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-numeric	string	Numeric equivalents for controller values. <ul style="list-style-type: none"><li>0: A</li><li>1: B</li></ul>
certificate-status	string	<ul style="list-style-type: none"><li>Customer-supplied: The controller is using a certificate that you have uploaded.</li><li>System-generated: The controller is using system-generated certificates.</li><li>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.</li></ul>
certificate-status-numeric	uint32	Numeric equivalents for certificate-status values. <ul style="list-style-type: none"><li>0: Default</li><li>1: Customer-supplied</li></ul>
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 chap-records](#).

**Table 16** 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](#).

**Table 17** 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"><li>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.</li><li>api: Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by COMP elements.</li><li>api-embed: Alternate form of XML output which displays “child” objects embedded (indented) under “parent” objects.</li><li>ipa: Alternate form of XML output.</li><li>json: Alternate data-interchange format.</li></ul>
output-format-api	string	<ul style="list-style-type: none"><li>console</li><li>api</li><li>api-brief</li><li>api-embed</li><li>api-embed-brief</li><li>json</li><li>json-full</li></ul>
output-format-api-numeric	uint32	Numeric equivalents for output-format-api values. <ul style="list-style-type: none"><li>1: console</li><li>2: api</li><li>3: api-brief</li><li>4: api-embed</li><li>5: api-embed-brief</li><li>6: json</li><li>7: json-full</li></ul>
brief-mode	string	<ul style="list-style-type: none"><li>Enabled: In XML output, this setting shows a subset of attributes of object properties. The name and type attributes are always shown.</li><li>Disabled: In XML output, this setting shows all attributes of object properties. This is the default.</li></ul>
brief-mode-numeric	uint32	Numeric equivalents for brief-mode values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
base	uint8	Alias for storage-size-base.
pager	string	<ul style="list-style-type: none"><li>Enabled: Halts output after each full screen to wait for keyboard input. This is the default.</li><li>Disabled: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.</li></ul>

**Table 17 cli-parameters properties (continued)**

Name	Type	Description
pager-numeric	uint32	Numeric equivalents for pager values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
locale	string	Display language. <ul style="list-style-type: none"> <li>English (the default)</li> <li>Spanish</li> <li>French</li> <li>German</li> <li>Italian</li> <li>Japanese</li> <li>Korean</li> <li>Dutch</li> <li>Chinese-simplified</li> <li>Chinese-traditional</li> <li>Korean</li> <li>Arabic</li> <li>Portuguese</li> <li>Russian</li> </ul>
locale-numeric	uint32	Numeric equivalents for locale values. <ul style="list-style-type: none"> <li>0: English</li> <li>1: Spanish</li> <li>2: French</li> <li>3: German</li> <li>4: Italian</li> <li>5: Japanese</li> <li>9: Korean</li> <li>6: Dutch</li> <li>7: Chinese-simplified</li> <li>8: Chinese-traditional</li> <li>9: Korean</li> <li>10: Arabic</li> <li>11: Portuguese</li> <li>12: Russian</li> </ul>
storage-size-base	uint8	Base for entry and display of storage-space sizes. <ul style="list-style-type: none"> <li>2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.</li> <li>10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default.</li> </ul> <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	Number of decimal places (1–10) for display of storage-space sizes. The default is 1.

**Table 17 cli-parameters properties (continued)**

Name	Type	Description
storage-size-units	string	<p>Unit for display of storage-space sizes.</p> <ul style="list-style-type: none"> <li>Auto: Lets the system determine the proper unit for a size. This is the default.</li> <li>MB: Sizes are shown in megabytes.</li> <li>GB: Sizes are shown in gigabytes.</li> <li>TB: Sizes are shown in terabytes.</li> </ul> <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 storage-size-units is set to TB, storage-size-precision is set to 1, and storage-size-base is set to 10, the size 0.11709 TB is instead shown as 117.1 GB.</p>
storage-size-units-numeric	uint32	<p>Numeric equivalents for storage-size-units values.</p> <ul style="list-style-type: none"> <li>0: Auto</li> <li>1: MB</li> <li>2: GB</li> <li>3: TB</li> </ul>
temperature-scale	string	<ul style="list-style-type: none"> <li>Fahrenheit: Temperatures are shown in degrees Fahrenheit.</li> <li>Celsius: Temperatures are shown in degrees Celsius. This is the default.</li> </ul>
temperature-scale-numeric	uint32	<p>Numeric equivalents for temperature-scale values.</p> <ul style="list-style-type: none"> <li>0: Fahrenheit</li> <li>1: Celsius</li> </ul>
user-type	string	<p>The logged-in user's experience level.</p> <ul style="list-style-type: none"> <li>Novice</li> <li>Standard (the default)</li> <li>Advanced</li> <li>Diagnostic</li> </ul>
user-type-numeric	uint32	<p>Numeric equivalents for user-type values.</p> <ul style="list-style-type: none"> <li>1: Novice</li> <li>2: Standard</li> <li>3: Advanced</li> <li>4: Diagnostic</li> </ul>
username	string	The logged-in user name.
management-mode	string	<p>The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session.</p> <ul style="list-style-type: none"> <li>v2: Uses terminology that is oriented to managing linear storage. For example, vdisk for disk groups and pools.</li> <li>v3: Uses terminology that is oriented to managing virtual and linear storage. For example, disk group for disk groups and pool for pools.</li> </ul>
management-mode-numeric	uint32	<p>Numeric equivalents for management-mode values.</p> <ul style="list-style-type: none"> <li>2: v2</li> <li>3: v3</li> </ul>

## code-load-readiness

This basetype is used by [check firmware-upgrade-health](#).

**Table 18** code-load-readiness properties

Name	Type	Description
overall-health	string	<ul style="list-style-type: none"><li>Pass: There are no risks to performing firmware upgrade.</li><li>Fail: At least one condition exists that presents a risk of upgrade failure or loss of availability.</li></ul>
overall-health-numeric	string	Numeric equivalents for overall-health values. <ul style="list-style-type: none"><li>0: Pass</li><li>1: Fail</li></ul>
code-load-readiness-reasons	Embedded; see <a href="#">code-load-readiness-reasons</a> .	

## code-load-readiness-reasons

This basetype is used by [check firmware-upgrade-health](#).

**Table 19** 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](#).

**Table 20 compact-flash properties**

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"><li>• Ctlr A CF: CompactFlash card in controller A.</li><li>• Ctlr B CF: CompactFlash card in controller B.</li></ul>
controller-id	string	<ul style="list-style-type: none"><li>• A: Controller A.</li><li>• B: Controller B.</li></ul>
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none"><li>• 0: B</li><li>• 1: A</li></ul>
name	string	<ul style="list-style-type: none"><li>• Controller A CompactFlash</li><li>• Controller B CompactFlash</li></ul>
status	string	<ul style="list-style-type: none"><li>• Not Installed</li><li>• Installed</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 0: Not Installed</li><li>• 1: Installed</li></ul>
cache-flush	string	<ul style="list-style-type: none"><li>• 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.</li><li>• Disabled: Cache flush is disabled.</li></ul>
cache-flush-numeric	uint32	Numeric equivalents for cache-flush values. <ul style="list-style-type: none"><li>• 0: Disabled</li><li>• 1: Enabled</li></ul>
health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Fault</li><li>• N/A</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 2: Fault</li><li>• 4: N/A</li></ul>
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.



## controller-cache-parameters

This basetype is used by [show cache-parameters](#) to show controller cache properties.

**Table 21** controller-cache-parameters properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"><li>cache-params-a: Cache parameters for controller A.</li><li>cache-params-b: Cache parameters for controller B.</li></ul>
controller-id	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
name	string	<ul style="list-style-type: none"><li>Controller A Cache Parameters</li><li>Controller B Cache Parameters</li></ul>
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"><li>Enabled: Write-back. This is the normal state.</li><li>Disabled: Write-through.</li><li>Not up: The controller is not up.</li></ul>
write-back-status-numeric	uint32	Numeric equivalents for write-back-status values. <ul style="list-style-type: none"><li>0: Enabled (write-back)</li><li>1: Disabled (write-through)</li><li>2: Not up</li></ul>
compact-flash-status	string	<ul style="list-style-type: none"><li>Not Installed: The CompactFlash card is not installed.</li><li>Installed: The CompactFlash card is installed.</li></ul>
compact-flash-status-numeric	uint32	Numeric equivalents for compact-flash-status values. <ul style="list-style-type: none"><li>0: Not Installed</li><li>1: Installed</li></ul>
compact-flash-health	string	<ul style="list-style-type: none"><li>OK</li><li>Degraded</li><li>Fault</li><li>N/A</li><li>Unknown</li></ul>
compact-flash-health-numeric	uint32	Numeric equivalents for compact-flash-health values. <ul style="list-style-type: none"><li>0: OK</li><li>1: Degraded</li><li>2: Fault</li><li>3: Unknown</li><li>4: N/A</li></ul>

**Table 21 controller-cache-parameters properties (continued)**

Name	Type	Description
cache-flush	string	<ul style="list-style-type: none"><li>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.</li><li>Disabled: Cache flush is disabled.</li></ul>
cache-flush-numeric	uint32	Numeric equivalents for cache-flush values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>

## controllers

This basetype is used by [show configuration](#) and [show controllers](#).

**Table 22** controllers properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"><li>controller a</li><li>controller b</li></ul>
controller-id	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-id-numeric	uint32	<ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
serial-number	string	<ul style="list-style-type: none"><li>Serial number of the controller module.</li><li>Not Available: The controller module is down or not installed.</li></ul>
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"><li>4: IPv4</li></ul>
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.
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"><li>SAS</li></ul>
drive-bus-type-numeric	uint32	Numeric equivalent for drive-bus-type value. <ul style="list-style-type: none"><li>8: SAS</li></ul>
status	string	<ul style="list-style-type: none"><li>Operational</li><li>Down</li><li>Not installed</li><li>Unknown</li></ul>

**Table 22 controllers properties (continued)**

Name	Type	Description
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> <li>0: Operational</li> <li>1: Down</li> <li>2: Not installed</li> <li>3: Unknown</li> </ul>
failed-over	string	Indicates whether the partner controller has failed over to this controller. <ul style="list-style-type: none"> <li>No: The partner controller has not failed over to this controller.</li> <li>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.</li> </ul>
failed-over-numeric	uint32	Numeric equivalents for failed-over values. <ul style="list-style-type: none"> <li>0: No</li> <li>1: Yes</li> </ul>
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.
internal-serial-number	string	Internal serial number of the controller.
cache-lock	string	Shows whether hosts are prevented from using the SCSI MODE SELECT command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> <li>No: Hosts are permitted to disable write-back cache.</li> <li>Yes: Hosts are prevented from disabling write-back cache.</li> </ul>
cache-lock-numeric	uint32	Numeric equivalents for cache-lock values. <ul style="list-style-type: none"> <li>0: No</li> <li>1: Yes</li> </ul>
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"> <li>write-back: This is the normal state.</li> <li>write-through</li> <li>Not up: The controller is not up.</li> </ul>

**Table 22 controllers properties (continued)**

Name	Type	Description
write-policy-numeric	uint32	Numeric equivalents for write-policy values. <ul style="list-style-type: none"> <li>0: write-back</li> <li>1: write-through</li> <li>2: Not up</li> </ul>
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 <i>year-month-day hour:minutes:seconds</i> (UTC), when the controller's PCBA was programmed.
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.
locator-led	string	Shows the state of the locator LED on a controller module. <ul style="list-style-type: none"> <li>Off</li> <li>On</li> </ul>
locator-led-numeric	uint32	Numeric equivalents for the locator-led property. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
ssd-alt-path-io-count	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"> <li>OK</li> <li>Degraded</li> <li>Fault</li> <li>Unknown</li> <li>N/A</li> </ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> <li>0: OK</li> <li>1: Degraded</li> <li>2: Fault</li> <li>3: Unknown</li> <li>4: N/A</li> </ul>
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.

**Table 22 controllers properties (continued)**

Name	Type	Description
position	string	Position of the controller module, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>• Left</li> <li>• Right</li> <li>• Top</li> <li>• Bottom</li> </ul>
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"> <li>• 0: Left</li> <li>• 1: Right</li> <li>• 2: Top</li> <li>• 3: Bottom</li> </ul>
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"> <li>• Enabled: PHY fault isolation is enabled. This is the default.</li> <li>• Disabled: PHY fault isolation is disabled.</li> </ul>
phy-isolation-numeric	uint32	Numeric equivalents for phy-isolation values. <ul style="list-style-type: none"> <li>• 0: Enabled</li> <li>• 1: Disabled</li> </ul>
redundancy-mode	string	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• Single Controller: The enclosure contains a single controller.</li> <li>• Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</li> <li>• Down: Both controllers are not operational.</li> </ul>
redundancy-mode-numeric	uint32	Numeric equivalents for redundancy-mode values. <ul style="list-style-type: none"> <li>• 1: Independent Cache Performance Mode</li> <li>• 2: Active-Active ULP</li> <li>• 3: Single Controller</li> <li>• 4: Failed Over</li> <li>• 5: Down</li> </ul>

**Table 22 controllers properties (continued)**

Name	Type	Description
redundancy-status	string	<ul style="list-style-type: none"><li>Redundant with independent cache: Both controllers are operational but are not mirroring their cache metadata to each other.</li><li>Redundant: Both controllers are operational.</li><li>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.</li><li>Down: This controller is not operational.</li><li>Unknown: Status information is not available.</li></ul>
redundancy-status-numeric	uint32	<p>Numeric equivalents for redundancy-status values.</p> <ul style="list-style-type: none"><li>0: Operational but not redundant</li><li>1: Redundant with independent cache</li><li>3: Redundant</li><li>4: Down</li><li>5: Unknown</li></ul>
unhealthy-component	Embedded; see <a href="#">unhealthy-component</a> .	
ip-address	Embedded; see <a href="#">network-parameters</a> .	
port-details	Embedded; see <a href="#">port</a> .	
enclosure-id	Embedded; see <a href="#">expander-ports</a> .	
compact-flash	Embedded; see <a href="#">compact-flash</a> .	

## controller-statistics

This basetype is used by [show controller-statistics](#).

**Table 23** controller-statistics properties

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"><li>controller a</li><li>controller b</li></ul>
cpu-load	uint32	Percentage of time the CPU is busy, from 0 to 100.
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 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	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 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.
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 iops and bytes-per-second values.



**Table 23** controller-statistics properties (continued)

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 iops and bytes-per-second 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](#).

**Table 24** copy-volumes properties

Name	Type	Description
source-volume	string	The name of the source volume.
source-volume-serial	string	The serial number of the source volume.
source-type	string	The type of the source volume: Virtual or Linear.
source-pool-name	string	The name of the source pool: A or B.
destination-volume	string	The name of the destination volume.
destination-volume-serial	string	The serial number of the destination volume.
destination-type	string	The type of the destination volume.
destination-pool-name	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](#).

**Table 25** cs-replicate-tasks properties

Name	Type	Description
replication-set-name	string	The name of the replication set.
replication-set-serialnum	string	The serial number of the replication set.

## cs-replication

This basetype is used by [show replication-sets](#).

**Table 26** cs-replication properties

Name	Type	Description
replication-state	string	<ul style="list-style-type: none"><li>• Last Run</li><li>• Current Run</li></ul>
replication-state-numeric	uint32	Numeric equivalents for replication-state values. <ul style="list-style-type: none"><li>• 0: Last Run</li><li>• 1: Current Run</li></ul>
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, the value will be 0.
progress	string	The percentage complete of the active replication. Otherwise, 0%.
total-data-transferred	uint64	The total number of bytes transferred.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
collection-time	uint32	The date and time when the replication data shown by this command was collected.
collection-time-numeric	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-time-completion	string	The date and time when the replication is estimated to end.
estimated-time-completion-numeric	uint32	Unformatted estimated-time-completion value.
most-recent-suspend-time	string	The most recent time that the replication was suspended.
most-recent-suspend-time-numeric	uint32	Unformatted most-recent-suspend-time value.
num-seconds-suspended	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](#) for a virtual replication set.

**Table 27** 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"><li>• Yes: The replication set is part of a group.</li><li>• No: The replication set is not part of a group.</li></ul>
group-numeric	uint32	Numeric equivalents for group values. <ul style="list-style-type: none"><li>• 0: No</li><li>• 1: Yes</li></ul>
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"><li>• 0: Remote</li><li>• 1: Local</li></ul>
peer-connection-name	string	The name of the peer connection.
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 group, it uses the . * notation.
secondary-volume-serial	string	The serial number of the secondary volume.
sync-job-active	string	<ul style="list-style-type: none"><li>• False: No replication is in progress on the replication set.</li><li>• True: A replication is currently in progress on the replication set.</li></ul>
sync-job-active-numeric	uint32	Numeric equivalents for sync-job-active values. <ul style="list-style-type: none"><li>• 0: False</li><li>• 1: True</li></ul>
status	string	<ul style="list-style-type: none"><li>• Not Ready: The replication set is not ready for replications because the system is still preparing the replication set.</li><li>• Unsynchronized: The primary and secondary volumes are unsynchronized because the system has prepared the replication set, but the initial replication has not run.</li><li>• Running: A replication is in progress.</li><li>• Ready: The replication set is ready for a replication.</li><li>• Suspended: Replications have been suspended.</li><li>• 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.</li></ul>

**Table 27 cs-replication-set properties (continued)**

Name	Type	Description
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.
last-success-time-numeric	uint32	Unformatted last-success-time value.
last-success-generation	sint32	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"><li>• N/A: The replication has not yet completed.</li><li>• Success: The replication completed successfully.</li><li>• Fail: The replication failed</li></ul>
last-run-status-numeric	uint32	Numeric equivalents for last-run-status values. <ul style="list-style-type: none"><li>• 0: N/A</li><li>• 1: Success</li><li>• 2: Fail</li></ul>
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 <a href="#">cs-replication</a> .	
current-replication-run	Embedded; see <a href="#">cs-replication</a> .	

## debug-log-parameters

This basetype is used by [show debug-log-parameters](#).

**Table 28** 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"><li>Off: Disabled.</li><li>On: Enabled. This is the default.</li></ul>
host-dbg-numeric	uint32	Numeric equivalents for host values. <ul style="list-style-type: none"><li>0: Off</li><li>1: On</li></ul>
disk	string	Shows whether disk interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"><li>Off: Disabled.</li><li>On: Enabled. This is the default.</li></ul>
disk-numeric	uint32	Numeric equivalents for disk values. <ul style="list-style-type: none"><li>0: Off</li><li>1: On</li></ul>
mem	string	Shows whether internal memory debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"><li>Off: Disabled. This is the default.</li><li>On: Enabled.</li></ul>
mem-numeric	uint32	Numeric equivalents for mem values. <ul style="list-style-type: none"><li>0: Off</li><li>1: On</li></ul>
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"><li>Off: Disabled.</li><li>On: Enabled. This is the default.</li></ul>
fo-numeric	uint32	Numeric equivalents for fo values. <ul style="list-style-type: none"><li>0: Off</li><li>1: On</li></ul>
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"><li>Off: Disabled.</li><li>On: Enabled. This is the default.</li></ul>
msg-numeric	uint32	Numeric equivalents for msg values. <ul style="list-style-type: none"><li>0: Off</li><li>1: On</li></ul>

**Table 28** debug-log-parameters properties (continued)

Name	Type	Description
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"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
ioa-numeric	uint32	Numeric equivalents for ioa values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
iob-numeric	uint32	Numeric equivalents for iob values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
ioc-numeric	uint32	Numeric equivalents for ioc values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
iod-numeric	uint32	Numeric equivalents for iod values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
misc	string	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
misc-numeric	uint32	Numeric equivalents for misc values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
rcm	string	Shows whether removable-component manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>



**Table 28 debug-log-parameters properties (continued)**

Name	Type	Description
rcm-numeric	uint32	Numeric equivalents for <code>rcm</code> values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
raid	string	Shows whether RAID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
raid-numeric	uint32	Numeric equivalents for <code>raid</code> values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
cache	string	Shows whether cache debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
cache-numeric	uint32	Numeric equivalents for <code>cache</code> values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
emp	string	Shows whether Enclosure Management Processor debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
emp-numeric	uint32	Numeric equivalents for <code>emp</code> values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
capi-numeric	uint32	Numeric equivalents for <code>capi</code> values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
mui-numeric	uint32	Numeric equivalents for <code>mui</code> values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>

**Table 28 debug-log-parameters properties (continued)**

Name	Type	Description
bkcfg	string	Shows whether internal configuration debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
bkcfg-numeric	uint32	Numeric equivalents for bkcfg values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
awt-numeric	uint32	Numeric equivalents for awt values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
res2	string	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
res2-numeric	uint32	Numeric equivalents for res2 values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
capi2-numeric	uint32	Numeric equivalents for capi2 values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
dms	string	Shows whether Snapshot feature debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
dms-numeric	uint32	Numeric equivalents for dms values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
fruid	string	Shows whether FRU ID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>

**Table 28** debug-log-parameters properties (continued)

Name	Type	Description
fruid-numeric	uint32	Numeric equivalents for fruid values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
resmgr	string	Shows whether Reservation Manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off: Disabled. This is the default.</li> <li>On: Enabled.</li> </ul>
resmgr-numeric	uint32	Numeric equivalents for resmgr values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
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"> <li>Off: Disabled.</li> <li>On: Enabled. This is the default.</li> </ul>
ps-numeric	uint32	Numeric equivalents for ps values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
hb	string	Not used.
hb-numeric	uint32	Not used.

## disk-groups

This basetype is used by [show configuration](#), [show disk-groups](#), and [show pools](#).

**Table 29** 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 size value in 512-byte blocks.
freespace	uint64	The amount of free space in the disk group, formatted to use the current base, precision, and units.
freespace-numeric	uint32	Unformatted freespace 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 raw-size value in 512-byte blocks.
storage-type	string	<ul style="list-style-type: none"><li>Linear: The disk group acts as a linear pool.</li><li>Virtual: The disk group is in a virtual pool.</li></ul>
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"><li>0: Linear</li><li>1: Virtual</li></ul>
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"><li>Archive: The disk group is in the lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).</li><li>Performance: The disk group is in the highest storage tier, which uses SSDs (high speed).</li><li>Read Cache: The disk is an SSD providing high-speed read cache for a storage pool.</li><li>Standard: The disk group is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).</li></ul>
storage-tier-numeric	uint32	Numeric equivalents for storage-tier values. <ul style="list-style-type: none"><li>0: N/A</li><li>1: Performance</li><li>2: Standard</li><li>4: Archive</li><li>8: Read Cache</li></ul>
total-pages	uint32	For a virtual disk group, the total number of 4-MB pages it contains. For a linear disk group, 0.
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.

**Table 29 disk-groups properties (continued)**

Name	Type	Description
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"> <li>A: Controller A.</li> <li>B: Controller B.</li> </ul>
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> <li>0: B</li> <li>1: A</li> </ul>
preferred-owner	string	Controller that owns the disk group and its volumes during normal operation. <ul style="list-style-type: none"> <li>A: Controller A.</li> <li>B: Controller B.</li> </ul>
preferred-owner-numeric	uint32	Numeric equivalents for preferred-owner values. <ul style="list-style-type: none"> <li>0: B</li> <li>1: A</li> </ul>
raidtype	string	The RAID level of the disk group. <ul style="list-style-type: none"> <li>NRAID</li> <li>RAID0</li> <li>RAID1</li> <li>RAID3</li> <li>RAID5</li> <li>RAID6</li> <li>RAID10</li> <li>RAID50</li> </ul>
raidtype-numeric	uint32	Numeric equivalents for raidtype values. <ul style="list-style-type: none"> <li>0: RAID0</li> <li>1: RAID1</li> <li>3: RAID3</li> <li>5: RAID5</li> <li>6: NRAID</li> <li>8: RAID50</li> <li>10: RAID10</li> <li>11: RAID6</li> </ul>
diskcount	uint16	Number of disks in the disk group.
sparecount	uint16	For a linear disk group, the number of spares assigned to the disk group. For a virtual disk group, 0.
chunksize	string	<ul style="list-style-type: none"> <li>For RAID levels except NRAID, RAID 1, and RAID 50, the chunk size for the disk group.</li> <li>For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).</li> <li>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).</li> </ul>

**Table 29 disk-groups properties (continued)**

Name	Type	Description
status	string	<ul style="list-style-type: none"> <li>• CRIT: Critical. The disk group is online but isn't fault tolerant because some of its disks are down.</li> <li>• DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.</li> <li>• FTDN: Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down.</li> <li>• FTOL: Fault tolerant and online.</li> <li>• MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.</li> <li>• OFFL: Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• STOP: The disk group is stopped.</li> <li>• UNKN: Unknown.</li> <li>• UP: Up. The disk group is online and does not have fault-tolerant attributes.</li> </ul>
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"> <li>• 0: FTOL</li> <li>• 1: FTDN</li> <li>• 2: CRIT</li> <li>• 3: OFFL</li> <li>• 4: QTCR</li> <li>• 5: QTOF</li> <li>• 6: QTDN</li> <li>• 7: STOP</li> <li>• 8: MSNG</li> <li>• 9: DMGD</li> <li>• 250: UP</li> <li>• <i>other: UNKN</i></li> </ul>
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 min-drive-size values.

**Table 29 disk-groups properties (continued)**

Name	Type	Description
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 create-date value.
cache-read-ahead	string	The read-ahead size, formatted to use the current base, precision, and units.
cache-read-ahead-numeric	uint64	Unformatted cache-read-ahead 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"> <li>Disabled</li> <li>Enabled</li> </ul>
read-ahead-enabled-numeric	uint32	Numeric equivalents for read-ahead-enabled values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
write-back-enabled	string	Shows the current, system-wide cache policy as determined by auto-write-through logic. <ul style="list-style-type: none"> <li>Disabled</li> <li>Enabled</li> </ul>
write-back-enabled-numeric	uint32	Numeric equivalents for write-back-enabled values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
job-running	string	Same as current-job.
current-job	string	Job running on the disk group, if any. <ul style="list-style-type: none"> <li>DRSC: A disk is being scrubbed.</li> <li>EXPD: The disk group is being expanded.</li> <li>INIT: The disk group is initializing.</li> <li>RCON: The disk group is being reconstructed.</li> <li>VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.</li> <li>VPREP: The virtual disk group is being prepared for use in a virtual pool.</li> <li>VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.</li> <li>VREMV: The disk group and its data are being removed.</li> <li>VERFY: The disk group is being verified.</li> <li>VRSC: The disk group is being scrubbed.</li> <li>Blank if no job is running.</li> </ul>

**Table 29 disk-groups properties (continued)**

Name	Type	Description
current-job-numeric	uint32	Numeric equivalents for current-job values. <ul style="list-style-type: none"> <li>0: (blank)</li> <li>2: INIT</li> <li>3: RCON</li> <li>4: VRFY</li> <li>5: EXPD</li> <li>6: VRSC</li> <li>7: DRSC</li> <li>9: VREMV</li> <li>12: VPREP</li> <li>13: VDRAIN</li> <li>14: VRECV</li> </ul>
current-job-completion	string	<ul style="list-style-type: none"> <li>0%-99%: Percent complete of running job.</li> <li>(blank): No job is running (job has completed).</li> </ul>
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.
num-drives-per-low-level-array	uint8	<ul style="list-style-type: none"> <li>For a RAID-10 or RAID-50 disk group, the number of disks in each subgroup.</li> <li>For other RAID levels, 1.</li> </ul>
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 new-partition-lba value in 512-byte blocks.
array-drive-type	string	Type of disks used in the disk group. <ul style="list-style-type: none"> <li>SAS: Enterprise SAS.</li> <li>SAS MDL: Midline SAS.</li> <li>sSAS: SAS SSD.</li> <li>MIX: Mixture of enterprise SAS and midline SAS disks.</li> </ul>
array-drive-type-numeric	uint32	Numeric equivalents for array-drive-type values. <ul style="list-style-type: none"> <li>1: MIX</li> <li>4: SAS</li> <li>8: sSAS</li> <li>11: SAS MDL</li> </ul>



**Table 29 disk-groups properties (continued)**

Name	Type	Description
is-job-auto-abortable	string	<ul style="list-style-type: none"> <li>false: The current job must be manually aborted before you can delete the disk group.</li> <li>true: The current job will automatically abort if you delete the disk group.</li> </ul>
is-job-auto-abortable-numeric	uint32	Numeric equivalents for is-job-auto-abortable values. <ul style="list-style-type: none"> <li>0: false</li> <li>1: true</li> </ul>
serial-number	string	Disk group serial number.
blocks	uint64	Unformatted size value in 512-byte blocks.
disk-dsd-enable-vdisk	string	<ul style="list-style-type: none"> <li>Disabled: DSD is disabled for the disk group.</li> <li>Enabled - all spinning: DSD is enabled for the disk group.</li> <li>Partial spin-down: DSD is enabled for the disk group and its disks are partially spun down to conserve power.</li> <li>Full spin-down: DSD is enabled for the disk group and its disks are fully spun down to conserve power.</li> </ul>
disk-dsd-enable-vdisk-numeric	uint32	Numeric equivalents for disk-dsd-enable-vdisk values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled - all spinning</li> <li>2: Partial spin-down</li> <li>3: Full spin-down</li> </ul>
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.
scrub-duration-goal	uint16	Not applicable.
pool-sector-format	string	The sector format of disks in the disk group. <ul style="list-style-type: none"> <li>512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>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.</li> <li>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 sector size types (512n, 512e).</li> </ul>
pool-sector-format-numeric	uint32	Numeric equivalents for pool-sector-format values. <ul style="list-style-type: none"> <li>0: 512n</li> <li>1: 512e</li> <li>3: Mixed</li> </ul>
health	string	<ul style="list-style-type: none"> <li>OK</li> <li>Degraded</li> <li>Fault</li> <li>Unknown</li> <li>N/A</li> </ul>

**Table 29 disk-groups properties (continued)**

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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 <a href="#">unhealthy-component</a> .	

## disk-group-statistics

This basetype is used by [show disk-group-statistics](#).

**Table 30** 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.
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 <a href="#">disk-group-statistics-paged</a> .	

## disk-group-statistics-paged

This basetype is used by [show disk-group-statistics](#) for a virtual disk group.

**Table 31** 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](#) when the `historical` parameter is specified.

**Table 32** 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.
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.
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 avg-io-size value.

**Table 32 disk-hist-statistics properties (continued)**

Name	Type	Description
avg-read-io-size	uint64	Average data size of read operations since the last sampling time.
avg-read-io-size-numeric	uint64	Unformatted avg-read-io-size value.
avg-write-io-size	uint64	Average data size of write operations since the last sampling time.
avg-write-io-size-numeric	uint64	Unformatted avg-write-io-size 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 sample-time value.

## disk-statistics

This basetype is used by [show disk-statistics](#) when the `historical` parameter is omitted.

**Table 33** disk-statistics properties

Name	Type	Description
durable-id	string	Disk ID in the form <code>disk_enclosure-number.disk-number</code> .
location	string	The disk location in the format <code>disk_enclosure-number.disk-number</code> .
serial-number	string	Disk serial number.
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.
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	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 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	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 <code>year-month-day hour:minutes:seconds</code> , 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 <code>year-month-day hour:minutes:seconds</code> , 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.

**Table 33 disk-statistics properties (continued)**

Name	Type	Description
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.
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.
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](#).

**Table 34** drawer-sensors properties

Name	Type	Description
durable-id	string	Sensor ID. For example: <code>sensor_temp_drawer_drawer-ID.sensor-number</code> and <code>sensor_volt_drawer_drawer-ID.sensor-number</code> .
drawer-id (2U48 enclosure)	uint32	<ul style="list-style-type: none"><li>0: Left</li><li>1: Middle</li><li>2: Right</li></ul>
drawer-id (4U56 enclosure)	uint32	<ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li></ul>
sensor-name	string	Sensor name and location.
value	string	<ul style="list-style-type: none"><li>For a sensor, its value.</li><li>For overall unit status, one of the status values below.</li></ul>
status	string	<ul style="list-style-type: none"><li>OK: The sensor is present and detects no error condition.</li><li>Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds.</li><li>Critical: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold.</li><li>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.</li><li>Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor.</li><li>Unknown: The sensor is present but status is not available.</li><li>Not Installed: The sensor is not present.</li><li>Unsupported: Status detection is not implemented.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: Unsupported</li><li>1: OK</li><li>2: Critical</li><li>3: Warning</li><li>4: Unrecoverable</li><li>5: Not Installed</li><li>6: Unknown</li><li>7: Unavailable</li></ul>
sensor-location	uint32	Deprecated; sensor location now shown by container property.

**Table 34 drawer-sensors properties (continued)**

Name	Type	Description
container	string	Hardware component that contains the sensor. <ul style="list-style-type: none"><li>• controllers</li><li>• drawer</li><li>• enclosures</li><li>• fan</li><li>• iom</li><li>• midplane</li><li>• power-supplies</li></ul>
container-numeric	uint32	Numeric equivalents for container values. <ul style="list-style-type: none"><li>• 17: enclosures</li><li>• 18: midplane</li><li>• 19: controllers</li><li>• 20: iom</li><li>• 21: power-supplies</li><li>• 22: fan</li><li>• 31: drawer</li></ul>
sensor-type	string	<ul style="list-style-type: none"><li>• Temperature</li><li>• Voltage</li><li>• Current</li><li>• Charge Capacity</li><li>• Unknown Type</li></ul>
sensor-type-numeric	uint32	Numeric equivalents for sensor-type values. <ul style="list-style-type: none"><li>• 0: Temperature</li><li>• 1: Current</li><li>• 2: Voltage</li><li>• 3: Charge capacity</li><li>• 4: Unknown Type</li></ul>

## drawers

This basetype is used by [show enclosures](#).

**Table 35 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"><li>0: Left</li><li>1: Middle</li><li>2: Right</li></ul>
drawer-id (4U56 enclosure)	uint8	<ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li></ul>
drawer-wwn	string	Drawer WWN.
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"><li>Left</li><li>Right</li><li>Middle</li></ul>
position-numeric	string	Numeric equivalents for the position property: <ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li><li>4: Middle</li></ul>
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) Sin 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.
emp-b-ch-id-rev	string	Channel ID and firmware revision of the Enclosure Management Processor B in a drawer's Expander Controller

**Table 35 drawers properties (continued)**

Name	Type	Description
locator-led	string	Shows the state of the locator LED on a drawer: <ul style="list-style-type: none"><li>• Off</li><li>• On</li></ul>
locator-led-numeric	uint32	Numeric equivalents for the locator-led property. <ul style="list-style-type: none"><li>• 0: Off</li><li>• 1: On</li></ul>
status	string	Drawer status: <ul style="list-style-type: none"><li>• Up</li><li>• Error</li><li>• Warning</li><li>• Not Present</li><li>• Unknown</li><li>• Unavailable</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 1: Up</li><li>• 2: Error</li><li>• 3: Warning</li><li>• 5: Not Present</li><li>• 6: Unknown</li><li>• 7: Unavailable</li></ul>
health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• N/A</li><li>• Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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 <a href="#">unhealthy-component</a> .	

## drive-parameters

This basetype is used by [show disk-parameters](#).

**Table 36** drive-parameters properties

Name	Type	Description
smart	string	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none"><li>• Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system.</li><li>• 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.</li><li>• Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.</li></ul>
smart-numeric	uint32	Numeric equivalents for smart values. <ul style="list-style-type: none"><li>• 0: Detect-Only</li><li>• 1: Enabled</li><li>• 2: Disabled</li></ul>
drive-write-back-cache	string	<ul style="list-style-type: none"><li>• Disabled: 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.</li></ul>
drive-write-back-cache-numeric	uint32	Numeric equivalents for drive-write-back-cache values. <ul style="list-style-type: none"><li>• 2: Disabled</li></ul>
drive-timeout-retry-max	uint8	Maximum number of times a timed-out I/O operation can be retried before the operation is failed.
drive-attempt-timeout	uint8	Number of seconds before an I/O operation is aborted and possibly retried.
drive-overall-timeout	uint8	Total time in seconds before an I/O operation is failed regardless of the drive-attempt-timeout and drive-timeout-retry-max settings.
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"><li>• Disabled: Drive spin down for available disks and global spares is disabled. This is the default.</li><li>• Enabled: Drive spin down for available disks and global spares is enabled.</li></ul>
disk-dsd-enable-numeric	uint32	Numeric equivalents for disk-dsd-enable values. <ul style="list-style-type: none"><li>• 0: Disabled</li><li>• 1: Enabled</li></ul>
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](#) when the `historical` parameter is specified.

**Table 37** 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 <a href="#">disk-hist-statistics</a> .	

## drives

This basetype is used by [show configuration](#) and [show disks](#).

**Table 38** 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"><li>0: Left</li><li>1: Middle</li><li>2: Right</li></ul>
drawer-id (4U56 enclosure)	uint8	<ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li></ul>
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 size 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.
description	string	Disk description. <ul style="list-style-type: none"><li>SAS: Enterprise SAS.</li><li>SAS MDL: Midline SAS.</li><li>sSAS: SAS SSD.</li></ul>
description-numeric	uint32	Numeric equivalents for description values. <ul style="list-style-type: none"><li>4: SAS</li><li>8: sSAS</li><li>11: SAS MDL</li></ul>
architecture	string	Disk architecture. <ul style="list-style-type: none"><li>HDD</li><li>SSD</li></ul>
architecture-numeric	uint32	Numeric equivalents for architecture values. <ul style="list-style-type: none"><li>0: SSD</li><li>1: HDD</li></ul>
interface	string	Disk interface. <ul style="list-style-type: none"><li>SAS</li></ul>

**Table 38 drives properties (continued)**

Name	Type	Description
interface-numeric	uint32	Numeric equivalents for interface values. <ul style="list-style-type: none"> <li>0: SAS</li> </ul>
single-ported	string	<ul style="list-style-type: none"> <li>Disabled: The disk has a dual-port connection to the midplane.</li> <li>Enabled: The disk has a single-port connection to the midplane.</li> </ul>
single-ported-numeric	uint32	Numeric equivalents for single-ported values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
type	string	Type of disk. <ul style="list-style-type: none"> <li>SAS: Enterprise SAS.</li> <li>SAS MDL: Midline SAS.</li> <li>sSAS: SAS SSD.</li> </ul>
type-numeric	uint32	Numeric equivalents for type values. <ul style="list-style-type: none"> <li>4: SAS</li> <li>8: sSAS</li> <li>11: SAS MDL</li> </ul>
usage	string	Shows the disk's usage. <ul style="list-style-type: none"> <li>AVAIL: The disk is available.</li> <li>DEDICATED SP: The disk is a spare assigned to a linear disk group.</li> <li>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.</li> <li>GLOBAL SP: The disk is a global spare.</li> <li>LEFTOVR: The disk is a leftover.</li> <li>LINEAR POOL: The disk is a member of a vdisk.</li> <li>UNUSABLE: The disk cannot be used in a disk group because the system is secured or the disk is locked to data access.</li> <li>VDISK: The disk is a member of a vdisk.</li> <li>VDISK SP: The disk is a spare assigned to a vdisk.</li> <li>VIRTUAL POOL: The disk is a member of a disk group in a storage pool.</li> </ul>
usage-numeric	uint32	Numeric equivalents for usage values. <ul style="list-style-type: none"> <li>0: AVAIL</li> <li>1: VDISK or LINEAR POOL</li> <li>2: VDISK SP or DEDICATED SP</li> <li>3: GLOBAL SP</li> <li>5: LEFTOVR</li> <li>7: FAILED8: UNUSABLE</li> <li>9: VIRTUAL POOL</li> </ul>



**Table 38 drives properties (continued)**

Name	Type	Description
job-running	string	<p>Job running on the disk, if any.</p> <ul style="list-style-type: none"> <li>• (blank): None.</li> <li>• DRSC: The disk group is being scrubbed.</li> <li>• EXPD: The disk group is being expanded.</li> <li>• INIT: The disk group is being initialized.</li> <li>• RCON: The disk group is being reconstructed.</li> <li>• VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.</li> <li>• VPREP: The virtual disk group is being prepared for use in a virtual pool.</li> <li>• VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.</li> <li>• VREMV: The disk group and its data are being removed.</li> <li>• VRFY: The disk group is being verified.</li> <li>• VRSC: The disk group is being scrubbed.</li> </ul>
job-running-numeric	uint32	<p>Numeric equivalents for job-running values.</p> <ul style="list-style-type: none"> <li>• 0: None</li> <li>• 2: INIT</li> <li>• 3: RCON</li> <li>• 4: VRFY</li> <li>• 5: EXPD</li> <li>• 6: VRSC</li> <li>• 7: DRSC</li> <li>• 9: VREMV</li> <li>• 12: VPREP</li> <li>• 13: VDRAIN</li> <li>• 14: VRECV</li> </ul>
state	string	Shows the disk's usage value.
current-job-completion	string	<ul style="list-style-type: none"> <li>• 0%-99%: Percent complete of running job.</li> <li>• (blank): No job is running (job has completed).</li> </ul>
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"> <li>• Off</li> <li>• On</li> </ul>
locator-led-numeric	uint32	<p>Numeric equivalents for the locator-led property.</p> <ul style="list-style-type: none"> <li>• 0: Off</li> <li>• 1: On</li> </ul>
speed	uint32	Not used.
smart	string	<ul style="list-style-type: none"> <li>• Disabled: SMART is disabled for this disk.</li> <li>• Enabled: SMART is enabled for this disk.</li> </ul>

**Table 38 drives properties (continued)**

Name	Type	Description
smart-numeric	string	Numeric equivalents for smart values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
dual-port	uint32	<ul style="list-style-type: none"> <li>0: Single-ported disk.</li> <li>1: Dual-ported disk.</li> </ul>
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 WWPNN.
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 WWPNN.
fc-p2-unit-number	uint32	Port 2 unit number.
drive-down-code	uint8	Numeric code indicating why the disk is down.
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"> <li>A: Controller A.</li> <li>B: Controller B.</li> </ul>
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> <li>0: B</li> <li>1: A</li> </ul>
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"> <li>512n: The disk uses 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>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.</li> </ul>
sector-format-numeric	string	Numeric equivalents for sector-format values. <ul style="list-style-type: none"> <li>0: 512n</li> <li>1: 512e</li> </ul>

**Table 38 drives properties (continued)**

Name	Type	Description
transfer-rate	string	<p>Disk data transfer rate in Gbit/s. It is normal behavior for the rate to vary.</p> <ul style="list-style-type: none"> <li>• 1.5</li> <li>• 3.0</li> <li>• 6.0</li> </ul> <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>
transfer-rate-numeric	uint32	For internal use only.
attributes	string	<p>Shows which controller a single-ported disk is connected to.</p> <ul style="list-style-type: none"> <li>• A: Controller A.</li> <li>• B: Controller B.</li> </ul>
attributes-numeric	uint32	For internal use only.
enclosure-wwn	string	Enclosure WWN.
status	string	<p>Disk status.</p> <ul style="list-style-type: none"> <li>• Up: The disk is present and is properly communicating with the expander.</li> <li>• Spun Down: The disk is present and has been spun down by the drive spin down feature.</li> <li>• 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.</li> <li>• Error: The disk is present but is not detected by the expander.</li> <li>• Unknown: Initial status when the disk is first detected or powered on.</li> <li>• Not Present: The disk slot indicates that no disk is present.</li> <li>• Unrecoverable: The disk is present but has unrecoverable errors.</li> <li>• Unavailable: The disk is present but cannot communicate with the expander.</li> <li>• Unsupported: The disk is present but is an unsupported type.</li> </ul>
recon-state	string	<p>The state of the disk (source or destination) if it is involved in a reconstruct operation.</p> <ul style="list-style-type: none"> <li>• From: This disk is being used as the source of a reconstruct operation.</li> <li>• To: This disk is being used as the target of a reconstruct operation.</li> <li>• N/A: This disk is not being used in a reconstruct operation.</li> </ul>
recon-state-numeric	uint32	<p>Numeric equivalents for recon-state values.</p> <ul style="list-style-type: none"> <li>• 0: N/A</li> <li>• 1: From</li> <li>• 2: To</li> </ul>
copyback-state	string	Not applicable.
copyback-state-numeric	uint32	Not applicable.

**Table 38 drives properties (continued)**

Name	Type	Description
virtual-disk-serial	string	If the disk is in a linear disk group, the vdisk name. Otherwise, blank.
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"> <li>Archive: The disk is in the lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).</li> <li>N/A: Not applicable.</li> <li>Performance: The disk is in the highest storage tier, which uses SSDs (high speed).</li> <li>Read Cache: The disk is an SSD providing high-speed read cache for a storage pool.</li> <li>Standard: The disk is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).</li> </ul>
storage-tier-numeric	uint32	<p>Numeric equivalents for storage-tier values.</p> <ul style="list-style-type: none"> <li>0: N/A</li> <li>1: Performance</li> <li>2: Standard</li> <li>4: Archive</li> <li>8: Read Cache</li> </ul>
ssd-life-left	string	<ul style="list-style-type: none"> <li>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.</li> <li>N/A: The disk is not an SSD.</li> </ul>
ssd-life-left-numeric	uint32	<p>Numeric equivalents for ssd-life-left values.</p> <ul style="list-style-type: none"> <li>0-100</li> <li>255: N/A</li> </ul>
led-status	string	<p>Disk LED status.</p> <ul style="list-style-type: none"> <li>Rebuild: The disk's disk group is being reconstructed.</li> <li>Fault: The disk has a fault.</li> <li>ID: The locator LED is illuminated to identify the disk.</li> <li>Remove: The disk is ready to be removed from the enclosure.</li> <li>Blank if the disk is not part of a disk group or is spun down.</li> </ul>
led-status-numeric	string	<p>Numeric equivalents for led-status values.</p> <ul style="list-style-type: none"> <li>1: Online</li> <li>2: Rebuild</li> <li>4: Fault</li> <li>8: Pred Fail</li> <li>16: ID</li> <li>32: Remove</li> </ul>

**Table 38 drives properties (continued)**

Name	Type	Description
disk-dsd-count	uint32	Number of times the DSD feature has spun down this disk.
spun-down	uint32	Shows whether the disk is spun down by the DSD feature. <ul style="list-style-type: none"> <li>0: Not spun down.</li> <li>1: Spun down.</li> </ul>
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	The FDE state of the disk. <ul style="list-style-type: none"> <li>Unknown: The FDE state is unknown.</li> <li>Not FDE Capable: The disk is not FDE-capable.</li> <li>Not Secured: The disk is not secured.</li> <li>Secured, Unlocked: The system is secured and the disk is unlocked.</li> <li>Secured, Locked: The system is secured and the disk is locked to data access, preventing its use.</li> <li>FDE Protocol Failure: A temporary state that can occur while the system is securing the disk.</li> </ul>
fde-state-numeric	uint32	Numeric equivalents for fde-state values. <ul style="list-style-type: none"> <li>0: Not FDE Capable</li> <li>1: Not Secured</li> <li>2: Secured, Unlocked</li> <li>3: Secure, Locked</li> <li>4: FDE Protocol Failure</li> <li>5: Unknown</li> </ul>
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). Otherwise, N/A.
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"> <li>OK: The disk sensor is present and detects no error condition.</li> <li>Warning: The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds.</li> <li>Critical: The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold.</li> <li>Unknown: The disk sensor is present but status is not available.</li> </ul>

**Table 38 drives properties (continued)**

Name	Type	Description
temperature-status-numeric	uint32	Numeric equivalents for temperature-status values. <ul style="list-style-type: none"><li>• 1: OK</li><li>• 2: Critical</li><li>• 3: Warning</li><li>• <i>other</i>: Unknown</li></ul>
pi-formatted	string	Not supported.
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"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• Unknown</li><li>• N/A</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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](#).

**Table 39** email-parameters properties

Name	Type	Description
email-notification	string	Shows whether email (SMTP) notification of events is enabled. <ul style="list-style-type: none"><li>Disabled: Email notification is disabled. This is the default.</li><li>Enabled: Email notification is enabled.</li></ul>
email-notification-numeric	uint32	Numeric equivalents for email-notification values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
email-notification-filter	string	The minimum severity for which the system should send notifications: <ul style="list-style-type: none"><li>crit: Sends notifications for Critical events only.</li><li>error: Sends notifications for Error and Critical events.</li><li>warn: Sends notifications for Warning, Error, and Critical events.</li><li>info: Sends notifications for all events.</li><li>none: Disables email notification. This is the default.</li></ul> 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"><li>8: crit</li><li>4: error</li><li>2: warn</li><li>1: info</li><li>0: none</li></ul>
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.
persistent-alerts	string	Not applicable.
persistent-alerts-numeric	uint32	Not applicable.

**Table 39 email-parameters properties (continued)**

Name	Type	Description
include-logs	string	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.
include-logs-numeric	uint32	Numeric equivalents for include-logs values. <ul style="list-style-type: none"><li>• 0: Disabled</li><li>• 1: Enabled</li></ul>



## enclosure-fru

This basetype is used by [show configuration](#) and [show frus](#).

**Table 40** enclosure-fru properties

Name	Type	Description
name	string	FRU name. <ul style="list-style-type: none"><li>CHASSIS_MIDPLANE: Chassis and midplane circuit board</li><li>RAID_IOM: Controller module</li><li>BOD_IOM: Expansion module</li><li>POWER_SUPPLY: Power supply module</li><li>DRAWER: Enclosure disk drawer</li><li>FAN: Fan module</li><li>MEMORY_CARD: CompactFlash card</li></ul>
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 a 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 (global manufacturing code) of the FRU manufacturer.

**Table 40 enclosure-fru properties (continued)**

Name	Type	Description
fru-location	string	<p>Location of the FRU in the enclosure.</p> <ul style="list-style-type: none"> <li>• MID-PLANE SLOT: Chassis midplane.</li> <li>• UPPER IOM SLOT: Controller module or expansion module A.</li> <li>• LOWER IOM SLOT: Controller module or expansion module B.</li> <li>• LEFT IOM SLOT: Controller module or expansion module B, in the left slot as viewed from the back.</li> <li>• RIGHT IOM SLOT: Controller module or expansion module A, in the right slot as viewed from the back.</li> <li>• LEFT PSU SLOT: Power supply module on the left, as viewed from the back.</li> <li>• RIGHT PSU SLOT: Power supply module on the right, as viewed from the back.</li> <li>• LEFT DRAWER SLOT: Drawer on the left, as viewed from the front.</li> <li>• MIDDLE DRAWER SLOT: Drawer on the middle, as viewed from the front.</li> <li>• RIGHT DRAWER SLOT: Drawer on the right, as viewed from the front.</li> <li>• LEFT FAN SLOT: Fan module on the left, as viewed from the back.</li> <li>• RIGHT FAN SLOT: Fan module on the right, as viewed from the back.</li> <li>• CONTROLLER A: Controller module A.</li> <li>• CONTROLLER B: Controller module B.</li> <li>• UPPER IOM MEMORY CARD SLOT: Memory card slot in controller module A.</li> <li>• LOWER IOM MEMORY CARD SLOT: Memory card slot in controller module B.</li> <li>• LEFT IOM MEMORY CARD SLOT: Memory card slot in controller module B.</li> <li>• RIGHT IOM MEMORY CARD SLOT: Memory card slot in controller module A.</li> </ul>
configuration-serialnumber	string	Configuration serial number.
fru-status	string	<ul style="list-style-type: none"> <li>• Absent: The FRU is not present.</li> <li>• Fault: The FRU's health is Degraded or Fault.</li> <li>• Invalid Data: The FRU ID data is invalid. The FRU's EEPROM is improperly programmed.</li> <li>• OK: The FRU is operating normally.</li> <li>• Power OFF: The FRU is powered off.</li> </ul>
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](#), and by [show disks](#) when the `encl` parameter is specified.

**Table 41** enclosure-list properties

Name	Type	Description
status	string	Disk slot status. <ul style="list-style-type: none"><li>• Up: The disk is present and is properly communicating with the expander.</li><li>• Spun Down: The disk is present and has been spun down by the drive spin down feature.</li><li>• 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.</li><li>• Error: The disk is present but is not detected by the expander.</li><li>• Unknown: Initial status when the disk is first detected or powered on.</li><li>• Not Present: The disk slot indicates that no disk is present.</li><li>• Unrecoverable: The disk is present but has unrecoverable errors.</li><li>• Unavailable: The disk is present but cannot communicate with the expander.</li><li>• Unsupported: The disk is present but is an unsupported type.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 0: Unsupported</li><li>• 1: Up</li><li>• 2: Error</li><li>• 3: Warning</li><li>• 4: Unrecoverable</li><li>• 5: Not Present</li><li>• 6: Unknown</li><li>• 7: Unavailable</li><li>• 20: Spun Down</li></ul>
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 size value in 512-byte blocks.

## enclosures

This basetype is used by [show configuration](#) and [show enclosures](#).

**Table 42** enclosures properties

Name	Type	Description
durable-id	string	Enclosure ID in the form enclosure_ <i>number</i> .
enclosure-id	uint8	Enclosure ID.
enclosure-wwn	string	Enclosure WWN.
name	string	Enclosure name.
type	string	Internal name for the enclosure type.
type-numeric	string	Numeric equivalents for type values.
iom-type	string	I/O module type.
iom-type-numeric	string	Numeric equivalents for iom-type values.
location	string	Enclosure location, or blank if not set.
rack-number	uint8	Number of the rack that contains the enclosure.
rack-position	uint8	Position of the enclosure in the rack.
number-of-coolings-elements	uint8	Number of fan units in the enclosure.
number-of-disks	uint8	Number of disk slots (not installed disks) in the enclosure.
number-of-power-supplies	uint8	Number of power supplies in the enclosure.
status	string	Disk slot status. <ul style="list-style-type: none"><li>• Unsupported</li><li>• Up</li><li>• Error</li><li>• Warning</li><li>• Unrecoverable</li><li>• Not Present</li><li>• Unknown</li><li>• Unavailable</li><li>• Spun Down</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 0: Unsupported</li><li>• 1: Up</li><li>• 2: Error</li><li>• 3: Warning</li><li>• 4: Unrecoverable</li><li>• 5: Not Present</li><li>• 6: Unknown</li><li>• 7: Unavailable</li><li>• 20: Spun Down</li></ul>
midplane-serial-number	string	Midplane serial number.

**Table 42 enclosures properties (continued)**

Name	Type	Description
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"> <li>MID-PLANE SLOT: Chassis midplane.</li> <li>(blank): Not applicable.</li> </ul>
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.
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"> <li>Off</li> <li>On</li> </ul>
locator-led-numeric	uint32	Numeric equivalents for locator-led values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
drive-orientation	string	<ul style="list-style-type: none"> <li>vertical: Disks are oriented vertically.</li> <li>horizontal: Disks are oriented horizontally.</li> </ul>
drive-orientation-numeric	uint32	Numeric equivalents for drive-orientation values. <ul style="list-style-type: none"> <li>0: vertical</li> <li>1: horizontal</li> </ul>
enclosure-arrangement	string	<ul style="list-style-type: none"> <li>vertical: Disks are numbered vertically (by column from top to bottom, proceeding rightward).</li> <li>horizontal: Disks are numbered horizontally (by row from left to right, proceeding downward).</li> </ul>
enclosure-arrangement-numeric	uint32	Numeric equivalents for enclosure-arrangement values. <ul style="list-style-type: none"> <li>0: vertical</li> <li>1: horizontal</li> </ul>
emp-a-busid	string	SCSI channel ID of controller A's EMP.
emp-a-targetid	string	SCSI target ID of controller A's EMP.
emp-b-busid	string	SCSI channel ID of controller B's EMP.

**Table 42 enclosures properties (continued)**

Name	Type	Description
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"> <li>4U56-6G: Midplane for 4U, 56-disk enclosure with 6-Gbit/s maximum data rate to disks</li> <li>2U48-6G: Midplane for 2U, 48-disk enclosure with 6-Gbit/s maximum data rate to disks</li> <li>2U24-6Gv2: Midplane for 2U, reduced-depth, 24-disk enclosure with 6-Gbit/s maximum data rate to disks</li> <li>2U24-6G: Midplane for 2U, 24-disk enclosure with 6-Gbit/s maximum data rate to disks</li> <li>2U12-6Gv2: Midplane for 2U, reduced-depth, 12-disk enclosure with 6-Gbit/s maximum data rate to disks</li> <li>2U12-6G: Midplane for 2U, 12-disk enclosure with 6-Gbit/s maximum data rate to disks</li> <li>N/A: Other type of midplane</li> </ul>
midplane-type-numeric	uint32	Numeric equivalents for midplane-type values. <ul style="list-style-type: none"> <li>0: 2U12-3G</li> <li>1: 2U24-3G</li> <li>2: 2U12-6G</li> <li>3: 2U24-6G</li> <li>5, 9, 13: 2U24-6Gv2</li> <li>6, 10: 2U12-6Gv2</li> <li>8: 2U48-6G</li> <li>11: 4U56-6G</li> </ul>
midplane-rev	uint8	Midplane revision number.
enclosure-power	string	Enclosure power in watts.
pcie2-capable	string	<ul style="list-style-type: none"> <li>False: Enclosure is not capable of using PCI Express version 2.</li> <li>True: Enclosure is capable of using PCI Express version 2.</li> </ul>
pcie2-capable-numeric	uint32	Numeric equivalents for pcie2-capable values. <ul style="list-style-type: none"> <li>0: False</li> <li>1: True</li> </ul>
health	string	<ul style="list-style-type: none"> <li>OK</li> <li>Degraded</li> <li>Fault</li> <li>Unknown</li> <li>N/A</li> </ul>

**Table 42** enclosures properties (continued)

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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 <a href="#">unhealthy-component</a> .	
drawer	Embedded; see <a href="#">drawers</a> .	
controllers	Embedded; see <a href="#">controllers</a> , <a href="#">io-modules</a> .	
power-supplies	Embedded; see <a href="#">power-supplies</a> .	
fan-details	Embedded; see <a href="#">fan</a> .	

## events

This basetype is used by [show events](#).

**Table 43** 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"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
severity	string	Event severity. <ul style="list-style-type: none"><li>CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem immediately.</li><li>ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.</li><li>WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.</li><li>INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.</li><li>RESOLVED: A condition that caused an event to be logged has been resolved.</li></ul>
severity-numeric	uint32	Numeric equivalents for severity values. <ul style="list-style-type: none"><li>0: INFORMATIONAL</li><li>1: WARNING</li><li>2: ERROR</li><li>3: CRITICAL</li><li>4: RESOLVED</li></ul>
message	string	Brief description of the event that occurred. For some events, the message includes data about affected components.
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](#) when the logs parameter is specified.

**Table 44** 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 time-stamp 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"><li>• CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem immediately.</li><li>• ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.</li><li>• WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.</li><li>• INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.</li><li>• RESOLVED: A condition that caused an event to be logged has been resolved.</li></ul>
severity-numeric	string	Numeric equivalents for severity values. <ul style="list-style-type: none"><li>• 0: INFORMATIONAL</li><li>• 1: WARNING</li><li>• 2: ERROR</li><li>• 3: CRITICAL</li><li>• 4: RESOLVED</li></ul>
message	string	Message giving details about the event.

## expander-ports

This basetype is used by [show sas-link-health](#).

**Table 45** 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"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
sas-port-type	string	<ul style="list-style-type: none"><li>Drawer Port Egress</li><li>Drawer Port Ingress</li><li>Expansion Port Egress</li><li>Expansion Port Ingress</li></ul>
sas-port-type-numeric	uint32	Numeric equivalents for sas-port-type values. <ul style="list-style-type: none"><li>1: Drawer Port Egress</li><li>2: Drawer Port Ingress</li><li>3: Expansion Port Egress</li><li>4: Expansion Port Ingress</li></ul>
sas-port-index	uint32	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 durable-id value.
name	string	<ul style="list-style-type: none"><li>Out Port: Egress (expansion) port on controller module or an expansion module. Can be connected to an ingress port in an expansion module.</li><li>In Port: Ingress port on an expansion module. Can be connected to an egress (expansion) port in a controller module or an expansion module.</li></ul>
name-numeric	uint32	<ul style="list-style-type: none"><li>2: In Port</li><li>3: Out Port</li></ul>
status	string	Expander port status. <ul style="list-style-type: none"><li>Up: The port is cabled and has an I/O link.</li><li>Warning: Not all of the port's PHYs are up.</li><li>Error: The port is reporting an error condition.</li><li>Not Present: The controller module is not installed or is down.</li><li>Disconnected: Either no I/O link is detected or the port is not cabled.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: Up</li><li>1: Warning</li><li>2: Error</li><li>3: Not Present</li><li>4: Unknown</li><li>6: Disconnected</li></ul>

**Table 45 expander-ports properties (continued)**

Name	Type	Description
health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• N/A</li><li>• Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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](#) and [show power-supplies](#).

**Table 46** fan properties

Name	Type	Description
durable-id	string	Fan unit ID in the form <i>fan_enclosure-ID.fan-number</i> .
name	string	Fan unit name in the form <i>Fan loc:position-PSU power-supply-ID</i> . The position is as viewed from the back of the enclosure.
location	string	Fan location in the form <i>Enclosure enclosure-ID - position</i> . The position is as viewed from the back of the enclosure.
status-ses	string	Fan status. <ul style="list-style-type: none"><li>• Unsupported</li><li>• OK</li><li>• Critical</li><li>• Warning</li><li>• Unrecoverable</li><li>• Not Installed</li><li>• Unknown</li><li>• Unavailable</li></ul>
status-ses-numeric	uint32	Numeric equivalents for status-ses values. <ul style="list-style-type: none"><li>• 0: Unsupported</li><li>• 1: OK</li><li>• 2: Critical</li><li>• 3: Warning</li><li>• 4: Unrecoverable</li><li>• 5: Not Installed</li><li>• 6: Unknown</li><li>• 7: Unavailable</li></ul>
extended-status	uint32	A numeric value that provides additional information to supplement the standard SES status shown by the status and status-numeric properties. The extended-status 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. <ul style="list-style-type: none"><li>• 1: The fan has reported a failure.</li><li>• 2: The fan is off.</li><li>• 4: The fan FRU is not installed.</li><li>• 8: The fan status cannot be determined.</li><li>• 16: The fan is requested to be on (not off). This is the default status and represents normal operation.</li><li>• 17: Fan has failed.</li><li>• 18: Fan is off.</li><li>• 19: Fan has failed and is off.</li><li>• 24: Fan status is unknown, which could represent an I2C communication issue.</li></ul>

**Table 46 fan properties (continued)**

Name	Type	Description
status	string	Fan unit status. <ul style="list-style-type: none"> <li>Up</li> <li>Error</li> <li>Off</li> <li>Missing</li> </ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> <li>0: Up</li> <li>1: Error</li> <li>2: Off</li> <li>3: Missing</li> </ul>
speed	uint32	Fan speed (revolutions per minute).
position	string	Fan position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>Left</li> <li>Right</li> </ul>
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"> <li>0: Left</li> <li>1: Right</li> </ul>
serial-number	string	<ul style="list-style-type: none"> <li>(blank): Not applicable.</li> </ul>
part-number	string	<ul style="list-style-type: none"> <li>(blank): Not applicable.</li> </ul>
fw-revision	string	<ul style="list-style-type: none"> <li>(blank): Not applicable.</li> <li>Firmware revision of a fan FRU.</li> </ul>
hw-revision	string	<ul style="list-style-type: none"> <li>(blank): Not applicable.</li> </ul>
locator-led	string	Shows the state of the locator LED on a fan unit. <ul style="list-style-type: none"> <li>Off</li> <li>On</li> </ul>
locator-led-numeric	uint32	Numeric equivalents for the locator-led property. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
health	string	<ul style="list-style-type: none"> <li>OK</li> <li>Degraded</li> <li>Fault</li> <li>N/A</li> <li>Unknown</li> </ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> <li>0: OK</li> <li>1: Degraded</li> <li>2: Fault</li> <li>3: N/A</li> <li>4: Unknown</li> </ul>

**Table 46 fan properties (continued)**

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.

## fc-port

This basetype is used by [show ports](#) for a Fibre Channel port.

**Table 47** fc-port properties

Name	Type	Description
configured-topology	string	Configured topology. <ul style="list-style-type: none"><li>• Loop: Fibre Channel arbitrated loop (public or private).</li><li>• PTP: Fibre Channel point-to-point.</li><li>• Auto: Loop preferred, otherwise point-to-point, based on the detected connection type.</li></ul>
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"><li>• OK</li><li>• Not present: No SFP is inserted in this port.</li><li>• Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.</li><li>• Incorrect protocol: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.</li></ul>
sfp-present	string	Shows whether the port contains an SFP. <ul style="list-style-type: none"><li>• Not Present</li><li>• Present</li></ul>
sfp-present-numeric	uint32	Numeric equivalents for sfp-present values. <ul style="list-style-type: none"><li>• 0: Not Present</li><li>• 1: Present</li></ul>
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 (AssuredSAN 4004 only)

This basetype is used by [show fde-state \(AssuredSAN 4004 only\)](#).

**Table 48** fde-state properties

Name	Type	Description
fde-security-status	string	Shows whether the system is secured or unsecured: <ul style="list-style-type: none"><li>• Unsecured: The system has not been secured with a passphrase.</li><li>• Secured: The system has been secured with a passphrase.</li><li>• Secured, Lock Ready: The system has been secured and lock keys are clear. The system will become locked after the next power cycle.</li><li>• Secured, Locked: The system is secured and the disks are locked to data access, preventing their use.</li></ul>
fde-security-status-numeric	uint32	Numeric equivalents for fde-security-status values. <ul style="list-style-type: none"><li>• 1: Unsecured</li><li>• 2: Secured</li><li>• 3: Secured, Lock Ready</li><li>• 4: Secured, Locked</li></ul>
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](#).

**Table 49** host properties

Name	Type	Description
durable-id	string	Host ID.
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 <a href="#">initiator</a> .	

## host-group

This basetype is used by [show host-groups](#).

**Table 50** 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 <a href="#">host</a> .	

## host-group-view

This basetype is used by [show maps](#) when the initiator parameter is specified.

**Table 51** 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 <a href="#">host-view-mappings</a> .	

## host-port-statistics

This basetype is used by [show host-port-statistics](#).

**Table 52** host-port-statistics properties

Name	Type	Description
durable-id	string	Host port ID in the form <i>hostport_controller-ID-and-port-number</i> .
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	uint32	Number of read operations since these statistics were last reset or since the controller was restarted.
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 iops and bytes-per-second 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 iops and bytes-per-second values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.

## hosts

This basetype is used by [show hosts \(Deprecated\)](#).

**Table 53** 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"><li>Yes: The host was discovered and its entry was automatically created.</li><li>No: The host entry was manually created.</li></ul>
host-mapped	string	<ul style="list-style-type: none"><li>Yes: At least one volume is explicitly mapped to the host.</li><li>No: No volumes are explicitly mapped to the host.</li></ul>
host-profile	string	<ul style="list-style-type: none"><li>Standard: Default profile.</li><li>HP-UX: The host uses Flat Space Addressing.</li></ul>
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none"><li>0: Standard</li><li>1: HP-UX</li></ul>
host-bus-type	string	<ul style="list-style-type: none"><li>If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.</li><li>If the host entry was manually created: Undefined.</li></ul>
host-bus-type-numeric	uint32	Numeric equivalents of host-bus-type values. <ul style="list-style-type: none"><li>0: UNKNOWN</li><li>6: FC</li><li>8: SAS</li><li>9: iSCSI</li></ul>
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 \(Deprecated\)](#).

**Table 54** 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"><li>Standard: Default profile.</li><li>HP-UX: The host uses Flat Space Addressing.</li></ul>
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none"><li>0: Standard</li><li>1: HP-UX</li></ul>
host-view-mapping	Embedded; see <a href="#">host-view-mappings</a> .	

## host-view-mappings

This basetype is used by [show maps](#) when the initiator parameter is specified.

**Table 55** host-view-mappings properties

Name	Type	Description
volume-name	string	Volume name.
volume-serial	string	Volume serial number.
lun	string	LUN assigned to the mapping.
access	string	Type of host access to the volume. <ul style="list-style-type: none"><li>• read-write: Read and write.</li><li>• read-only: Read only.</li><li>• no-access: No access (masked).</li><li>• not-mapped: Not mapped.</li></ul>
access-numeric	uint32	Numeric equivalents of access values. <ul style="list-style-type: none"><li>• 0: not-mapped</li><li>• 1: no-access</li><li>• 2: read-only</li><li>• 3: read-write</li></ul>
ports	string	Controller host ports assigned to the mapping.

## initiator

This basetype is used by [show initiators](#).

**Table 56** initiator properties

Name	Type	Description
durable-id	string	Initiator ID.
nickname	string	The nickname of the initiator, or blank.
discovered	string	<ul style="list-style-type: none"><li>Yes: The initiator was discovered and its entry was automatically created.</li><li>No: The initiator was manually created.</li></ul>
mapped	string	<ul style="list-style-type: none"><li>Yes: At least one volume is explicitly mapped to the initiator.</li><li>No: No volumes are explicitly mapped to the initiator.</li></ul>
profile	string	<ul style="list-style-type: none"><li>Standard: Default profile.</li><li>HP-UX: The host uses Flat Space Addressing.</li></ul>
profile-numeric	uint32	Numeric equivalents of <code>profile</code> values. <ul style="list-style-type: none"><li>0: Standard</li><li>1: HP-UX</li></ul>
host-bus-type	string	<ul style="list-style-type: none"><li>If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.</li><li>If the host entry was manually created: Undefined.</li></ul>
host-bus-type-numeric	uint32	Numeric equivalents of <code>host-bus-type</code> values. <ul style="list-style-type: none"><li>0: UNKNOWN</li><li>6: FC</li><li>8: SAS</li><li>9: iSCSI</li></ul>
id	string	<ul style="list-style-type: none"><li>For an FC initiator, its WWPN.</li><li>For a SAS initiator, its WWPN.</li><li>For an iSCSI initiator, its node name (typically the IQN).</li></ul>
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](#) when the initiator parameter is specified.

**Table 57** initiator-view properties

Name	Type	Description
id	string	<ul style="list-style-type: none"><li>For an FC initiator, its WWPN.</li><li>For a SAS initiator, its WWPN.</li><li>For an iSCSI initiator, its node name (typically the IQN).</li></ul>
hba-nickname	string	The nickname of the initiator.
host-profile	string	<ul style="list-style-type: none"><li>Standard: Default profile.</li><li>HP-UX: The host uses Flat Space Addressing.</li></ul>
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none"><li>0: Standard</li><li>1: HP-UX</li></ul>
host-view-mappings	Embedded; see <a href="#">host-view-mappings</a> .	

## inquiry

This basetype is used by [show inquiry](#).

**Table 58** 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.
nvr-am-defaults	string	For internal use only.

## io-modules

This basetype is used by [show enclosures](#) for an expansion module.

**Table 59** io-modules properties

Name	Type	Description
durable-id	string	Expansion module ID.
controller-id	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-id-numeric	uint32	Numeric equivalents for controller-id values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
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"><li>Left</li><li>Right</li><li>Top</li><li>Bottom</li></ul>
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li><li>2: Top</li><li>3: Bottom</li></ul>
configuration-serialnumber	string	Configuration serial number.
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"><li>Enabled: PHY fault isolation is enabled.</li><li>Disabled: PHY fault isolation is disabled.</li></ul>

**Table 59 io-modules properties (continued)**

Name	Type	Description
phy-isolation-numeric	uint32	Numeric equivalents for phy-isolation values. <ul style="list-style-type: none"><li>• 0: Enabled</li><li>• 1: Disabled</li></ul>
locator-led	string	Shows the state of the locator LED on an expansion module. <ul style="list-style-type: none"><li>• Off</li><li>• On</li></ul>
locator-led-numeric	uint32	Numeric equivalents for the locator-led property. <ul style="list-style-type: none"><li>• 0: Off</li><li>• 1: On</li></ul>
status	string	<ul style="list-style-type: none"><li>• Operational</li><li>• Down</li><li>• Not installed</li><li>• Unknown</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 0: Operational</li><li>• 1: Down</li><li>• 2: Not installed</li><li>• 3: Unknown</li></ul>
health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• N/A</li><li>• Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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 <a href="#">unhealthy-component</a> .	
enclosure-id	Embedded; see <a href="#">expander-ports</a> .	

## iscsi-parameters

This basetype is shown by [show iscsi-parameters](#).

**Table 60** iscsi-parameters properties

Name	Type	Description
chap	string	Shows whether Challenge-Handshake Authentication Protocol (CHAP) is enabled. <ul style="list-style-type: none"><li>Enabled: CHAP is enabled.</li><li>Disabled: CHAP is disabled. This is the default.</li></ul>
chap-numeric	uint32	Numeric equivalents for chap values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
jumbo-frames	string	Shows whether support for jumbo frames is enabled. <ul style="list-style-type: none"><li>Enabled: Jumbo-frame support is enabled.</li><li>Disabled: Jumbo-frame support is disabled. This is the default.</li></ul>
jumbo-frames-numeric	uint32	Numeric equivalents for jumbo-frames values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
isns	string	Shows whether support for Internet Storage Name Service (iSNS) is enabled. <ul style="list-style-type: none"><li>Enabled: iSNS is enabled.</li><li>Disabled: iSNS is disabled. This is the default.</li></ul>
isns-numeric	uint32	Numeric equivalents for isns values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
isns-ip	string	Address of the iSNS server. The default address is all zeroes.
isns-alt-ip	string	Address of the alternate iSNS server. The default address is all zeroes.
iscsi-speed	string	iSCSI host port link speed. <ul style="list-style-type: none"><li>auto: The proper speed is auto-negotiated. This is the default.</li><li>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.</li></ul>
iscsi-speed-numeric	uint32	Numeric equivalents for iscsi-speed values. <ul style="list-style-type: none"><li>0: auto</li><li>1: 1Gbps</li></ul>
iscsi-ip-version	uint8	iSCSI IP version. <ul style="list-style-type: none"><li>4: iSCSI host port addresses use IPv4 format. This is the default.</li><li>6: iSCSI host port addresses use IPv6 format.</li></ul>

## iscsi-port

This basetype is used by [show ports](#) for an iSCSI host port.

**Table 61** iscsi-port properties

Name	Type	Description
ip-version	string	iSCSI IP version. <ul style="list-style-type: none"><li>IPv4: iSCSI host port addresses use IPv4 format.</li><li>IPv6: iSCSI host port addresses use IPv6 format.</li></ul>
ip-address	string	Assigned port IP address.
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"><li>OK</li><li>Not present: No SFP is inserted in this port.</li><li>Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.</li><li>Incorrect protocol: The SFP protocol does not match the port protocol. When this condition is detected, event 464 is logged.</li></ul>
sfp-present	string	Shows whether the port contains an SFP. <ul style="list-style-type: none"><li>Not Present</li><li>Present</li></ul>
sfp-present-numeric	uint32	Numeric equivalents for sfp-present values. <ul style="list-style-type: none"><li>0: Not Present</li><li>1: Present</li></ul>
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](#).

**Table 62** license properties

Name	Type	Description
license-key	string	<ul style="list-style-type: none"><li>• The license key, if a license is installed and valid.</li><li>• Blank if a license is not installed.</li></ul>
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	Shows when the snapshot license will expire. <ul style="list-style-type: none"><li>• <code>Never</code>: License doesn't expire.</li><li>• <code>days</code>: Number of days remaining for a temporary license.</li><li>• <code>Expired</code>: Temporary license has expired and cannot be renewed.</li></ul>
max-snapshots-expiry-numeric	uint32	Numeric equivalents for max-snapshots-expiry values. <ul style="list-style-type: none"><li>• <code>0</code>: <code>Never</code></li><li>• <code>255</code>: <code>Expired</code></li><li>• <code>days</code>: Number of days remaining</li></ul>
virtualization	string	Shows whether the capability to create and manage virtual pools is enabled or disabled. <ul style="list-style-type: none"><li>• <code>Disabled</code>: The capability is disabled.</li><li>• <code>Enabled</code>: The capability is enabled.</li></ul>
virtualization-numeric	uint32	Numeric equivalents for virtualization values. <ul style="list-style-type: none"><li>• <code>0</code>: <code>Disabled</code></li><li>• <code>1</code>: <code>Enabled</code></li></ul>
virtualization-expiry	string	Shows when the virtualization license will expire. <ul style="list-style-type: none"><li>• <code>Never</code>: License is purchased and doesn't expire.</li></ul>
virtualization-expiry-numeric	uint32	Numeric equivalents for virtualization-expiry values. <ul style="list-style-type: none"><li>• <code>0</code>: <code>Never</code></li></ul>
performance-tier	string	Shows whether the capability to create a Performance tier comprised of SSDs is enabled or disabled. <ul style="list-style-type: none"><li>• <code>Disabled</code>: The capability is disabled.</li><li>• <code>Enabled</code>: The capability is enabled.</li></ul>
performance-tier-numeric	uint32	Numeric equivalents for performance-tier values. <ul style="list-style-type: none"><li>• <code>0</code>: <code>Disabled</code></li><li>• <code>1</code>: <code>Enabled</code></li></ul>

**Table 62** license properties (continued)

Name	Type	Description
performance-tier-expiry	string	Shows when the performance tier license will expire. <ul style="list-style-type: none"> <li>Never: License is purchased and doesn't expire.</li> <li><i>days</i>: Number of days remaining for a temporary license.</li> <li>Expired: Temporary license has expired and cannot be renewed.</li> </ul>
performance-tier-expiry-numeric	uint32	Numeric equivalents for performance-tier-expiry values. <ul style="list-style-type: none"> <li>0: Never</li> <li>255: Expired</li> <li><i>days</i>: Number of days remaining</li> </ul>
volume-copy	string	Shows whether the capability to copy volumes is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled: The capability is disabled.</li> <li>Enabled: The capability is enabled.</li> </ul>
volume-copy-numeric	uint32	Numeric equivalents for volume-copy values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
volume-copy-expiry	string	Shows when the volume copy license will expire. <ul style="list-style-type: none"> <li>Never: Always enabled and doesn't expire.</li> </ul>
volume-copy-expiry-numeric	uint32	Numeric equivalents for volume-copy-expiry values. <ul style="list-style-type: none"> <li>0: Never</li> </ul>
remote-snapshot-replication	string	Shows whether the capability to replicate volumes to a remote system is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled: The capability is disabled.</li> <li>Enabled: The capability is enabled.</li> </ul>
remote-snapshot-replication-numeric	uint32	Numeric equivalents for remote-snapshot-replication values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
remote-snapshot-replication-expiry	string	Shows when the volume replication feature will expire. <ul style="list-style-type: none"> <li>Never: License is purchased and doesn't expire.</li> <li><i>days</i>: Number of days remaining for a temporary license.</li> <li>Expired: Temporary license has expired and cannot be renewed.</li> </ul>
remote-snapshot-replication-expiry-numeric	uint32	Numeric equivalents for remote-snapshot-replication values. <ul style="list-style-type: none"> <li>0: Never</li> <li>255: Expired</li> <li><i>days</i>: Number of days remaining</li> </ul>
vds	string	Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled. <ul style="list-style-type: none"> <li>Disabled: VDS is disabled.</li> <li>Enabled: VDS is enabled.</li> </ul>
vds-numeric	uint32	Numeric equivalents for vds values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>



**Table 62 license properties (continued)**

Name	Type	Description
vds-expiry	string	Shows when the VDS (Virtual Disk Service) Hardware Provider will expire. <ul style="list-style-type: none"> <li>Never: License and doesn't expire.</li> <li><i>days</i>: Number of days remaining for a temporary license.</li> <li>Expired: Temporary license has expired and cannot be renewed.</li> </ul>
vds-expiry-numeric	uint32	Numeric equivalents for vds-expiry values. <ul style="list-style-type: none"> <li>0: Never</li> <li>255: Expired</li> <li><i>days</i>: Number of days remaining</li> </ul>
vss	string	Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is enabled. <ul style="list-style-type: none"> <li>Disabled: VSS is disabled.</li> <li>Enabled: VSS is enabled.</li> </ul>
vss-numeric	uint32	Numeric equivalents for vss values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
vss-expiry	string	Shows when the VSS (Volume Shadow Copy Service) Hardware Provider will expire. <ul style="list-style-type: none"> <li>Never: License and doesn't expire.</li> <li><i>days</i>: Number of days remaining for a temporary license.</li> <li>Expired: Temporary license has expired and cannot be renewed.</li> </ul>
vss-expiry-numeric	uint32	Numeric equivalents for vss-expiry values. <ul style="list-style-type: none"> <li>0: Never</li> <li>255: Expired</li> <li><i>days</i>: Number of days remaining</li> </ul>
dsd	string	Shows whether the Drive Spin Down (DSD) feature is enabled. <ul style="list-style-type: none"> <li>Disabled: DSD is disabled.</li> <li>Enabled: DSD is enabled.</li> </ul>
dsd-numeric	uint32	Numeric equivalents for dsd values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
dsd-expiry	string	Shows when the Drive Spin Down (DSD) feature will expire. <ul style="list-style-type: none"> <li>Never: Always enabled and doesn't expire.</li> </ul>
dsd-expiry-numeric	uint32	Numeric equivalents for dsd-expiry values. <ul style="list-style-type: none"> <li>0: Never</li> </ul>
sra	string	Shows whether Storage Replication Adapter (SRA) support is enabled. <ul style="list-style-type: none"> <li>Disabled: SRA is disabled.</li> <li>Enabled: SRA is enabled.</li> </ul>
sra-numeric	uint32	Numeric equivalents for sra values. <ul style="list-style-type: none"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>

**Table 62** license properties (continued)

Name	Type	Description
sra-expiry	string	Shows when the SRA feature will expire. <ul style="list-style-type: none"><li>• <i>Never</i>: License and doesn't expire.</li><li>• <i>days</i>: Number of days remaining for a temporary license.</li><li>• <i>Expired</i>: Temporary license has expired and cannot be renewed.</li></ul>
sra-expiry-numeric	uint32	Numeric equivalents for sra-expiry values. <ul style="list-style-type: none"><li>• <i>0</i>: <i>Never</i></li><li>• <i>255</i>: <i>Expired</i></li><li>• <i>days</i>: Number of days remaining</li></ul>

## local-ports

This basetype is used by [show peer-connections](#).

**Table 63** local-ports 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.

## local-ports-detail

This basetype is used by [show peer-connections](#) when the `verify-links` parameter is specified.

**Table 64** 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 SMC or FTP.

**Table 65** log-header-table properties

Name	Type	Description
log-contact	string	Contact person's name, if specified in the SMC Save Logs panel.
log-email	string	Contact's email address, if specified in the SMC Save Logs panel.
log-phone	string	Contact's phone number, if specified in the SMC Save Logs panel.
log-comments	string	Comments describing the problem and specifying the date and time when the problem occurred, if specified in the SMC 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](#).

**Table 66** 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 size value in 512-byte blocks.
status	string	Master volume status. <ul style="list-style-type: none"><li>• Available: The master volume is available.</li><li>• Unavailable: The master volume is not available.</li></ul>
status-reason	string	More information about the status value. <ul style="list-style-type: none"><li>• MV Not Accessible: Master volume is not accessible.</li><li>• MV Not Found: Master volume is not found.</li><li>• RV: Replication volume (either a primary volume or a secondary volume).</li><li>• RV Prepared: Replication-prepared volume, which could become a secondary volume in a replication set.</li><li>• SP Not Accessible: Snap pool is not accessible.</li><li>• SP Not Found: Snap pool is not found.</li><li>• ---: The master volume is available.</li><li>• Unknown Reason</li></ul>
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 snap-data value in 512-byte blocks.
rollback	string	<ul style="list-style-type: none"><li>• value: Percent complete if a rollback is in progress.</li><li>• ---: No rollback is in progress.</li></ul>

## network-parameters

This basetype is used by [show network-parameters](#).

**Table 67** network-parameters properties

Name	Type	Description
durable-id	string	Controller network port ID in the form <code>mgmtport_controller-ID</code>
active-version	uint32	The configured network port IP version. <ul style="list-style-type: none"><li>4: IPv4</li></ul>
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"><li>Manual: Network settings are set manually (statically).</li><li>DHCP: DHCP is used to set network parameters.</li></ul>
addressing-mode-numeric	uint32	Numeric equivalents for addressing-mode values. <ul style="list-style-type: none"><li>1: Manual</li><li>2: DHCP</li></ul>
link-speed	string	<ul style="list-style-type: none"><li>Unknown: For a system operating in Single Controller mode, this controller module is not present.</li><li>10mbps: The network port link speed is set to 10 Mb/s.</li><li>100mbps: The network port link speed is set to 100 Mb/s.</li><li>1000mbps: The network port link speed is set to 1000 Mb/s.</li></ul>
link-speed-numeric	uint32	Numeric equivalents for link-speed values. <ul style="list-style-type: none"><li>0: 10mbps</li><li>1: 100mbps</li><li>2: 1000mbps</li></ul>
duplex-mode	string	<ul style="list-style-type: none"><li>Undefined: For a system operating in Single Controller mode, this controller module is not present.</li><li>Half: The network port duplex mode is set to half duplex.</li><li>Full: The network port duplex mode is set to full duplex.</li></ul>
duplex-mode-numeric	uint32	Numeric equivalents for duplex-mode values. <ul style="list-style-type: none"><li>0: full</li><li>1: half</li><li>2: Undefined</li></ul>
auto-negotiation	string	Not applicable.
auto-negotiation-numeric	uint32	Not applicable.
health	string	The health of the network connection. <ul style="list-style-type: none"><li>OK</li><li>Degraded</li><li>Fault</li><li>N/A</li><li>Unknown</li></ul>

**Table 67 network-parameters properties (continued)**

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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"><li>• Enabled: The system will respond to a broadcast ping.</li><li>• Disabled: The system will not respond to a broadcast ping.</li></ul>
ping-broadcast-numeric	uint32	Numeric equivalents for ping-broadcast values. <ul style="list-style-type: none"><li>• 0: Disabled</li><li>• 1: Enabled</li></ul>



## ntp-status

This basetype is used by [show ntp-status](#).

**Table 68** 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"><li>activated: NTP is enabled.</li><li>deactivated: NTP is disabled. This is the default.</li></ul>
ntp-server-address	string	<ul style="list-style-type: none"><li>The current NTP server IP address if NTP is enabled.</li><li>The last-set NTP server IP address if NTP was enabled and has been disabled.</li><li>0.0.0.0 if the NTP server IP address has not been set.</li></ul>
ntp-contact-time	string	<ul style="list-style-type: none"><li>Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), of the last message received from the NTP server.</li><li>none: No contact.</li></ul>

## peer-connection-info

This basetype is used by [query peer-connection](#).

**Table 69** 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.
vendor-name	string	The vendor name.
product-id	string	The product model identifier.
product-key through sra-expiry	See <a href="#">license</a> .	
peer-controllers	Embedded; see <a href="#">peer-controllers</a> .	

## peer-connections

This basetype is used by [show peer-connections](#).

**Table 70** 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"><li>• iSCSI</li></ul>
connection-type-numeric	uint32	Numeric equivalents for connection-type values. <ul style="list-style-type: none"><li>• 2: iSCSI</li></ul>
connection-status	string	<ul style="list-style-type: none"><li>• Online: The systems have a valid connection.</li><li>• Offline: No connection is available to the remote system.</li></ul>
connection-status-numeric	uint32	Numeric equivalents for connection-status values.
health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Fault</li><li>• Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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 <a href="#">local-ports</a> .	
remote-ports	Embedded; see <a href="#">remote-ports</a> .	

## peer-controllers

This basetype is used by [query peer-connection](#).

**Table 71** peer-controllers properties

Name	Type	Description
controller	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
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.
ip-address	string	Controller network port IP address.
local-ports	Embedded; see <a href="#">peer-ports</a> .	

## peer-ports

This basetype is used by [query peer-connection](#).

**Table 72** 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"><li>• iSCSI</li></ul>
host-port-health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• N/A</li></ul>
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](#).

**Table 73** policy-threshold properties

Name	Type	Description
threshold	string	<p>Snap pool threshold level:</p> <ul style="list-style-type: none"><li>• <b>Warning:</b> The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator. The default is 75%.</li><li>• <b>Error:</b> 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%.</li><li>• <b>Critical:</b> 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.</li></ul>
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"><li>• <b>autoexpand:</b> 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"><li>◦ If the snap pool is successfully expanded, the system will log Informational event 444.</li><li>◦ 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.</li></ul></li></ul> <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> <ul style="list-style-type: none"><li>• <b>deleteoldestsnapshot:</b> Delete the oldest snapshot.</li><li>• <b>deletesnapshots:</b> Delete all snapshots.</li><li>• <b>haltwrites:</b> Halt writes to the snap pool.</li><li>• <b>notifyonly:</b> Generates an event to notify the administrator.</li></ul>
size-to-expand	string	<ul style="list-style-type: none"><li>• <b>size:</b> For the autoexpand policy, the size (formatted to use the current base, precision, and units) by which to expand the snap pool when the threshold is reached.</li><li>• <b>N/A:</b> The policy is not set to autoexpand.</li></ul>
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](#) when the `historical` parameter is specified.

**Table 74** pool-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	The total number of read and write operations since the last sampling time.
number-of-reads	uint64	The number of read operations since the last sampling time.
number-of-writes	uint64	The number of write operations since the last sampling time.
total-data-transferred	uint64	The total amount of data read and written since the last sampling time.
data-read	uint64	The amount of data read since the last sampling time.
data-read-numeric	uint64	The amount of data written since the last sampling time.
data-written	uint64	The amount of data written since the last sampling time.
data-written-numeric	uint64	The amount of data written since the last sampling time.
total-iops	uint64	The total number of read and write operations per second since the last sampling time.
read-iops	uint64	The number of read operations per second since the last sampling time.
write-iops	uint64	The number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	The 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	The 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	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](#).

**Table 75** 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.
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 <a href="#">resettable-statistics</a> .	
tier-statistics	Embedded; see <a href="#">tier-statistics</a> .	



## pool-summary

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

**Table 76** 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 <a href="#">pool-hist-statistics</a> .	

## pools

This basetype is used by [show configuration](#) and [show pools](#).

**Table 77** 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"><li>Linear: Linear pool.</li><li>Virtual: Virtual pool.</li></ul>
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"><li>0: Linear</li><li>1: Virtual</li></ul>
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"><li>Disabled: The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.</li><li>Enabled: The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool.</li><li>N/A: Not applicable (linear pool).</li></ul>
overcommit-numeric	uint32	Numeric equivalents for overcommit values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li><li>2: N/A</li></ul>
over-committed	string	<ul style="list-style-type: none"><li>True: The pool is overcommitted.</li><li>False: The pool is not overcommitted.</li></ul>
over-committed-numeric	uint16	Numeric equivalents for over-committed values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
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 page-size value in 512-byte blocks.
low-threshold	string	The low threshold for page allocation as a percentage of pool capacity.

**Table 77 pools properties (continued)**

Name	Type	Description
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"> <li>• (blank): None.</li> <li>• DRSC: The disk group is being scrubbed.</li> <li>• EXPD: The disk group is being expanded.</li> <li>• INIT: The disk group is being initialized.</li> <li>• RCON: The disk group is being reconstructed.</li> <li>• VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.</li> <li>• VPREP: The virtual disk group is being prepared for use in a virtual pool.</li> <li>• VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.</li> <li>• VREMV: The disk group and its data are being removed.</li> <li>• VRFY: The disk group is being verified.</li> <li>• VRSC: The disk group is being scrubbed.</li> </ul>
utility-running-numeric	uint32	<p>Numeric equivalents for job-running values.</p> <ul style="list-style-type: none"> <li>• 0: None</li> <li>• 2: INIT</li> <li>• 3: RCON</li> <li>• 4: VRFY</li> <li>• 5: EXPD</li> <li>• 6: VRSC</li> <li>• 7: DRSC</li> <li>• 9: VREMV</li> <li>• 12: VPREP</li> <li>• 13: VDRAIN</li> <li>• 14: VRECV</li> </ul>
preferred-owner	string	<p>Controller that owns the disk group and its volumes during normal operation.</p> <ul style="list-style-type: none"> <li>• A: Controller A.</li> <li>• B: Controller B.</li> </ul>
preferred-owner-numeric	uint32	<p>Numeric equivalents for preferred-owner values.</p> <ul style="list-style-type: none"> <li>• 0: B</li> <li>• 1: A</li> </ul>
owner	string	<p>Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline.</p> <ul style="list-style-type: none"> <li>• A: Controller A.</li> <li>• B: Controller B.</li> </ul>

**Table 77** pools properties (continued)

Name	Type	Description
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"> <li>0: B</li> <li>1: A</li> </ul>
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.
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 metadata-vol-size value in 512-byte blocks.
total-rfc-size	string	The total size in blocks of the read cache in the pool.
total-rfc-size-numeric	uint64	Unformatted total-rfc-size value in 512-byte blocks.
available-rfc-size	string	The unused read-cache space in blocks that is available for use by the pool.
available-rfc-size-numeric	uint64	Unformatted available-rfc-size value in 512-byte blocks.
reserved-size	string	The total number of pages that are reserved for virtual volumes in the pool.
reserved-size-numeric	uint64	Unformatted reserved-size 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 reserved-unalloc-size value in 512-byte blocks.
pool-sector-format	string	The sector format of disks in the disk group. <ul style="list-style-type: none"> <li>512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>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.</li> <li>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 sector size types (512n, 512e).</li> </ul>

**Table 77** pools properties (continued)

Name	Type	Description
pool-sector-format-numeric	uint32	Numeric equivalents for pool-sector-numeric values. <ul style="list-style-type: none"> <li>• 0: 512n</li> <li>• 1: 512e</li> <li>• 3: Mixed</li> </ul>
health	string	<ul style="list-style-type: none"> <li>• OK</li> <li>• Degraded</li> <li>• Fault</li> <li>• N/A</li> <li>• Unknown</li> </ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> <li>• 0: OK</li> <li>• 1: Degraded</li> <li>• 2: Fault</li> <li>• 3: Unknown</li> <li>• 4: N/A</li> </ul>
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 <a href="#">disk-groups</a> .	
tiers	Embedded; see <a href="#">tiers</a> .	
unhealthy-component	Embedded; see <a href="#">unhealthy-component</a> .	

## port

This basetype is used by [show configuration](#) and [show ports](#).

**Table 78** port properties

Name	Type	Description
durable-id	string	Controller host port ID in the form <code>hostport_controller-ID-and-port-number</code> .
controller	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
port	string	Controller ID and port number.
port-type	string	<ul style="list-style-type: none"><li>FC: Fibre Channel.</li><li>iSCSI: Internet SCSI.</li><li>SAS: Serial Attached SCSI.</li></ul>
port-type-numeric	uint32	Numeric equivalents for port-type values. <ul style="list-style-type: none"><li>0: UNKNOWN</li><li>6: FC</li><li>8: SAS</li><li>9: iSCSI</li></ul>
media	string	<ul style="list-style-type: none"><li>FC(P): Fibre Channel Point-to-Point.</li><li>FC(L): Fibre Channel-Arbitrated Loop (public or private).</li><li>FC(-): Not applicable, as when the port is disconnected.</li><li>SAS: Serial Attached SCSI.</li><li>iSCSI: Internet SCSI.</li></ul>
target-id	string	Port WWN or IQN.
status	string	Port status. <ul style="list-style-type: none"><li>Up: The port is cabled and has an I/O link.</li><li>Warning: Not all of the port's PHYs are up.</li><li>Error: The port is reporting an error condition.</li><li>Not Present: The controller module is not installed or is down.</li><li>Disconnected: Either no I/O link is detected or the port is not cabled.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: Up</li><li>1: Warning</li><li>2: Error</li><li>3: Not Present</li><li>6: Disconnected</li></ul>

**Table 78 port properties (continued)**

Name	Type	Description
actual-speed	string	Actual link speed in Mbit/s or Gbit/s. <ul style="list-style-type: none"> <li>• 10Mb</li> <li>• 100Mb</li> <li>• 1Gb</li> <li>• 4Gb</li> <li>• 6Gb</li> <li>• 8Gb</li> <li>• 12Gb</li> <li>• 16Gb</li> <li>• (blank): Port is disconnected.</li> </ul>
actual-speed-numeric	uint32	Numeric equivalents for actual-speed values. <ul style="list-style-type: none"> <li>• 0: 1Gb</li> <li>• 2: 4Gb</li> <li>• 6: 6Gb</li> <li>• 7: 8Gb</li> <li>• 8: 10Mb</li> <li>• 9: 100Mb</li> <li>• 11: 12Gb</li> <li>• 12: 16Gb</li> <li>• 255: Port is disconnected.</li> </ul>
configured-speed	string	Configured host-port link speed in Gbit/s. <ul style="list-style-type: none"> <li>• Auto</li> <li>• 1Gb</li> <li>• 4Gb</li> <li>• 8Gb</li> <li>• 12Gb</li> <li>• 16Gb</li> </ul>
configured-speed-numeric	uint32	Numeric equivalents for configured-speed values. <ul style="list-style-type: none"> <li>• 0: 1Gb</li> <li>• 2: 4Gb</li> <li>• 3: Auto</li> <li>• 7: 8Gb</li> <li>• 11: 12Gb</li> <li>• 12: 16Gb</li> </ul>
fan-out	uint8	Applicable to a 3004 SAS controller module only. <ul style="list-style-type: none"> <li>• Disabled: The port is configured to use a standard cable.</li> <li>• Enabled: The port is configured to use a fan-out cable.</li> </ul>

**Table 78 port properties (continued)**

Name	Type	Description
health	string	<ul style="list-style-type: none"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• N/A</li><li>• Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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 <a href="#">fc-port</a> , <a href="#">iscsi-port</a> , <a href="#">sas-port</a> .	



## power-supplies

This basetype is used by [show power-supplies](#).

**Table 79** 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.
part-number	string	FRU part number.
description	string	FRU long description.
name	string	Power supply identifier and location.
fw-revision	string	<ul style="list-style-type: none"><li>(blank): Not applicable.</li><li>Firmware revision of the power supply.</li></ul>
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"><li>Left</li><li>Right</li><li>Top</li><li>Bottom</li></ul>
position-numeric	uint32	Numeric equivalents for position values. <ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li><li>2: Top</li><li>3: Bottom</li></ul>
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.
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.

**Table 79** power-supplies properties (continued)

Name	Type	Description
dctemp	uint32	Power supply temperature.
health	string	<ul style="list-style-type: none"> <li>• OK</li> <li>• Degraded</li> <li>• Fault</li> <li>• N/A</li> <li>• Unknown</li> </ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> <li>• 0: OK</li> <li>• 1: Degraded</li> <li>• 2: Fault</li> <li>• 3: Unknown</li> <li>• 4: N/A</li> </ul>
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.
status	string	Power supply status. <ul style="list-style-type: none"> <li>• Up</li> <li>• Warning</li> <li>• Error</li> <li>• Not Present</li> <li>• Unknown</li> </ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> <li>• 0: Up</li> <li>• 1: Warning</li> <li>• 2: Error</li> <li>• 3: Not Present</li> <li>• 4: Unknown</li> </ul>
unhealthy-component	Embedded; see <a href="#">unhealthy-component</a> .	
fan-details	Embedded; see <a href="#">fan</a> .	

## product-info

This basetype is used by [show inquiry](#).

**Table 80** 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](#).

**Table 81** provisioning properties

Name	Type	Description
volume	string	<ul style="list-style-type: none"><li>Volume name.</li><li>Blank if the vdisk or pool does not have a volume.</li></ul>
volume-serial	string	Volume serial number.
wwn	string	<ul style="list-style-type: none"><li>Volume World Wide Name.</li><li>Blank if the vdisk or pool does not have a volume.</li></ul>
controller	string	Owning controller of the vdisk or pool. <ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
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 virtual-disk 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"><li>OK</li><li>Degraded</li><li>Fault</li><li>N/A</li><li>Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>0: OK</li><li>1: Degraded</li><li>2: Fault</li><li>3: Unknown</li><li>4: N/A</li></ul>
mapped	string	<ul style="list-style-type: none"><li>Yes: The volume is mapped.</li><li>No: The volume is not mapped.</li></ul>
lun-view	Embedded; see <a href="#">volume-view-mappings</a> .	

## readcache-hist-statistics

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

**Table 82** readcache-hist-statistics properties

Name	Type	Description
number-of-ios	uint64	The total number of read and write operations since the last sampling time.
number-of-reads	uint64	The number of read operations since the last sampling time.
number-of-writes	uint64	The number of write operations since the last sampling time.
total-data-transferred	uint64	The total amount of data read and written since the last sampling time.
data-read	uint64	The amount of data read since the last sampling time.
data-read-numeric	uint64	The amount of data written since the last sampling time.
data-written	uint64	The amount of data written since the last sampling time.
data-written-numeric	uint64	The amount of data written since the last sampling time.
total-iops	uint64	The total number of read and write operations per second since the last sampling time.
read-iops	uint64	The number of read operations per second since the last sampling time.
write-iops	uint64	The number of write operations per second since the last sampling time.
total-bytes-per-sec	uint64	The 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	The 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 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.
number-of-pages-copied	uint64	The number of pages copied to read cache in the sample time period.
number-of-pages-discarded	uint64	The number of pages discarded from read cache (to make room for new hot data) in the sample time period.
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.

## redundancy

This basetype is used by [show redundancy-mode](#).

**Table 83** 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"><li>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.</li><li>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.</li><li>Single Controller: The enclosure contains a single controller.</li><li>Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</li><li>Down: Both controllers are not operational.</li></ul>
redundancy-mode-numeric	uint32	<p>Numeric equivalents for redundancy-mode values.</p> <ul style="list-style-type: none"><li>1: Independent Cache Performance Mode</li><li>2: Active-Active ULP</li><li>3: Single Controller</li><li>4: Failed Over</li><li>5: Down</li></ul>
redundancy-status	string	<ul style="list-style-type: none"><li>Redundant with independent cache: Both controllers are operational but are not mirroring their cache metadata to each other.</li><li>Redundant: Both controllers are operational.</li><li>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.</li><li>Down: This controller is not operational.</li><li>Unknown: Status information is not available.</li></ul>
redundancy-status-numeric	uint32	<p>Numeric equivalents for redundancy-status values.</p> <ul style="list-style-type: none"><li>0: Redundant with independent cache</li><li>1: Redundant</li><li>3: Operational but not redundant</li><li>4: Down</li><li>5: Unknown</li></ul>
controller-a-status	string	<ul style="list-style-type: none"><li>Operational: The controller is operational.</li><li>Down: The controller is installed but not operational.</li><li>Not Installed: The controller is not installed.</li></ul>
controller-a-status-numeric	uint32	<p>Numeric equivalents for controller-a-status values.</p> <ul style="list-style-type: none"><li>0: Operational</li><li>1: Down</li><li>2: Not Installed</li></ul>

**Table 83** redundancy properties (continued)

Name	Type	Description
controller-a-serial-number	string	<ul style="list-style-type: none"> <li>Controller module serial number</li> <li>Not Available: The controller is down or not installed.</li> </ul>
controller-b-status	string	<ul style="list-style-type: none"> <li>Operational: The controller is operational.</li> <li>Down: The controller is installed but not operational.</li> <li>Not Installed: The controller is not installed.</li> </ul>
controller-b-status-numeric	uint32	Numeric equivalents for controller-b-status values. <ul style="list-style-type: none"> <li>0: Operational</li> <li>1: Down</li> <li>2: Not Installed</li> </ul>
controller-b-serial-number	string	<ul style="list-style-type: none"> <li>Controller module serial number</li> <li>Not Available: The controller is down or not installed.</li> </ul>
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"> <li>Not Communicating</li> <li>Not Operational</li> <li>Operational</li> <li>Unknown</li> </ul>
other-MC-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none"> <li>1524: Not Communicating</li> <li>3231: Not Operational</li> <li>4749: Operational</li> <li>1496: Unknown</li> </ul>

## refresh-counters

This basetype is used by [show refresh-counters](#).

**Table 84** refresh-counters properties

Name	Type	Description
basetype-name	(Not shown)	<p>Shows when the data represented by the base type was last updated.</p> <ul style="list-style-type: none"><li>0: The data has never been updated and is not cached.</li><li><i>nonzero-number</i>: 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.</li></ul>



## remote-addresses

This basetype is used by [show replication-volumes](#).

**Table 85** remote-addresses properties

Name	Type	Description
connected-ports	string	<ul style="list-style-type: none"><li>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.</li><li>For a local primary or secondary volume, this shows N/A.</li></ul>
remote-address	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](#) and [verify remote-link](#).

**Table 86** 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"><li>Unknown: Port type is unknown.</li><li>FC: FC port.</li><li>iSCSI: iSCSI port.</li></ul>
type-numeric	uint32	Numeric equivalents for type values. <ul style="list-style-type: none"><li>0: Unknown</li><li>6: FC</li><li>9: iSCSI</li></ul>
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](#).

**Table 87** 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](#) when the `verify-links` parameter is specified.

**Table 88** 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](#).

**Table 89** remote-system properties

Name	Type	Description
id	string	Remote system ID.
system-name	string	<ul style="list-style-type: none"><li>The name of the remote system.</li><li>Uninitialized Name: The default value.</li></ul>
system-contact	string	<ul style="list-style-type: none"><li>The name of the person who administers the remote system.</li><li>Uninitialized Contact: The default value.</li></ul>
system-location	string	<ul style="list-style-type: none"><li>The location of the remote system.</li><li>Uninitialized Location: The default value.</li></ul>
system-information	string	<ul style="list-style-type: none"><li>A brief description of the remote system.</li><li>Uninitialized Info: The default value.</li></ul>
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"><li>The IP address of the network port in controller A in the remote system.</li><li>Not Present</li></ul>
ip-address-b	string	<ul style="list-style-type: none"><li>The IP address of the network port in controller B in the remote system.</li><li>Not Present</li></ul>
username	string	The name of a user that is configured in the remote system. This must be a user with the manage role to remotely configure or provision that system.
status	string	<ul style="list-style-type: none"><li>Uninitialized: This system hasn't communicated with the remote system.</li><li>Ready: This system has contacted the remote system and it is ready to use.</li><li>Connected: This system is transferring data to the remote system.</li><li>Not Connected: The system is not connected to the remote system.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: Uninitialized</li><li>1: Ready</li><li>2: Connected</li></ul>
last-connected	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when successful communication was last established between the MC in the local system and the Management Controller (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.
interfaces	string	<ul style="list-style-type: none"><li>FC</li><li>iSCSI</li><li>SAS</li><li>Hybrid: FC and iSCSI.</li></ul>

**Table 89 remote-system properties (continued)**

Name	Type	Description
interfaces-numeric	uint32	Numeric equivalents for interfaces values. <ul style="list-style-type: none"><li>• 0: FC</li><li>• 1: iSCSI</li><li>• 2: SAS</li><li>• 3: Hybrid</li></ul>
storage-model	string	<ul style="list-style-type: none"><li>• LINEAR</li></ul>
storage-model-numeric	uint32	Numeric equivalents for storage-model values. <ul style="list-style-type: none"><li>• 0: LINEAR</li></ul>
isvalid-ip-a	string	<ul style="list-style-type: none"><li>• False: The IP address is not valid for controller module A in the remote system.</li><li>• True: The IP address is valid for controller module A in the remote system.</li></ul>
isvalid-ip-a-numeric	uint32	Numeric equivalents for isvalid-ip-a values. <ul style="list-style-type: none"><li>• 0: False</li><li>• 1: True</li></ul>
isvalid-ip-b	string	<ul style="list-style-type: none"><li>• False: The IP address is not valid for controller B in the remote system.</li><li>• True: The IP address is valid for controller B in the remote system.</li></ul>
isvalid-ip-b-numeric	uint32	Numeric equivalents for isvalid-ip-b values. <ul style="list-style-type: none"><li>• 0: False</li><li>• 1: True</li></ul>

## replicate-volume-tasks

This basetype is used by [show tasks](#) for a ReplicateVolume task.

**Table 90** 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.
replication-mode	string	<ul style="list-style-type: none"><li>new-snapshot: Replicate a new snapshot of the volume to the remote system.</li><li>last-snapshot: Replicate the last (most recent existing) snapshot of the volume to the remote system.</li></ul>
retention-count	uint32	Number of snapshots to retain with this prefix, from 3 to 32.
last-created	string	<ul style="list-style-type: none"><li>The name of the last snapshot created by the task.</li><li>Blank if the task has not created a snapshot.</li></ul>
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 <a href="#">snap-tasks</a> .	

## replication-image

This basetype is used by [show replication-images](#).

**Table 91** 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.
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 <a href="#">replication-image-params</a> .	



## replication-image-params

This basetype is used by [show replication-images](#).

**Table 92** replication-image-params properties

Name	Type	Description
status	string	Replication image status. <ul style="list-style-type: none"><li>• N/A: The image information is not valid.</li><li>• Queued: The image is known to exist in the primary-view volume but replication has not started.</li><li>• Replicating: The image is being replicated.</li><li>• Suspended: The image is being replicated but replication is suspended.</li><li>• Complete: The image is created, fully replicated, and available.</li><li>• Create-Snapshot: The image is fully replicated but a snapshot of the image is being created.</li><li>• Offline: The image has been replicated but is unusable due to an error.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 0: N/A</li><li>• 1: Queued</li><li>• 2: Replicating</li><li>• 3: Suspended</li><li>• 4: Create-Snapshot</li><li>• 5: Complete</li><li>• 6: Offline</li></ul>
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 start-time 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 update-time 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 suspended-time 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 est-completion-time 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](#) for a linear replication set.

**Table 93** replication-set properties

Name	Type	Description
name	string	Replication set name.
serial-number	string	Replication set serial number.
primary		Embedded; see <a href="#">replication-volume</a> .

## replication-volume

This basetype is used by [show replication-volumes](#).

**Table 94** 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"><li>• Initializing: The initial (full) replication to the volume is in progress.</li><li>• Online: The volume is online and is consistent with the last replicated image.</li><li>• Inconsistent: The volume is online but is in an inconsistent state. A full replication is required to initialize it.</li><li>• Replicating: The volume is online and replication is in progress.</li><li>• Replicate-delay: The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.</li><li>• Suspended: The volume is online but the in-progress replication has been suspended.</li><li>• Offline: The volume cannot be accessed and is unusable due to an error.</li><li>• 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.</li><li>• Detached: The volume is detached for removal.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>• 0: Initializing</li><li>• 1: Online</li><li>• 2: Inconsistent</li><li>• 3: Replicating</li><li>• 4: Replicate-Delay</li><li>• 5: Suspended</li><li>• 6: Offline</li><li>• 7: Establishing proxy</li><li>• 8: Detached</li></ul>
status-reason	string	More information about the status value. <ul style="list-style-type: none"><li>• N/A</li><li>• Record Missing</li><li>• Adding Volume</li><li>• Changing Primary</li></ul>
status-reason-numeric	uint32	Numeric equivalents for status-reason values. <ul style="list-style-type: none"><li>• 0: N/A</li><li>• 1: Record Missing</li><li>• 2: Adding Volume</li><li>• 4: Changing Primary</li></ul>

**Table 94 replication-volume properties (continued)**

Name	Type	Description
monitor	string	Replication volume monitoring status. <ul style="list-style-type: none"> <li>OK: Communication to the remote volume is successfully occurring on the network.</li> <li>Failed: Communication to the remote volume has failed because of a communication issue or because the remote volume has gone offline.</li> </ul>
monitor-numeric	uint32	Numeric equivalents for monitor values. <ul style="list-style-type: none"> <li>2: OK</li> <li>other: Failed</li> </ul>
location	string	<ul style="list-style-type: none"> <li>Local: The replication volume is in the local system.</li> <li>Remote: The replication volume is in a remote system.</li> </ul>
location-numeric	uint32	Numeric equivalents for location values. <ul style="list-style-type: none"> <li>0: Local</li> <li>1: Remote</li> </ul>
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.
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"> <li>Online</li> <li>Conflict</li> <li>Offline</li> </ul>
primary-volume-status-numeric	uint32	Numeric equivalents for primary-volume-status values. <ul style="list-style-type: none"> <li>0: Online</li> <li>1: Conflict</li> <li>2: Offline</li> </ul>
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"> <li>Retry: Retry the replication for the time specified by the max-retry-time property.</li> <li>Suspend: Suspend the replication until the error is resolved automatically or through user intervention.</li> </ul>
error-policy-numeric	uint32	Numeric equivalents for error-policy values. <ul style="list-style-type: none"> <li>0: Retry</li> <li>1: Suspend</li> </ul>

**Table 94 replication-volume properties (continued)**

Name	Type	Description
link-type	string	Type of ports used to link the primary and secondary volumes. <ul style="list-style-type: none"> <li>FC: FC ports.</li> <li>iSCSI: iSCSI ports.</li> </ul>
link-type-numeric	uint32	Numeric equivalents for link-type values. <ul style="list-style-type: none"> <li>8: FC WWNN</li> <li>16: FC WWPN</li> <li>64: iSCSI IPv4</li> <li>128: iSCSI IPv6</li> </ul>
collision-policy	string	Determines the next image to replicate when multiple replication images are queued. <ul style="list-style-type: none"> <li>Newest: Only the latest replication image should be considered for the next replication operation.</li> <li>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.</li> </ul>
collision-policy-numeric	uint32	Numeric equivalents for collision-policy values. <ul style="list-style-type: none"> <li>0: Oldest</li> <li>1: Newest</li> </ul>
monitor-interval	uint32	Interval in seconds at which the primary volume should query the secondary volume.
priority	string	Priority of the replication operation with respect to I/O operations competing for the system's processors. <ul style="list-style-type: none"> <li>High: Replication has higher priority than host I/O. This can cause heavy I/O to be slower than normal.</li> <li>Medium: Replication performance is balanced with host I/O performance.</li> <li>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.</li> </ul>
priority-numeric	uint32	Numeric equivalents for priority values. <ul style="list-style-type: none"> <li>0: High</li> <li>1: Medium</li> <li>2: Low</li> </ul>
connection-status	string	<ul style="list-style-type: none"> <li>Not Attempted: Communication has not been attempted to the remote volume.</li> <li>Online: The volumes in the replication set have a valid connection but communication is not currently active.</li> <li>Active: Communication is currently active to the remote volume.</li> <li>Offline: No connection is available to the remote system.</li> </ul>
connection-status-numeric	uint32	Numeric equivalents for connection-status values. <ul style="list-style-type: none"> <li>0: Not Attempted</li> <li>1: Online</li> <li>2: Active</li> <li>3: Offline</li> </ul>

**Table 94** replication-volume properties (continued)

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 <a href="#">remote-addresses</a> .	
image-details	Embedded; see <a href="#">replication-image</a> .	

## replication-volume-summary

This basetype is used by [show replication-images](#).

**Table 95** 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"><li>Primary Volume: The volume is the primary volume in a replication set.</li><li>Secondary Volume: The volume is the secondary volume in a replication set.</li></ul>
volume-type-numeric	uint32	Numeric equivalents for volume-type values. <ul style="list-style-type: none"><li>0: Secondary Volume</li><li>1: Primary Volume</li></ul>
images	Embedded; see <a href="#">replication-image</a> .	

## reset-snapshot-tasks

This basetype is used by [show tasks](#) for a ResetSnapshot task.

**Table 96** 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](#) and [show tier-statistics](#).

**Table 97** 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.
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-phy-statistics](#).

**Table 98** 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](#) for a SAS host port.

**Table 99** sas-port properties

Name	Type	Description
configured-topology	string	<ul style="list-style-type: none"><li>Direct</li></ul>
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 Warning, the health will change to Degraded, and event 354 will be logged.
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](#) for controller A and controller B.

**Table 100** 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 expander-type values.
drawer-id (2U48 enclosure)	string	<ul style="list-style-type: none"><li>0: Left</li><li>1: Middle</li><li>2: Right</li></ul>
drawer-id (4U56 enclosure)	string	<ul style="list-style-type: none"><li>0: Left</li><li>1: Right</li></ul>
drawer-id-numeric	uint32	Same as drawer-id.
controller	string	<ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
controller-numeric	uint32	Numeric equivalents for controller values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
wide-port-index	uint32	The wide-port index.
phy-index	uint32	The PHY index.
wide-port-role	string	The wide-port role. <ul style="list-style-type: none"><li>Drive</li><li>Drawer Egress</li><li>Drawer Ingress</li><li>Expansion Egress</li><li>Expansion Ingress</li><li>SC Primary</li><li>SC Alternate</li><li>Inter Expander</li><li>Unused</li><li>Unknown</li></ul>

**Table 100 sas-status-controller-a properties (continued)**

Name	Type	Description
wide-port-role-numeric	string	<p>Numeric equivalents for wide-port-role values.</p> <ul style="list-style-type: none"> <li>• 0: Unknown</li> <li>• 1: Drive</li> <li>• 2: Drawer Egress</li> <li>• 3: Drawer Ingress</li> <li>• 4: Expansion Egress</li> <li>• 5: Expansion Ingress</li> <li>• 6: SC Primary</li> <li>• 7: SC Alternate</li> <li>• 8: Inter Expander</li> <li>• 9: Unused</li> </ul>
wide-port-num	uint32	The wide-port number.
type	string	<p>The PHY type.</p> <ul style="list-style-type: none"> <li>• Drawer0-Egress: Drawer 0 egress PHY.</li> <li>• Drawer0-Ingress: Drawer 0 ingress PHY.</li> <li>• Drawer1-Egress: Drawer 1 egress PHY.</li> <li>• Drawer1-Ingress: Drawer 1 drawer ingress PHY.</li> <li>• Drawer2-Egress: Drawer 2 egress PHY.</li> <li>• Drawer2-Ingress: Drawer 2 ingress PHY.</li> <li>• Drive: Drive slot PHY.</li> <li>• Egress: Expansion port egress PHY.</li> <li>• Expander-Egress-0: Expansion port 0 egress PHY.</li> <li>• Expander-Egress-1: Expansion port 1 egress PHY.</li> <li>• Expander-Ingress-0: Expansion port 0 ingress PHY.</li> <li>• Expander-Ingress-1: Expansion port 1 ingress PHY.</li> <li>• Ingress: Expansion port ingress PHY.</li> <li>• Inter-Exp: Inter-expander PHY.</li> <li>• SC: Storage Controller PHY.</li> <li>• SC-0: Storage Controller primary PHY.</li> <li>• SC-1: Storage Controller alternate PHY.</li> <li>• SCA-A: Storage Controller A alternate PHY.</li> <li>• SCA-P: Storage Controller A primary PHY.</li> <li>• SCB-A: Storage Controller B alternate PHY.</li> <li>• SCB-P: Storage Controller B primary PHY.</li> </ul>
status	string	<p>PHY status.</p> <ul style="list-style-type: none"> <li>• Unavailable: No status information is available.</li> <li>• Enabled - Healthy: The PHY is enabled and healthy.</li> <li>• Enabled - Degraded: The PHY is enabled but degraded.</li> <li>• Disabled: The PHY has been disabled by a user or by the system.</li> </ul>

**Table 100 sas-status-controller-a properties (continued)**

Name	Type	Description
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> <li>0: Unavailable</li> <li>1: Enabled - Healthy</li> <li>2: Enabled - Degraded</li> <li>3: Disabled</li> </ul>
elem-status	string	The SES status that corresponds to the PHY status. <ul style="list-style-type: none"> <li>Disabled: Critical condition is detected.</li> <li>Error: Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data.</li> <li>OK: Element is installed and no error conditions are known.</li> <li>Non-critical: Non-critical condition is detected.</li> <li>Not Used: Element is not installed in enclosure.</li> <li>Unknown: Either: <ul style="list-style-type: none"> <li>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.</li> <li>Element is installed with no known errors, but the element has not been turned on or set into operation.</li> </ul> </li> </ul>
elem-status-numeric	uint32	Numeric equivalents for elem-status values. <ul style="list-style-type: none"> <li>0: Error</li> <li>1: OK</li> <li>2: Disabled</li> <li>3: Non-critical</li> <li>4: Error</li> <li>5: Not Used</li> <li>6: Unknown</li> <li>7: Unknown</li> <li>8: Unknown</li> </ul>
elem-disabled	string	<ul style="list-style-type: none"> <li>Enabled: PHY is enabled.</li> <li>Disabled: PHY is disabled.</li> </ul>
elem-disabled-numeric	uint32	Numeric equivalents for elem-disabled values. <ul style="list-style-type: none"> <li>0: Enabled</li> <li>1: Disabled</li> </ul>

**Table 100 sas-status-controller-a properties (continued)**

Name	Type	Description
elem-reason	string	<p>More information about the status value.</p> <ul style="list-style-type: none"> <li>Blank if elem-status is OK.</li> <li>Error count interrupts: PHY disabled because of error-count interrupts.</li> <li>PHY control: PHY disabled by a SES control page as a result of action by a Storage Controller or user.</li> <li>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.</li> <li>Drive removed: PHY disabled because drive slot is empty.</li> <li>Unused - disabled by default: PHY is disabled by default because it is not used.</li> <li>Excessive PHY changes: PHY is disabled because of excessive PHY change counts.</li> </ul>
elem-reason-numeric	uint32	<p>Numeric equivalents for elem-reason values.</p> <ul style="list-style-type: none"> <li>0: (blank)</li> <li>32769: Error count interrupts</li> <li>32771: PHY control</li> <li>32772: Not ready</li> <li>32774: Drive removed</li> <li>32775: Unused - disabled by default</li> <li>32776: Excessive PHY changes</li> </ul>
change-counter	uint32	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.
code-violations	uint32	Number of times the PHY received an unrecognized or unexpected signal.
disparity-errors	uint32	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.
crc-errors	uint32	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.
conn-crc-errors	uint32	Number of times the lane between two expanders experienced a communication error.
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](#) and has the same properties as [sas-status-controller-a](#).

## schedules

This basetype is used by [show schedules](#).

Table 101 schedules properties

Name	Type	Description
name	string	Schedule name.
schedule-specification	string	Schedule settings for running the associated task.
status	string	Schedule status. <ul style="list-style-type: none"><li>Uninitialized: The schedule is not yet ready to run.</li><li>Ready: The schedule is ready to run at the next scheduled time.</li><li>Suspended: The schedule had an error and is holding in its current state.</li><li>Expired: The schedule has exceeded a constraint and will not run again.</li><li>Invalid: The schedule is invalid.</li><li>Deleted: The task has been deleted.</li></ul>
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"><li>If an error occurred while running the schedule, the error message.</li><li>Blank if no error occurred.</li></ul>
task	Embedded; see <a href="#">tasks</a> .	



## security-communications-protocols

This basetype is used by [show protocols](#).

**Table 102** security-communications-protocols properties

Name	Type	Description
wbi-http	string	<ul style="list-style-type: none"><li>Disabled: The standard SMC web server is disabled.</li><li>Enabled: The standard SMC web server is enabled. This is the default.</li></ul>
wbi-http-numeric	uint32	Numeric equivalents for wbi-http values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
wbi-https	string	<ul style="list-style-type: none"><li>Disabled: The secure SMC web server is disabled.</li><li>Enabled: The secure SMC web server is enabled. This is the default.</li></ul>
wbi-https-numeric	uint32	Numeric equivalents for wbi-https values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
cli-telnet	string	<ul style="list-style-type: none"><li>Disabled: The standard CLI is disabled.</li><li>Enabled: The standard CLI is enabled. This is the default.</li></ul>
cli-telnet-numeric	uint32	Numeric equivalents for cli-telnet values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
cli-ssh	string	<ul style="list-style-type: none"><li>Disabled: The secure shell CLI is disabled. This is the default.</li><li>Enabled: The secure shell CLI is enabled.</li></ul>
cli-ssh-numeric	uint32	Numeric equivalents for cli-ssh values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
smis	string	<ul style="list-style-type: none"><li>Disabled: The secure SMI-S interface is disabled.</li><li>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.</li></ul>
smis-numeric	uint32	Numeric equivalents for smis values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
usmis	string	<ul style="list-style-type: none"><li>Disabled: The unsecure SMI-S interface is disabled. This is the default.</li><li>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.</li></ul>
usmis-numeric	uint32	Numeric equivalents for smis values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
ftp	string	<ul style="list-style-type: none"><li>Disabled: The FTP interface is disabled.</li><li>Enabled: The FTP interface is enabled. This is the default.</li></ul>

**Table 102 security-communications-protocols properties (continued)**

Name	Type	Description
ftp-numeric	uint32	Numeric equivalents for ftp values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
snmp	string	<ul style="list-style-type: none"><li>Disabled: The SNMP interface is disabled. All SNMP requests to the MIB are disabled and SNMP traps are disabled.</li><li>Enabled: The SNMP interface is enabled. This is the default.</li></ul>
snmp-numeric	uint32	Numeric equivalents for snmp values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
debug-interface	string	<ul style="list-style-type: none"><li>Disabled: The Telnet debug port is disabled. This is the default.</li><li>Enabled: The Telnet debug port is enabled.</li></ul>
debug-interface-numeric	uint32	Numeric equivalents for debug-interface values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
inband-ses	string	<ul style="list-style-type: none"><li>Disabled: The in-band SES interface is disabled.</li><li>Enabled: The in-band SES interface is enabled. This is the default.</li></ul>
inband-ses-numeric	uint32	Numeric equivalents for inband-ses values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
activity-progress	string	<ul style="list-style-type: none"><li>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.</li><li>Disabled: Access to the activity progress interface via HTTP port 8081 is disabled. This is the default.</li></ul>
activity-progress-numeric	uint32	Numeric equivalents for activity-progress values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
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"><li>v2: Uses terminology that is oriented to managing linear storage. For example, vdisk for disk groups and pools.</li><li>v3: Uses terminology that is oriented to managing virtual and linear storage. For example, disk group for disk groups and pool for pools.</li></ul>
management-mode-numeric	uint32	Numeric equivalents for management-mode values. <ul style="list-style-type: none"><li>2: v2</li><li>3: v3</li></ul>

## sensors

This basetype is used by [show sensor-status](#).

**Table 103** 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"><li>For a sensor, its value.</li><li>For overall unit status, one of the status values below.</li></ul>
status	string	<ul style="list-style-type: none"><li>OK: The sensor is present and detects no error condition.</li><li>Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds.</li><li>Critical: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold.</li><li>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.</li><li>Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor.</li><li>Unknown: The sensor is present but status is not available.</li><li>Not Installed: The sensor is not present.</li><li>Unsupported: Status detection is not implemented.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: Unsupported</li><li>1: OK</li><li>2: Critical</li><li>3: Warning</li><li>4: Unrecoverable</li><li>5: Not Installed</li><li>6: Unknown</li><li>7: Unavailable</li></ul>
sensor-location	uint32	Superseded by the container property.
container	string	Hardware component that contains the sensor. <ul style="list-style-type: none"><li>controllers</li><li>enclosures</li><li>fan</li><li>iom</li><li>midplane</li><li>power-supplies</li></ul>

**Table 103** sensors properties (continued)

Name	Type	Description
container-numeric	uint32	Numeric equivalents for container values. <ul style="list-style-type: none"><li>• 17: enclosures</li><li>• 18: midplane</li><li>• 19: controllers</li><li>• 20: iom</li><li>• 21: power-supplies</li><li>• 22: fan</li></ul>
sensor-type	string	<ul style="list-style-type: none"><li>• Temperature</li><li>• Voltage</li><li>• Current</li><li>• Charge Capacity</li><li>• Unknown Type</li></ul>
sensor-type-numeric	uint32	Numeric equivalents for sensor-type values. <ul style="list-style-type: none"><li>• 0: Temperature</li><li>• 1: Current</li><li>• 2: Voltage</li><li>• 3: Charge capacity</li><li>• 4: Unknown Type</li></ul>

## show-other-mc-status

This basetype is used by [show shutdown-status](#).

**Table 104** 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"><li>• Not Communicating</li><li>• Not Operational</li><li>• Operational</li><li>• Unknown</li></ul>
other-mc-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none"><li>• 1524: Not Communicating</li><li>• 3231: Not Operational</li><li>• 4749: Operational</li><li>• 1496: Unknown</li></ul>

## shutdown-status

This basetype is used by [show shutdown-status](#).

**Table 105** shutdown-status properties

Name	Type	Description
controller	string	<ul style="list-style-type: none"><li>• A: Controller A.</li><li>• B: Controller B.</li></ul>
status	string	<ul style="list-style-type: none"><li>• up: The controller is operational.</li><li>• down: The controller is shut down.</li><li>• not installed: The controller is not installed.</li></ul>
status-numeric	uint32	<p>Numeric equivalents for status values.</p> <ul style="list-style-type: none"><li>• 0: up</li><li>• 1: down</li><li>• 2: not installed</li></ul>

## snap-pools

This basetype is used by [show snap-pools](#).

**Table 106** 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.
free-numeric	uint32	Unformatted free 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"><li>Available: The snap pool is available for use.</li><li>Offline: The snap pool is not available for use, as in the case where its disks are not present.</li><li>Corrupt: The snap pool's data integrity has been compromised. The snap pool can no longer be used.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: Available</li><li>Bitmask with second significant digit set: Offline</li><li>Bitmask with third significant digit set: Corrupt</li></ul>
policy	Embedded; see <a href="#">policy-threshold</a> .	

## snap-space

This basetype is used by [show snapshot-space](#).

**Table 107** 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.
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-snapspace	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"><li>• <code>notify-only</code>: When the snapshot space is reached an event is generated and logged. This is the default.</li><li>• <code>delete</code>: When the snapshot space is reached an event is generated and logged and automatic deletion of snapshots occurs.</li></ul>
limit-policy-numeric	uint32	Numeric equivalents for limit-policy values. <ul style="list-style-type: none"><li>• 0: <code>notify-only</code></li><li>• 1: <code>delete</code></li></ul>



## snapshots

This basetype is used by [show snapshots](#).

**Table 108** 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 creation-date-time value.
status	string	Snapshot status. <ul style="list-style-type: none"><li>• Available</li><li>• Unavailable: See the status-reason value.</li></ul>
status-numeric	uint32	<ul style="list-style-type: none"><li>• 0: Available</li><li>• Nonzero: Unavailable</li></ul>
status-reason	string	Shows N/A for Available status, or one of the following reasons for Unavailable status: <ul style="list-style-type: none"><li>• snapshot not found</li><li>• snap pool not found</li><li>• master volume not found</li><li>• snapshot pending (not yet committed)</li><li>• snap pool not accessible</li><li>• master volume not accessible</li><li>• Volume copy with modified data is in progress</li><li>• Rollback with modified data is in progress</li><li>• Unknown reason</li></ul>
status-reason-numeric	uint32	Numeric equivalents for status-reason values. <ul style="list-style-type: none"><li>• 1: snapshot pending (not yet committed)</li><li>• 3: snap pool not accessible</li><li>• 4: master volume not accessible</li><li>• 6: Rollback with modified data is in progress</li><li>• 7: Volume copy with modified data is in progress</li><li>• 8: snapshot not found</li><li>• 9: snap pool not found</li><li>• 10: master volume not found</li><li>• 254: N/A</li><li>• <i>hex-code</i>: Unknown reason</li></ul>
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.

**Table 108 snapshots properties (continued)**

Name	Type	Description
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"> <li>The name of the snap pool for linear snapshots.</li> <li>Blank for virtual snapshots.</li> </ul>
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.
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"> <li>never-delete: Snapshots will never be deleted.</li> <li>high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.</li> <li>medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.</li> <li>low: Snapshots may be deleted.</li> </ul> <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"> <li>0: never-delete</li> <li>1: high</li> <li>2: medium</li> <li>3: low</li> </ul>

**Table 108 snapshots properties (continued)**

Name	Type	Description
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"> <li>0x2000: Queued snapshot. The snapshot was taken for remote replication but is queued, waiting for a previous replication to complete.</li> <li>0x4000: Replication snapshot.</li> <li>0x6000: Standard snapshot.</li> <li>0x8000: Common sync point. The latest snapshot that is copy-complete on all secondary volumes.</li> <li>0xa000: Volume-copy snapshot. Snapshot that is being used to copy data from a source volume to a destination volume.</li> <li>0xc000: Replicating snapshot. Snapshot that is being replicated from a primary system to a secondary system.</li> <li>0xe000: Only sync point. The snapshot is the only sync point that is available on any secondary volume.</li> </ul>
user_priority-value	string	User-defined retention priority for the snapshot type.
snapshot-type	string	<p>Snapshot type.</p> <ul style="list-style-type: none"> <li>Standard snapshot: Snapshot of a source volume that consumes a snapshot license.</li> <li>Standard snapshot (DRM): A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).</li> <li>Replication snapshot: For a primary or secondary volume, a snapshot that was created by a replication operation but is not a sync point.</li> <li>Replication snapshot (Replicating): For a primary volume, a snapshot that is being replicated to a secondary system.</li> <li>Replication snapshot (Current sync point): For a primary or secondary volume, the latest snapshot that is copy-complete on any secondary system in the replication set.</li> <li>Replication snapshot (Common sync point): For a primary or secondary volume, the latest snapshot that is copy-complete on all secondary systems in the replication set.</li> <li>Replication snapshot (Old Common sync point): For a primary or secondary volume, a common sync point that has been superseded by a new common sync point.</li> <li>Replication snapshot (Only sync point): For a primary or secondary volume, the only snapshot that is copy-complete on any secondary system in the replication set.</li> <li>Replication snapshot (Queued): For a primary volume, a snapshot associated with a replication operation that is waiting for a previous replication operation to complete.</li> <li>Replication snapshot (Awaiting replicate): For a primary volume, a snapshot that is waiting to be replicated to a secondary system.</li> </ul>

**Table 108 snapshots properties (continued)**

Name	Type	Description
snapshot-type-numeric	uint32	<p>Numeric equivalents for snapshot-type values.</p> <ul style="list-style-type: none"><li>• 0x00004000: Standard snapshot</li><li>• 0x0000b000: Standard snapshot (DRM)</li><li>• 0x00008000: Replication snapshot</li><li>• 0x00010000: Replication snapshot (Replicating)</li><li>• 0x00020000: Replication snapshot (Current sync point)</li><li>• 0x00040000: Replication snapshot (Common sync point)</li><li>• 0x00080000: Replication snapshot (Only sync point)</li><li>• 0x00100000: Replication snapshot (Queued)</li><li>• 0x00200000: Replication snapshot (Awaiting replicate)</li><li>• 0x00800000: Replication snapshot (Common sync point)</li><li>• 0x00000000: N/A</li></ul>
storage-type	string	<ul style="list-style-type: none"><li>• Linear: Linear pool.</li><li>• Virtual: Virtual pool.</li></ul>
storage-type-numeric	uint32	<p>Numeric equivalents for storage-type values.</p> <ul style="list-style-type: none"><li>• 0: Linear</li><li>• 1: Virtual</li></ul>
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 tasks](#) for a TakeSnapshot task.

**Table 109** 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"><li>The name of the last snapshot created by the task.</li><li>Blank if the task has not created a snapshot.</li></ul>
snapshot	Embedded; see <a href="#">snap-tasks</a> .	

## snap-tasks

This basetype is used by [show schedules](#), and [show tasks](#) for a task that has created at least one snapshot.

**Table 110** 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](#).

**Table 111** 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"><li>Disabled: SNMP is disabled.</li><li>Enabled: SNMP is enabled.</li></ul>
snmp-enabled-numeric	uint32	Numeric equivalents for snmp-enabled values. <ul style="list-style-type: none"><li>0: Disabled</li><li>1: Enabled</li></ul>
snmp-filter	string	Minimum level of events to include for SNMP traps. <ul style="list-style-type: none"><li>crit: Only critical events are sent as traps.</li><li>error: Error and critical events are sent as traps.</li><li>warn: Warning, error, and critical events are sent as traps.</li><li>info: All events are sent as traps.</li><li>none: No events are sent as traps and traps are disabled.</li></ul>
snmp-filter-numeric	uint32	Numeric equivalents for snmp-filter values. <ul style="list-style-type: none"><li>0: none</li><li>1: info</li><li>2: error</li><li>4: warn</li><li>8: crit</li></ul>
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 monitor role and is shown in clear text for users having the manage role.
snmp-write-community	string	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.

## 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 112** status properties

Name	Type	Description
response-type	string	<ul style="list-style-type: none"><li>• Success: The command succeeded.</li><li>• Error: The command failed.</li><li>• Info: The command returned an informational message.</li></ul>
response-type-numeric	uint32	<ul style="list-style-type: none"><li>• 0: Success</li><li>• 1: Error</li><li>• 2: Info</li></ul>
response	string	A message stating what the command accomplished, why the command failed, or information about the command's progress.
return-code	sint32	<ul style="list-style-type: none"><li>• 0: The command completed.</li><li>• <i>-nnnnn</i>: The command failed.</li></ul>
component-id	string	Not used.
time-stamp	string	Date and time, in the format <i>year-month-day hour:minutes:seconds</i> (UTC), when the command was issued.
time-stamp-numeric	uint32	Unformatted time-stamp value.



## syslog-parameters

This basetype is used by [show syslog-parameters](#).

**Table 113** syslog-parameters properties

Name	Type	Description
syslog-host-ip	string	The IP address of the remote syslog server to use for the notifications.
syslog-notification-level	string	Shows the minimum severity for which the system sends notifications: <ul style="list-style-type: none"><li>crit: Sends notifications for Critical events only.</li><li>error: Sends notifications for Error and Critical events.</li><li>warn: Sends notifications for Warning, Error, and Critical events.</li><li>info: Sends notifications for all events.</li><li>none: Disables syslog notification and clears the settings.</li></ul>
syslog-notification-level-numeric	uint32	Numeric equivalents for syslog-notification-level values. <ul style="list-style-type: none"><li>0: none</li><li>8: crit</li><li>12: error</li><li>14: warn</li><li>15: info</li></ul>
syslog-host-port	uint32	The port on which the remote syslog facility is expected to listen for notifications.

## system

This basetype is used by [show configuration](#) and [show system](#).

**Table 114** system properties

Name	Type	Description
system-name	string	The name of the storage 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.
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"><li>• OK</li><li>• Degraded</li><li>• Fault</li><li>• N/A</li><li>• Unknown</li></ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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"><li>• Operational</li><li>• Not Operational</li><li>• Not Communicating</li><li>• Unknown</li></ul>
other-MC-status-numeric	uint32	Numeric equivalents for other-mc-status values. <ul style="list-style-type: none"><li>• 1524: Not Communicating</li><li>• 3231: Not Operational</li><li>• 4749: Operational</li><li>• 1496: Unknown</li></ul>
pfuStatus	string	Shows whether partner firmware update is running on the system, or is idle.

**Table 114 system properties (continued)**

Name	Type	Description
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"> <li>Unsecured: The system has not been secured with a passphrase.</li> <li>Secured: The system has been secured with a passphrase.</li> <li>Secured, Lock Ready: The system has been secured and lock keys are clear. The system will become locked after the next power cycle.</li> <li>Secured, Locked: The system is secured and the disks are locked to data access, preventing their use.</li> </ul>
fde-security-status-numeric	uint32	Numeric equivalents for fde-security-status values. <ul style="list-style-type: none"> <li>1: Unsecured</li> <li>2: Secured</li> <li>3: Secured, Lock Ready</li> <li>4: Secured, Locked</li> </ul>
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 <a href="#">redundancy</a> .	
unhealthy-component	Embedded; see <a href="#">unhealthy-component</a> .	

## system-parameters-table

This basetype is used by [show system-parameters](#).

**Table 115** system-parameters-table properties

Name	Type	Description
ulp-enabled	string	Shows true 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"><li>• true: Host profiles are enabled.</li><li>• false: Host profiles are disabled.</li></ul>
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.
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.
max-storage-pools-per-controller	uint32	The number of virtual pools that each controller supports.
max-components-per-storage-pool	uint32	The number of virtual pools that each pool can contain.
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.

**Table 115 system-parameters-table properties (continued)**

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"> <li>A: Controller A.</li> <li>B: Controller B.</li> </ul>
local-controller-numeric	uint32	Numeric equivalents for local-controller values. <ul style="list-style-type: none"> <li>0: B</li> <li>1: A</li> </ul>
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"> <li>CAPI_TWO_IP_ADDRESSES_MODE: Dual controller system has a unique IP address for each controller.</li> <li>CAPI_ONE_IP_ADDRESS_MODE: Dual controller system has the same IP address for both controllers, only one active at a time.</li> </ul>
ip-address-mode-numeric	uint32	Numeric equivalents for lan-heartbeat values. <ul style="list-style-type: none"> <li>0: CAPI_TWO_IP_ADDRESSES_MODE</li> <li>1: CAPI_ONE_IP_ADDRESS_MODE</li> </ul>
debug-flags	uint32	For use by service personnel.
enclosure-flags	uint32	For internal use only.
num-global-spares	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"> <li>0: Disabled</li> <li>1: Enabled</li> </ul>
min-backing-store-size	uint32	Minimum snap-pool size in blocks.
max-fc-speed	string	Maximum FC host-port speed.

**Table 115 system-parameters-table properties (continued)**

Name	Type	Description
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.
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"><li>False: No linear replication sets exist on the system.</li><li>True: At least one linear replication set exists on the system.</li></ul>
linear-replication-configured-numeric	uint32	Numeric equivalents for linear-replication-configured values. <ul style="list-style-type: none"><li>0: False</li><li>1: True</li></ul>
virtual-replication-configured	string	<ul style="list-style-type: none"><li>False: No virtual replication sets exist on the system.</li><li>True: At least one virtual replication set exists on the system.</li></ul>
virtual-replication-configured-numeric	uint32	Numeric equivalents for virtual-replication-configured values. <ul style="list-style-type: none"><li>0: False</li><li>1: True</li></ul>

## tasks

This basetype is used by [show tasks](#).

**Table 116** tasks properties

Name	Type	Description
name	string	Task name.
type	string	Type of operation this task performs. <ul style="list-style-type: none"><li>TakeSnapshot</li><li>ResetSnapshot</li><li>VolumeCopy</li><li>ReplicateVolume</li><li>Replicate</li><li>EnableDSD</li><li>DisableDSD</li></ul>
status	string	Task status. <ul style="list-style-type: none"><li>Uninitialized: Task is not yet ready to run.</li><li>Ready: Task is ready to run.</li><li>Active: Task is running.</li><li>Error: Task has an error.</li><li>Complete: For a TakeSnapshot task only, the task is complete but not yet ready to run again.</li><li>Deleted: The task is expired but this state is not yet synchronized to the partner controller.</li></ul>
state	string	Current step of the task. <ul style="list-style-type: none"><li>For an EnableDSD or DisableDSD task:<ul style="list-style-type: none"><li>Start</li></ul></li><li>For a TakeSnapshot task:<ul style="list-style-type: none"><li>Start</li><li>VerifyVolume</li><li>ValidateLicensingLimit</li><li>CreateName</li><li>CreateSnap</li><li>VerifySnap</li><li>InspectRetention</li><li>FindOldestSnap</li><li>UnmapSnap</li><li>ResetSnap</li><li>RenameSnap</li></ul></li><li>For a ResetSnapshot task:<ul style="list-style-type: none"><li>Start</li><li>VerifySnap</li><li>UnmapSnap</li><li>ResetSnap</li></ul></li></ul>

**Table 116 tasks properties (continued)**

Name	Type	Description
		<ul style="list-style-type: none"> <li>For a VolumeCopy task: <ul style="list-style-type: none"> <li>Start</li> <li>VerifyVolume</li> <li>CreateName</li> <li>ObtainMap</li> <li>UnmapVolume</li> <li>CreateVolume</li> <li>RemapVolume</li> <li>VerifyCreatedVolume</li> </ul> </li> <li>For a ReplicateVolume task: <ul style="list-style-type: none"> <li>Start</li> <li>VerifyVolume</li> <li>CreateName</li> <li>RepVolume</li> <li>VerifySnap</li> </ul> </li> <li>For a Replicate task: <ul style="list-style-type: none"> <li>Idle</li> <li>Replicate</li> <li>VerifyRunning</li> </ul> </li> </ul>
error-message	string	<ul style="list-style-type: none"> <li>If an error occurred while processing the task, the error message.</li> <li>Blank if no error has occurred.</li> </ul>
associated-vdisk-serial	string	For a VolumeCopy task, the serial number of the destination vdisk.
task-details	Embedded; see <a href="#">cs-replicate-tasks</a> , <a href="#">replicate-volume-tasks</a> , <a href="#">reset-snapshot-tasks</a> , <a href="#">snap-tasks</a> , <a href="#">snapshot-with-retention-tasks</a> , <a href="#">volume-copy-tasks</a> .	



## tier-hist-statistics

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

**Table 117** 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.
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.)

**Table 117 tier-hist-statistics properties (continued)**

Name	Type	Description
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).
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

This basetype is used by [show tier-statistics](#) and [show pool-statistics](#).

**Table 118** 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"><li>• Archive: The lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).</li><li>• Performance: The highest storage tier, which uses SSDs (high speed).</li><li>• Read Cache: The tier that provides read cache for a storage pool.</li><li>• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).</li></ul>
tier-numeric	uint32	Numeric equivalents for tier values. <ul style="list-style-type: none"><li>• 0: N/A</li><li>• 1: Performance</li><li>• 2: Standard</li><li>• 4: Archive</li><li>• 8: Read Cache</li></ul>
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 <a href="#">resettable-statistics</a> .	

## tier-summary

This basetype is used by [show pool-statistics](#) when the `historical` parameter is specified.

**Table 119** tier-summary properties

Name	Type	Description
serial-number	string	The serial number of the pool.
pool	string	The name of the pool.
tier	string	<ul style="list-style-type: none"><li>• Archive: The lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).</li><li>• Performance: The highest storage tier, which uses SSDs (high speed).</li><li>• Read Cache: The tier that provides read cache for a storage pool.</li><li>• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).</li></ul>
tier-numeric	uint32	<p>Numeric equivalents for tier values.</p> <ul style="list-style-type: none"><li>• 0: N/A</li><li>• 1: Performance</li><li>• 2: Standard</li><li>• 4: Archive</li><li>• 8: Read Cache</li></ul>
tier-hist-statistics	Embedded; see <a href="#">tier-hist-statistics</a> .	
readcache-hist-statistics	Embedded; see <a href="#">readcache-hist-statistics</a> . (AssuredSAN 4004 only)	

## tiers

This basetype is used by [show pools](#) and [show tiers](#).

**Table 120** 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"><li>• Archive: The lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).</li><li>• Performance: The highest storage tier, which uses SSDs (high speed).</li><li>• Read Cache: The tier that provides read cache for a storage pool.</li><li>• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).</li></ul>
tier-numeric	uint32	Numeric equivalents for tier values. <ul style="list-style-type: none"><li>• 0: N/A</li><li>• 1: Performance</li><li>• 2: Standard</li><li>• 4: Archive</li><li>• 8: Read Cache</li></ul>
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 raw-size value in 512-byte blocks.
total-size	string	The total capacity of the tier.
total-size-numeric	uint64	Unformatted total-size value in 512-byte blocks.
allocated-size	string	The amount of space currently allocated to volumes in the tier.
allocated-size-numeric	uint64	Unformatted allocated-size value in 512-byte blocks.
available-size	string	The available capacity in the tier.
available-size-numeric	uint64	Unformatted available-size 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](#).

**Table 121** 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 date-time 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"><li>• activated: NTP is enabled.</li><li>• deactivated: NTP is disabled. This is the default.</li></ul>
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 122** unhealthy-component properties

Name	Type	Description
component-type	string	<p>Component type.</p> <ul style="list-style-type: none"><li>• super-cap: Supercapacitor pack</li><li>• MC: Management Controller</li><li>• port: Host port</li><li>• controller: Controller module</li><li>• expansion module: Expansion module</li><li>• PSU: Power supply unit</li><li>• disk: Disk</li><li>• enclosure: Enclosure</li><li>• vdisk: Vdisk (v2)</li><li>• disk group: Disk group (v3)</li><li>• fan</li><li>• CompactFlash</li><li>• disk slot</li><li>• SAS port</li><li>• sensor</li><li>• network port</li><li>• virtual pool</li><li>• virtual disk group</li><li>• volume</li><li>• snap pool</li><li>• volume: Source volume</li><li>• snapshot</li><li>• host</li><li>• replication image</li><li>• replication volume</li><li>• replication set</li><li>• volume map</li><li>• system</li></ul>

**Table 122 unhealthy-component properties (continued)**

Name	Type	Description
component-type-numeric	uint32	<p>Numeric equivalents for component-type values.</p> <ul style="list-style-type: none"> <li>• 0: super-cap</li> <li>• 1: MC</li> <li>• 2: port</li> <li>• 3: controller</li> <li>• 4: expansion module</li> <li>• 5: PSU</li> <li>• 6: disk</li> <li>• 7: enclosure</li> <li>• 8: vdisk (v2) or disk group (v3)</li> <li>• 9: fan</li> <li>• 10: CompactFlash</li> <li>• 11: disk slot</li> <li>• 12: SAS port</li> <li>• 13: sensor</li> <li>• 14: network port</li> <li>• 15: virtual pool</li> <li>• 16: virtual disk group</li> <li>• 17: volume</li> <li>• 18: snap pool</li> <li>• 19: volume (source volume)</li> <li>• 20: snapshot</li> <li>• 21: host</li> <li>• 22: replication image</li> <li>• 23: replication volume</li> <li>• 24: replication set</li> <li>• 25: volume map</li> <li>• 26: system</li> </ul>
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"> <li>• OK</li> <li>• Degraded</li> <li>• Fault</li> <li>• Unknown</li> <li>• N/A</li> </ul>



**Table 122** unhealthy-component properties (continued)

Name	Type	Description
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"><li>• 0: OK</li><li>• 1: Degraded</li><li>• 2: Fault</li><li>• 3: Unknown</li><li>• 4: N/A</li></ul>
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](#).

**Table 123** 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](#).

**Table 124** users properties

Name	Type	Description
username	string	User name.
roles	string	<ul style="list-style-type: none"><li>• monitor: User can view but not change system settings.</li><li>• manage: User can view and change system settings.</li><li>• admin: User can view and change system settings.</li><li>• diagnostic: User can view and change system settings.</li></ul>
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"><li>• 1: Novice</li><li>• 2: Standard</li><li>• 3: Advanced</li><li>• 4: Diagnostic</li></ul>
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"><li>• 0: English</li><li>• 1: Spanish</li><li>• 2: French</li><li>• 3: German</li><li>• 4: Italian</li><li>• 5: Japanese</li><li>• 6: Netherlands</li><li>• 7: Simplified Chinese</li><li>• 8: Traditional Chinese</li><li>• 9: Korean</li><li>• 10: Arabic</li><li>• 11: Portuguese</li><li>• 12: Russian</li></ul>
interface-access-WBI	string	<ul style="list-style-type: none"><li>• x: User can use the web-browser interface (the SMC). This is the default.</li><li>• (blank): User cannot access this interface.</li></ul>
interface-access-CLI	string	<ul style="list-style-type: none"><li>• x: User can use the command-line interface.</li><li>• (blank): User cannot access this interface. This is the default.</li></ul>
interface-access-FTP	string	<ul style="list-style-type: none"><li>• x: User can use the FTP interface.</li><li>• (blank): User cannot access this interface. This is the default.</li></ul>
interface-access-SMIS	string	<ul style="list-style-type: none"><li>• x: User can use the Storage Management Initiative Specification (SMI-S) interface.</li><li>• (blank): User cannot access this interface. This is the default.</li></ul>

**Table 124** users properties (continued)

Name	Type	Description
interface-access-SNMP	string	<ul style="list-style-type: none"> <li>U: The user can access the SNMPv3 interface and view the MIB.</li> <li>T: The user can access the SNMPv3 interface and receive trap notifications.</li> <li>(blank): User cannot access this interface. This is the default.</li> </ul>
storage-size-base	uint8	<p>The base for entry and display of storage-space sizes:</p> <ul style="list-style-type: none"> <li>2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.</li> <li>10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default.</li> </ul> <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"> <li>auto: Lets the system determine the proper unit for a size. This is the default.</li> <li>MB: Megabytes.</li> <li>GB: Gigabytes.</li> <li>TB: Terabytes.</li> </ul> <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"> <li>Celsius: Use the Celsius scale to display temperature values. This is the default.</li> <li>Fahrenheit: Use the Fahrenheit scale to display temperature values.</li> </ul>
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"> <li>none: No authentication.</li> <li>MD5: MD5 authentication. This is the default.</li> <li>SHA: SHA (Secure Hash Algorithm) authentication.</li> </ul>
privacy-type	string	<p>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.</p> <ul style="list-style-type: none"> <li>none: No encryption. This is the default.</li> <li>DES: Data Encryption Standard.</li> <li>AES: Advanced Encryption Standard.</li> </ul>
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](#) when the historical parameter is specified.

**Table 125** 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 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-bytes-per-sec	uint64	Data transfer rate, in bytes per second, since the last sampling time. This is the sum of read-bytes-per-second and write-bytes-per-second.
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 since the last sampling time.
write-bytes-per-sec-numeric	uint64	Unformatted write-bytes-per-second value.
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.

## vdisk-statistics

This basetype is used by [show vdisk-statistics](#) when the `historical` parameter is omitted.

**Table 126** vdisk-statistics properties

Name	Type	Description
name	string	Vdisk name.
serial-number	string	Vdisk serial number.
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 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	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 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.
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.
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](#), [show versions](#), and [versions \(Deprecated\)](#).

**Table 127** versions properties

Name	Type	Description
sc-cpu-type	string	Storage Controller processor type.
bundle-version	string	Firmware bundle version.
bundle-base-version	string	Firmware bundle base 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.
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"><li><i>version</i>: Customization Toolkit (CTK) version applied to the system.</li><li>Not present: No CTK version has been applied to this system.</li></ul>

## virtual-disk-summary

This basetype is used by [show vdisk-statistics](#) when the `historical` parameter is specified.

**Table 128** virtual-disk-summary properties

Name	Type	Description
name	string	Vdisk name.
serial-number	string	Vdisk serial number.
vdisk-hist-statistics	Embedded; see <a href="#">vdisk-hist-statistics</a> .	



## virtual-disks

This basetype is used by [show configuration](#) and [show vdisks](#).

**Table 129** 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 size 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 freespace 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"><li>• A: Controller A.</li><li>• B: Controller B.</li></ul>
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"><li>• 0: B</li><li>• 1: A</li></ul>
preferred-owner	string	Controller that owns the vdisk and its volumes during normal operation. <ul style="list-style-type: none"><li>• A: Controller A.</li><li>• B: Controller B.</li></ul>
preferred-owner-numeric	uint32	Numeric equivalents for preferred-owner values. <ul style="list-style-type: none"><li>• 0: B</li><li>• 1: A</li></ul>
raidtype	string	Vdisk RAID level. <ul style="list-style-type: none"><li>• NRAID</li><li>• RAID0</li><li>• RAID1</li><li>• RAID3</li><li>• RAID5</li><li>• RAID6</li><li>• RAID10</li><li>• RAID50</li></ul>
raidtype-numeric	uint32	Numeric equivalents for raidtype values. <ul style="list-style-type: none"><li>• 0: RAID0</li><li>• 1: RAID1</li><li>• 3: RAID3</li><li>• 5: RAID5</li><li>• 6: NRAID</li><li>• 8: RAID50</li><li>• 10: RAID10</li><li>• 11: RAID6</li></ul>

**Table 129 virtual-disks properties (continued)**

Name	Type	Description
storage-type	string	<ul style="list-style-type: none"> <li>Linear: The disk group acts as a linear pool.</li> <li>Virtual: The disk group is in a virtual pool.</li> </ul>
storage-type-numeric	uint32	<p>Numeric equivalents for storage-type values.</p> <ul style="list-style-type: none"> <li>0: Linear</li> <li>1: Virtual</li> </ul>
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"> <li>For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk.</li> <li>For NRAID and RAID 1, chunk size has no meaning and is therefore shown as not applicable (N/A).</li> <li>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).</li> </ul>
status	string	<p>Vdisk status.</p> <ul style="list-style-type: none"> <li>CRIT: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.</li> <li>DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.</li> <li>FTDN: Fault tolerant with a down disk. The vdisk is online and fault tolerant, but some of its disks are down.</li> <li>FTOL: Fault tolerant and online.</li> <li>MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.</li> <li>OFFL: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>STOP: The vdisk is stopped.</li> <li>UP: Up. The vdisk is online and does not have fault-tolerant attributes.</li> <li>UNKN: Unknown.</li> </ul>

**Table 129** virtual-disks properties (continued)

Name	Type	Description
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"> <li>• 0: FTOL</li> <li>• 1: FTDN</li> <li>• 2: CRIT</li> <li>• 3: OFFL</li> <li>• 4: QTCR</li> <li>• 5: QTOF</li> <li>• 6: QTDN</li> <li>• 7: STOP</li> <li>• 8: MSNG</li> <li>• 9: DMGD</li> <li>• 250: UP</li> <li>• <i>other</i>: UNKN</li> </ul>
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 min-drive-size 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 create-date 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 current-job.

**Table 129 virtual-disks properties (continued)**

Name	Type	Description
current-job	string	<p>Job running on the vdisk, if any.</p> <ul style="list-style-type: none"> <li>• (blank): No job is running.</li> <li>• DRSC: A disk is being scrubbed.</li> <li>• EXPD: The vdisk is being expanded.</li> <li>• INIT: The vdisk is initializing.</li> <li>• RCON: The vdisk is being reconstructed.</li> <li>• VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.</li> <li>• VPREP: The virtual disk group is being prepared for use in a virtual pool.</li> <li>• VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.</li> <li>• REMV: The disk group and its data are being removed.</li> <li>• VRFY: The vdisk is being verified.</li> <li>• VRSC: The vdisk is being scrubbed.</li> </ul>
current-job-numeric	uint32	<p>Numeric equivalents for current-job values.</p> <ul style="list-style-type: none"> <li>• 0: (blank)</li> <li>• 2: INIT</li> <li>• 3: RCON</li> <li>• 4: VRFY</li> <li>• 5: EXPD</li> <li>• 6: VRSC</li> <li>• 7: DRSC</li> <li>• 9: REMV</li> <li>• 12: VPREP</li> <li>• 13: VDRAIN</li> <li>• 14: VRECV</li> </ul>
current-job-completion	string	<ul style="list-style-type: none"> <li>• 0%–99%: Percent complete of running job.</li> <li>• (blank): No job is running (job has completed).</li> </ul>
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.
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"> <li>• For a RAID-10 or RAID-50 vdisk, the number of disks in each sub-vdisk.</li> <li>• For other RAID levels, 1.</li> </ul>
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.

**Table 129 virtual-disks properties (continued)**

Name	Type	Description
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"> <li>• SAS: Enterprise SAS.</li> <li>• SAS MDL: Midline SAS.</li> <li>• sSAS: SAS SSD.</li> <li>• MIX: Mixture of enterprise SAS and midline SAS disks.</li> </ul>
array-drive-type-numeric	uint32	Numeric equivalents for array-drive-type values. <ul style="list-style-type: none"> <li>• 1: MIX</li> <li>• 4: SAS</li> <li>• 8: sSAS</li> <li>• 11: SAS MDL</li> </ul>
is-job-auto-abortable	string	<ul style="list-style-type: none"> <li>• false: The current job must be manually aborted before you can delete the vdisk.</li> <li>• true: The current job will automatically abort if you delete the vdisk.</li> </ul>
is-job-auto-abortable-numeric	uint32	Numeric equivalents for is-job-auto-abortable values. <ul style="list-style-type: none"> <li>• 0: false</li> <li>• 1: true</li> </ul>
serial-number	string	Vdisk serial number.
blocks	uint64	Unformatted size value in 512-byte blocks.
disk-dsd-enable-vdisk	string	<ul style="list-style-type: none"> <li>• Disabled: DSD is disabled for the vdisk. This is the default.</li> <li>• Enabled - all spinning: DSD is enabled for the vdisk.</li> <li>• Partial spin-down: DSD is enabled for the vdisk and its disks are partially spun down to conserve power.</li> <li>• Full spin-down: DSD is enabled for the vdisk and its disks are fully spun down to conserve power.</li> </ul>
disk-dsd-enable-vdisk-numeric	uint32	Numeric equivalents for disk-dsd-enable-vdisk values. <ul style="list-style-type: none"> <li>• 0: Disabled</li> <li>• 1: Enabled - all spinning</li> <li>• 2: Partial spin-down</li> <li>• 3: Full spin-down</li> </ul>
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	Not applicable.

**Table 129 virtual-disks properties (continued)**

Name	Type	Description
pool-sector-format	string	<p>The sector format of disks in the disk group.</p> <ul style="list-style-type: none"> <li>512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>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.</li> <li>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 sector size types (512n, 512e).</li> </ul>
pool-sector-format-numeric	uint32	<p>Numeric equivalents for pool-sector-numeric values.</p> <ul style="list-style-type: none"> <li>0: 512n</li> <li>1: 512e</li> <li>3: Mixed</li> </ul>
health	string	<ul style="list-style-type: none"> <li>OK</li> <li>Degraded</li> <li>Fault</li> <li>Unknown</li> <li>N/A</li> </ul>
health-numeric	uint32	<p>Numeric equivalents for health values.</p> <ul style="list-style-type: none"> <li>0: OK</li> <li>1: Degraded</li> <li>2: Fault</li> <li>3: Unknown</li> <li>4: N/A</li> </ul>
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 <a href="#">unhealthy-component</a> .	

## volume-copy-status

This basetype is used by [show volumecopy-status](#).

**Table 130** 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.
source-volume	string	Source volume name.
progress	string	Percent complete of the volume copy (0%–99%).
status	string	<ul style="list-style-type: none"><li>VC Online: A volume copy is in progress to the destination volume.</li><li>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.</li><li>Unknown: Status is unknown.</li></ul>
status-numeric	uint32	Numeric equivalents for status values. <ul style="list-style-type: none"><li>0: VC Online</li><li>1: VC Offline</li><li>2: Unknown</li></ul>
status-reason	string	More information about the status value.

## volume-copy-tasks

This basetype is used by [show tasks](#) for a VolumeCopy task.

**Table 131** 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.
destination-volume-prefix	string	Label that identifies copies created by this task.
include-modified-data	string	<ul style="list-style-type: none"><li>modified: The copy includes modified snapshot data.</li><li>preserved: The copy excludes modified snapshot data.</li></ul>
last-created	string	<ul style="list-style-type: none"><li>The name of the last snapshot created by the task.</li><li>Blank if the task has not created a snapshot.</li></ul>



## volume-groups

This basetype is used by [show volume-groups](#).

**Table 132** volume-group properties

Name	Type	Description
durable-id	string	Volume group ID.
group-name	string	The name of the volume group in the format volume-group.*, where * represents all volumes in the group.
serial-number	string	The serial number of the volume group.
type	string	The group type, which is Volume.
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 <a href="#">volumes</a> .	

## volume-group-view

This basetype is used by [show maps](#) if volume groups exist.

**Table 133** 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 volume-group.*, where the * represents all volumes in the group.
volume-view-mappings	Embedded; see <a href="#">volume-view-mappings</a> .	

## volume-group-view-mappings

This basetype is used by [show maps](#).

**Table 134** 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"><li>The controller host ports to which the mapping applies.</li><li>Blank if not mapped or mapped as no-access.</li></ul>
access	string	Type of host access to the volume. <ul style="list-style-type: none"><li>read-write: Read and write.</li><li>read-only: Read only.</li><li>no-access: No access (masked).</li><li>not-mapped: Not mapped.</li></ul>
initiator-id	string	<ul style="list-style-type: none"><li>For an FC initiator, its WWPN.</li><li>For a SAS initiator, its WWPN.</li><li>For an iSCSI initiator, its node name (typically the IQN).</li><li>all other initiators: The volume's default mapping.</li></ul>
nickname	string	<ul style="list-style-type: none"><li>For a host, its name in the format <code>host-name.*</code>, where the <code>*</code> represents all initiators in the host.</li><li>For a host group, its name in the format <code>host-group.*.*</code>, where the first <code>*</code> represents all hosts in the host group and the second <code>*</code> represents all initiators in those hosts.</li><li>Blank if not set or for all other initiators.</li></ul>
host-profile	string	<ul style="list-style-type: none"><li>Standard: Default profile.</li><li>HP-UX: The host uses Flat Space Addressing.</li></ul>
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none"><li>0: Standard</li><li>1: HP-UX</li></ul>
lun-view	Embedded; see <a href="#">volume-view-mappings</a> .	

## volume-names

This basetype is used by [show volume-names](#).

**Table 135** 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](#).

**Table 136** volume-reservations properties

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.
reservation-active	string	<ul style="list-style-type: none"><li>Free: The volume is not reserved.</li><li>Reserved: The volume has been reserved by a host.</li></ul>
reservation-active-numeric	uint32	Numeric equivalents for reservation-active values. <ul style="list-style-type: none"><li>0: Free</li><li>1: Reserved</li></ul>
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"><li>0: Logical Unit</li></ul>
reserve-type	string	The reservation type. <ul style="list-style-type: none"><li>Undefined: The volume has no persistent reservations.</li><li>Write Exclusive: Write commands are only allowed for a single reservation holder.</li><li>Exclusive Access: Certain access (read, write) commands are only allowed for a single reservation holder.</li><li>Write Exclusive - Registrants Only: Write commands are only allowed for registered hosts. There is a single reservation holder.</li><li>Exclusive Access - Registrants Only: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.</li><li>Write Exclusive - All Registrants: Write commands are only allowed for registered hosts. There is a single reservation holder.</li><li>Exclusive Access - All Registrants: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.</li></ul>
reserve-type-numeric	uint32	Numeric equivalents for reserve-type values. <ul style="list-style-type: none"><li>0: Undefined</li><li>1: Write Exclusive</li><li>3: Exclusive Access</li><li>5: Write Exclusive - Registrants Only</li><li>6: Exclusive Access - Registrants Only</li><li>7: Write Exclusive - All Registrants</li><li>8: Exclusive Access - All Registrants</li></ul>

## volumes

This basetype is used by [show volumes](#) and [show volume-groups](#).

**Table 137** 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	uint64	Volume capacity, formatted to use the current base, precision, and units.
size-numeric	uint64	Unformatted size value in 512-byte blocks.
total-size	uint64	The total size of the volume.
total-size-numeric	uint64	Unformatted total-size value in 512-byte blocks.
allocated-size	uint64	The amount of space currently allocated to a virtual volume, or the total size of a linear volume.
allocated-size-numeric	uint64	Unformatted allocated-size value in 512-byte blocks.
storage-type	string	<ul style="list-style-type: none"><li>Linear: The volume is in a linear pool.</li><li>Virtual: The volume is in a virtual pool.</li></ul>
storage-type-numeric	uint32	Numeric equivalents for storage-type values. <ul style="list-style-type: none"><li>0: Linear</li><li>1: Virtual</li></ul>
preferred-owner	string	Controller that owns the volume during normal operation. <ul style="list-style-type: none"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
preferred-owner-numeric	uint32	Numeric equivalents for preferred-owner values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
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"><li>A: Controller A.</li><li>B: Controller B.</li></ul>
owner-numeric	uint32	Numeric equivalents for owner values. <ul style="list-style-type: none"><li>0: B</li><li>1: A</li></ul>
serial-number	string	Volume serial number.

**Table 137 volumes properties (continued)**

Name	Type	Description
write-policy	string	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>
write-policy-numeric	uint32	<p>Numeric equivalents for write-policy values.</p> <ul style="list-style-type: none"> <li>• 0: write-through</li> <li>• 1: write-back</li> </ul>
cache-optimization	string	<ul style="list-style-type: none"> <li>• standard: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy. This is the default.</li> <li>• no-mirror: In this mode of operation, the controller cache performs the same as the standard mode with the exception that the cache metadata is not mirrored to the partner. While this improves the response time of write I/O, it comes at the cost of redundancy. If this option is used, the user can expect higher write performance but is exposed to data loss if a controller fails.</li> </ul>
cache-optimization-numeric	uint32	<p>Numeric equivalents for cache-optimization values.</p> <ul style="list-style-type: none"> <li>• 0: standard</li> <li>• 2: no-mirror</li> </ul>
read-ahead-size	string	<p>The volume's read-ahead cache setting.</p> <ul style="list-style-type: none"> <li>• Disabled: Read-ahead is disabled.</li> <li>• Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.</li> <li>• Stripe: Read-ahead is set to one stripe. The controllers treat RAID-1 disk groups internally as if they have a stripe size of 512 KB, even though they are not striped.</li> <li>• 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.</li> </ul>
read-ahead-size-numeric	uint32	<p>Numeric equivalents for read-ahead-size values.</p> <ul style="list-style-type: none"> <li>• -2: Stripe</li> <li>• -1: Adaptive</li> <li>• 0: Disabled</li> <li>• 524288: 512 KB</li> <li>• 1048576: 1 MB</li> <li>• 2097152: 2 MB</li> <li>• 4194304: 4 MB</li> <li>• 8388608: 8 MB</li> <li>• 16777216: 16 MB</li> <li>• 33554432: 32 MB</li> <li>• -2147483648: Maximum</li> </ul>

**Table 137 volumes properties (continued)**

Name	Type	Description
volume-type	string	<ul style="list-style-type: none"> <li>base: Base volume</li> <li>standard: Standard volume.</li> <li>standard*: Destination of an in-progress volume copy and cannot be mounted until the copy is complete.</li> <li>snap-pool: Snap-pool volume.</li> <li>master volume: Master volume.</li> <li>snapshot: Snapshot volume.</li> <li>replication source: Source for an in-progress replication to a secondary volume.</li> </ul>
volume-type-numeric	uint32	<p>Numeric equivalents for volume-type values.</p> <ul style="list-style-type: none"> <li>0: standard</li> <li>1: snap-pool</li> <li>2: master volume</li> <li>3: snapshot</li> <li>4: standard*</li> <li>8: replication source</li> <li>15: base</li> </ul>
volume-class	string	<ul style="list-style-type: none"> <li>standard: Standard volume, not enabled for snapshots.</li> <li>PTSNAP: Snapshot-related volume such as a master volume, snap pool, or snapshot.</li> <li>Proxy: Destination of an in-progress replication from a remote volume, which when complete will change to type snapshot.</li> </ul>
volume-class-numeric	uint32	<p>Numeric equivalents for volume-class values.</p> <ul style="list-style-type: none"> <li>0: standard</li> <li>1: PTSNAP</li> <li>3: Proxy</li> </ul>
tier-affinity	string	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> </ul>
tier-affinity-numeric	uint32	<p>Numeric equivalents for tier-affinity values.</p> <ul style="list-style-type: none"> <li>0: No Affinity</li> <li>1: Archive</li> <li>2: Performance</li> </ul>
snapshot	string	Shows whether the volume is a snapshot.



**Table 137 volumes properties (continued)**

Name	Type	Description
snapshot-retention-priority	string	<p>The retention priority for snapshots of the volume.</p> <ul style="list-style-type: none"> <li>• never-delete: Snapshots will never be deleted.</li> <li>• high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.</li> <li>• medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted. This is the default.</li> <li>• low: Snapshots may be deleted.</li> </ul> <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"> <li>• 0: never-delete</li> <li>• 1: high</li> <li>• 2: medium</li> <li>• 3: low</li> </ul>
volume-qualifier	string	<ul style="list-style-type: none"> <li>• N/A: Non-replication-specific volume such as a standard volume, master volume, snapshot, or snap pool.</li> <li>• RSR: Replication-specific volume, such as a primary volume, secondary volume, replication snapshot, or replication image.</li> <li>• 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.</li> </ul>
volume-qualifier-numeric	uint32	<p>Numeric equivalents for volume-qualifier values.</p> <ul style="list-style-type: none"> <li>• 0: N/A</li> <li>• 2: RSR</li> <li>• 6: RSR (DRM Promoted Secondary)</li> </ul>
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.
replication-set	string	Replication set serial number.
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"> <li>• For HP-UX, a text value (set in-band by a host application) that identifies the volume.</li> <li>• Blank by default.</li> </ul>

**Table 137 volumes properties (continued)**

Name	Type	Description
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%).
progress-numeric	uint32	Unformatted progress 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.
raidtype	string	Disk group RAID level. <ul style="list-style-type: none"> <li>• NRAID</li> <li>• RAID0</li> <li>• RAID1</li> <li>• RAID3</li> <li>• RAID5</li> <li>• RAID6</li> <li>• RAID10</li> <li>• RAID50</li> </ul>
raidtype-numeric	string	Numeric equivalents for raidtype values. <ul style="list-style-type: none"> <li>• 0: RAID0</li> <li>• 1: RAID1</li> <li>• 3: RAID3</li> <li>• 5: RAID5</li> <li>• 6: NRAID</li> <li>• 8: RAID50</li> <li>• 10: RAID10</li> <li>• 11: RAID6</li> </ul>
pi-format	string	Not applicable.

**Table 137 volumes properties (continued)**

Name	Type	Description
pi-format-numeric	string	Not applicable.
cs-replication-role	string	<ul style="list-style-type: none"> <li>Copy Source: The volume is the source for a volume copy operation.</li> <li>Copy Destination: The volume is the destination for a volume copy operation.</li> <li>Primary: The volume is the primary volume in a replication set.</li> <li>Secondary: The volume is the secondary volume in a replication set.</li> <li>(blank): Not applicable.</li> </ul>
cs-copy-dest	string	<ul style="list-style-type: none"> <li>Off: Not applicable.</li> <li>On: The volume is the destination for a volume copy operation.</li> </ul>
cs-copy-dest-numeric	string	Numeric equivalents for cs-copy-dest values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
cs-copy-src	string	<ul style="list-style-type: none"> <li>Off: Not applicable.</li> <li>On: The volume is the source for a volume copy operation.</li> </ul>
cs-copy-src-numeric	string	Numeric equivalents for cs-copy-src values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
cs-primary	string	<ul style="list-style-type: none"> <li>Off: Not applicable.</li> <li>On: The volume is the primary volume in a replication set.</li> </ul>
cs-primary-numeric	string	Numeric equivalents for cs-primary values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
cs-secondary	string	<ul style="list-style-type: none"> <li>Off: Not applicable.</li> <li>On: The volume is the secondary volume in a replication set.</li> </ul>
cs-secondary-numeric	string	Numeric equivalents for cs-secondary values. <ul style="list-style-type: none"> <li>0: Off</li> <li>1: On</li> </ul>
health	string	<ul style="list-style-type: none"> <li>OK</li> <li>Degraded</li> <li>Fault</li> <li>Unknown</li> <li>N/A</li> </ul>
health-numeric	uint32	Numeric equivalents for health values. <ul style="list-style-type: none"> <li>0: OK</li> <li>1: Degraded</li> <li>2: Fault</li> <li>3: Unknown</li> <li>4: N/A</li> </ul>
health-reason	string	If Health is not OK, the reason for the health state.

**Table 137 volumes properties (continued)**

Name	Type	Description
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](#).

**Table 138** 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.
percent-tier-ssd	uint16	The percentage of volume capacity occupied by data in the Performance tier.
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.
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.

**Table 138 volume-statistics properties (continued)**

Name	Type	Description
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.
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 reset-time 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 iops and bytes-per-second values.
start-sample-time-numeric	uint32	Unformatted start-sample-time 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 iops and bytes-per-second values.
stop-sample-time-numeric	uint32	Unformatted stop-sample-time value.

## volume-view

This basetype is used by [show maps](#).

**Table 139** 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 <a href="#">volume-view-mappings</a> .	

## volume-view-mappings

This basetype is used by [show maps](#).

**Table 140** 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"><li>The controller host ports to which the mapping applies.</li><li>Blank if not mapped or mapped as no-access.</li></ul>
lun	string	<ul style="list-style-type: none"><li>The LUN that identifies the volume to a host.</li><li>For a volume group, * means multiple LUNs are represented in the group.</li><li>Blank if not mapped or mapped as no-access.</li></ul>
access	string	Type of host access to the volume. <ul style="list-style-type: none"><li>read-write: Read and write. This is the default.</li><li>read-only: Read only.</li><li>no-access: No access (masked).</li><li>not-mapped: Not mapped.</li></ul>
access-numeric	uint32	Numeric equivalents of access values. <ul style="list-style-type: none"><li>0: not-mapped</li><li>1: no-access</li><li>2: read-only</li><li>3: read-write</li></ul>
identifier	string	<ul style="list-style-type: none"><li>For an FC initiator, its WWPN.</li><li>For a SAS initiator, its WWPN.</li><li>For an iSCSI initiator, its node name (typically the IQN).</li><li>all other initiators: The volume's default mapping.</li></ul>
nickname	string	<ul style="list-style-type: none"><li>For a host, its name in the format <code>host-name.*</code>, where the * represents all initiators in the host.</li><li>For a host group, its name in the format <code>host-group.*.*</code>, where the first * represents all hosts in the host group and the second * represents all initiators in those hosts.</li><li>Blank if not set or for all other initiators.</li></ul>
host-profile	string	<ul style="list-style-type: none"><li>Standard: Default profile.</li><li>HP-UX: The host uses Flat Space Addressing.</li></ul>
host-profile-numeric	uint32	Numeric equivalents of host-profile values. <ul style="list-style-type: none"><li>0: Standard</li><li>1: HP-UX</li></ul>



# A Settings changed by restore defaults

This appendix summarizes the system settings that result from using the restore defaults command.

**Table 141 Settings changed by restore defaults**

Setting	Value
System information settings:	
<ul style="list-style-type: none"> <li>System name</li> <li>System contact</li> <li>System location</li> <li>System information</li> </ul>	<ul style="list-style-type: none"> <li>Uninitialized Name</li> <li>Uninitialized Contact</li> <li>Uninitialized Location</li> <li>Uninitialized Info</li> </ul>
Management protocols settings:	
<ul style="list-style-type: none"> <li>CLI/Telnet</li> <li>CLI/SSH</li> <li>FTP</li> <li>SNMP</li> <li>WBI/HTTP</li> <li>WBI/HTTPS</li> <li>SMI-S</li> <li>Unsecure SMI-S</li> <li>Debug</li> <li>In-band SES</li> <li>Activity Progress Reporting</li> </ul>	<ul style="list-style-type: none"> <li>Enabled</li> <li>Disabled</li> <li>Enabled</li> <li>Enabled</li> <li>Enabled</li> <li>Enabled</li> <li>Enabled</li> <li>Disabled</li> <li>Disabled</li> <li>Enabled</li> <li>Disabled</li> </ul>
Management mode	v3
Users	<p>All configured users are deleted and replaced with default user definitions and default settings:</p> <ul style="list-style-type: none"> <li>User: manage; password: !manage</li> <li>User: monitor; password: !monitor</li> <li>User: ftp; password: !ftp</li> <li>Temperature scale: Celsius</li> <li>Timeout: 30 minutes</li> </ul>
CLI session timeout	30 minutes
Tasks and schedules	(preserved) <sup>1</sup>
Remote system definitions	(preserved) <sup>2</sup>
Management Controller debug logs	(preserved) <sup>3</sup>
Storage Controller event logs	(preserved)
Time/date and NTP settings	(preserved) <sup>4</sup>
Network IP settings	(preserved) <sup>5</sup>

**Table 141 Settings changed by restore defaults (continued)**

Setting	Value
SNMP settings:	
<ul style="list-style-type: none"> <li>• SNMP</li> <li>• SNMP trap notification level</li> <li>• SNMP trap host IPs</li> <li>• SNMP read community</li> <li>• SNMP write community</li> </ul>	<ul style="list-style-type: none"> <li>• Disabled</li> <li>• none</li> <li>• 0.0.0.0</li> <li>• public</li> <li>• private</li> </ul>
SMTP settings:	
<ul style="list-style-type: none"> <li>• Email notification</li> <li>• Email notify filter</li> <li>• Email addresses</li> <li>• Email server</li> <li>• Email domain</li> <li>• Email sender</li> <li>• Log destination</li> <li>• Include logs</li> </ul>	<ul style="list-style-type: none"> <li>• Disabled</li> <li>• (none)</li> <li>• (none)</li> <li>• (none)</li> <li>• (none)</li> <li>• (none)</li> <li>• (none)</li> <li>• Disabled</li> </ul>
SSL/SSH certificates	(preserved) <sup>6</sup>
Licenses	(preserved)
Disk group metadata	(preserved)
Host port settings:	
<ul style="list-style-type: none"> <li>• FC link speed</li> <li>• FC topology</li> <li>• SAS fan-out cable support</li> </ul>	<ul style="list-style-type: none"> <li>• Auto</li> <li>• Point-to-point</li> <li>• Disabled</li> </ul>
Host names and profiles	(preserved) <sup>7</sup>
Drive spin down	Disabled
Advanced settings:	
<ul style="list-style-type: none"> <li>• Disk group background scrub (v3)</li> <li>• Disk group background scrub interval (v3)</li> <li>• Vdisk background scrub (v2)</li> <li>• Vdisk background scrub interval (v2)</li> </ul>	<ul style="list-style-type: none"> <li>• Disabled</li> <li>• 24 hours</li> <li>• High</li> <li>• (preserved)<sup>8</sup></li> </ul>

**Table 141 Settings changed by restore defaults (continued)**

Setting	Value
<ul style="list-style-type: none"> <li>• Partner firmware upgrade</li> <li>• Utility priority</li> <li>• SMART</li> <li>• Dynamic spare configuration</li> <li>• Enclosure polling rate</li> <li>• Host control of caching</li> <li>• Sync cache mode</li> <li>• Independent Cache mode</li> <li>• Missing LUN response</li> <li>• Controller failure</li> <li>• Supercap failure</li> <li>• CompactFlash failure</li> <li>• Power supply failure</li> <li>• Fan failure</li> <li>• Temperature exceeded</li> <li>• Partner notify</li> <li>• Auto write back</li> <li>• Inactive drive spin down</li> <li>• Inactive drive spin down delay</li> <li>• Disk background scrub</li> <li>• Managed logs</li> <li>• Single controller mode</li> <li>• Auto stall recovery</li> <li>• Restart on CAPI fail</li> <li>• Large pools</li> </ul>	<ul style="list-style-type: none"> <li>• Enabled</li> <li>• 24 hours</li> <li>• Enabled</li> <li>• Disabled</li> <li>• 5 seconds</li> <li>• Disabled</li> <li>• Immediate</li> <li>• Disabled</li> <li>• Not Ready</li> <li>• Disabled</li> <li>• Enabled</li> <li>• Enabled</li> <li>• Disabled</li> <li>• Disabled</li> <li>• Disabled</li> <li>• Disabled</li> <li>• Enabled</li> <li>• Disabled</li> <li>• Disabled</li> <li>• Disabled</li> <li>• Enabled</li> <li>• Disabled</li> <li>• Disabled</li> </ul>
FDE settings (AssuredSAN 4004 only)	(preserved)

1. Factory default: no tasks or schedules.
2. Factory default: no remote system definitions.
3. Factory default: MC logs are cleared.
4. Factory default: NTP is disabled; NTP host IP address is 0.0.0.0; NTP offset is 0.
5. Factory 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.
6. Factory default: certificates are initialized.
7. Factory default: host names and profiles are cleared.
8. Factory default: no action for all disks.

# Glossary

<b>2U12</b>	An enclosure that is two rack units in height and can contain 12 disks.
<b>2U24</b>	An enclosure that is two rack units in height and can contain 24 disks.
<b>2U48</b>	An enclosure that is two rack units in height and can contain 48 disks.
<b>4U56</b>	An enclosure that is four rack units in height and can contain 56 disks.
<b>Additional Sense Code/Additional Sense Code Qualifier</b>	See ASC/ASCQ.
<b>Advanced Encryption Standard</b>	See AES.
<b>AES</b>	Advanced Encryption Standard. A specification for the encryption of data using a symmetric-key algorithm.
<b>Air Management Sled</b>	See AMS.
<b>Air Management Solution</b>	See AMS.
<b>allocated page</b>	A page of storage-pool space that has been allocated to a volume to store data.
<b>allocation rate</b>	The rate, in pages per minute, at which a pool is allocating pages to its volumes because they need more space to store data.
<b>ALUA</b>	Asymmetric Logical Unit Access.
<b>AMS</b>	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.
<b>array</b>	See storage system.
<b>ASC/ASCQ</b>	Additional Sense Code/Additional Sense Code Qualifier. Information on sense data returned by a SCSI device.
<b>ATS</b>	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.
<b>automated tiered storage</b>	See ATS.
<b>auto-write-through</b>	See AWT.
<b>available disk</b>	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.
<b>AWT</b>	Auto-write-through. A setting that specifies when the RAID controller cache mode automatically changes from write-back to write-through.
<b>base volume</b>	For virtual storage, a volume that is not a snapshot of any other volume, and is the root of a snapshot tree.
<b>CAPI</b>	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.
<b>CHAP</b>	Challenge-Handshake Authentication Protocol.
<b>chassis</b>	The sheetmetal housing of an enclosure.
<b>child volume</b>	For virtual storage, the snapshot of a parent volume in a snapshot tree.

<b>chunk size</b>	The amount of contiguous data that is written to a disk group member before moving to the next member of the disk group.
<b>CIM</b>	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.
<b>CIM Query Language</b>	See CQL.
<b>CIMOM</b>	Common Information Model Object Manager. A component in CIM that handles the interactions between management applications and providers.
<b>CNC</b>	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.
<b>comma separated values</b>	See CSV.
<b>Common Information Model</b>	See CIM.
<b>Common Information Model Object Manager</b>	See CIMOM.
<b>compatible disk</b>	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. <i>See also</i> available disk, dedicated spare, dynamic spare, and global spare.
<b>complex programmable logic device</b>	See CPLD.
<b>Configuration Application Programming Interface</b>	See CAPI.
<b>controller A (or B)</b>	A short way of referring to controller module A (or B).
<b>controller enclosure</b>	An enclosure that contains one or two controller modules.
<b>controller module</b>	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.
<b>converged network controller</b>	See CNC.
<b>Coordinated Universal Time</b>	See UTC.
<b>CPLD</b>	Complex programmable logic device. An electronic component used to build reconfigurable digital circuits. It can replace large numbers of logic gates.
<b>CQL</b>	CIM Query Language.
<b>CRC</b>	Cyclic Redundancy Check. A mathematical algorithm that, when implemented in software or hardware, can be used to detect errors in data.
<b>CSV</b>	Comma separated values. A format to store tabular data in plain-text form.
<b>Cyclic Redundancy Check</b>	See CRC.
<b>DAS</b>	Direct Attached Storage. A dedicated storage device that connects directly to a host without the use of a switch.
<b>Data Encryption Standard</b>	See DES.
<b>deallocation rate</b>	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.
<b>dedicated spare</b>	A disk that is reserved for use by a specific linear disk group to replace a failed disk. <i>See also</i> available disk, compatible disk, dynamic spare, and global spare.

<b>default mapping</b>	Host-access settings that apply to all initiators that are not explicitly mapped to that volume using different settings. <i>See also</i> explicit mapping and masking.
<b>DES</b>	Data Encryption Standard. An algorithm for the encryption of electronic data.
<b>DHCP</b>	Dynamic Host Configuration Protocol. A network configuration protocol for hosts on IP networks.
<b>Direct Attached Storage</b>	<i>See</i> DAS.
<b>disk group</b>	A set of disk drives that is configured to use a specific RAID type and provides storage capacity for a pool. <i>See also</i> linear disk group and virtual disk group.
<b>Distributed Management Task Force</b>	<i>See</i> DMTF.
<b>DMTF</b>	Distributed Management Task Force. An industry organization that develops and maintains standards for system management.
<b>drain</b>	For virtual storage, the automatic movement of active volume data from a disk group to other disk-group members within the same pool.
<b>drawer</b>	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.
<b>drive enclosure</b>	<i>See</i> expansion enclosure. <i>See also</i> JBOD.
<b>drive spin down</b>	<i>See</i> DSD.
<b>DRM</b>	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. <i>See also</i> SRA.
<b>DSD</b>	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.
<b>dual-port disk</b>	A disk that is connected to both controllers so it has two data paths, achieving fault tolerance.
<b>Dynamic Host Configuration Protocol</b>	<i>See</i> DHCP.
<b>dynamic spare</b>	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. <i>See also</i> available disk, compatible disk, dedicated spare, and global spare.
<b>EC</b>	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. <i>See also</i> EMP, MC, and SC.
<b>EMP</b>	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.
<b>enclosure</b>	A physical storage device that contains I/O modules, disk drives, and other FRUs.
<b>enclosure management processor</b>	<i>See</i> EMP.
<b>Expander Controller</b>	<i>See</i> EC.
<b>expansion enclosure</b>	An enclosure that contains one or two expansion modules. Expansion enclosures can be connected to a controller enclosure to provide additional storage capacity. <i>See also</i> JBOD.
<b>expansion module</b>	A FRU that contains the following subsystems and devices: a SAS expander and EC processor; host, expansion, and service ports; and midplane connectivity.
<b>explicit mapping</b>	Access settings for an initiator to a volume that override the volume's default mapping. <i>See also</i> default mapping and masking.
<b>failback</b>	<i>See</i> recovery.

<b>failover</b>	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 <i>recovery</i> .
<b>fan module</b>	The fan FRU used in 4U56 enclosures. There are two in each enclosure, separate from the PSUs.
<b>FC</b>	Fibre Channel interface protocol.
<b>FC-AL</b>	Fibre Channel Arbitrated Loop. The FC topology in which devices are connected in a one-way loop.
<b>FDE</b>	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.
<b>Fibre Channel Arbitrated Loop</b>	See FC-AL.
<b>field-programmable gate array</b>	See FPGA.
<b>field-replaceable unit</b>	See FRU.
<b>FPGA</b>	Field-programmable gate array. An integrated circuit designed to be configured after manufacturing.
<b>FRU</b>	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.
<b>full disk encryption</b>	See FDE.
<b>global spare</b>	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.
<b>HBA</b>	Host bus adapter. A device that facilitates I/O processing and physical connectivity between a host and the storage system.
<b>host</b>	(v3) A user-defined group of initiators that represents a server or switch.  (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.
<b>host bus adapter</b>	See HBA.
<b>host group</b>	A user-defined group of hosts for ease of management, such as for mapping operations.
<b>host port</b>	A port on a controller module that interfaces to a host computer, either directly or through a network switch.
<b>image ID</b>	For linear replication, 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.
<b>initiator</b>	(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.
<b>I/O Manager</b>	A MIB-specific term for a controller module.
<b>I/O module</b>	See IOM.
<b>IOM</b>	Input/output module. An IOM can be either a controller module or an expansion module.
<b>IQN</b>	iSCSI Qualified Name.
<b>iSCSI</b>	Internet SCSI interface protocol.
<b>iSNS</b>	Internet Storage Name Service.
<b>JBOD</b>	“Just a bunch of disks.” See drive enclosure.
<b>large form factor</b>	See LFF.
<b>LBA</b>	Logical Block Address. The address used for specifying the location of a block of data.

<b>leftover</b>	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.
<b>LFF</b>	Large form factor.
<b>linear</b>	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.
<b>linear disk group</b>	A set of disk drives that is configured to use a specific RAID type. The number of disks that a 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. <i>See also</i> linear pool.
<b>linear pool</b>	A container for volumes that is composed of one linear disk group.
<b>LIP</b>	Loop Initialization Primitive. An FC primitive used to determine the loop ID for a controller.
<b>lock key</b>	A system-generated value that manages the encryption and decryption of data on FDE-capable disks. <i>See also</i> FDE and passphrase.
<b>logical block address</b>	<i>See</i> LBA.
<b>Logical Unit Number</b>	<i>See</i> LUN.
<b>loop</b>	<i>See</i> FC-AL.
<b>Loop Initialization Primitive</b>	<i>See</i> LIP.
<b>LUN</b>	Logical Unit Number. A number that identifies a mapped volume to a host system.
<b>MAC address</b>	Media Access Control Address. A unique identifier assigned to network interfaces for communication on a network.
<b>Management Controller</b>	<i>See</i> MC.
<b>Management Information Base</b>	<i>See</i> MIB.
<b>map/mapping</b>	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. <i>See also</i> default mapping, explicit mapping, and masking.
<b>masking</b>	A volume-mapping setting that specifies no access to that volume by hosts. <i>See also</i> default mapping and explicit mapping.
<b>master volume</b>	For linear storage, a volume that is enabled for snapshots and has an associated snap pool.
<b>MC</b>	Management Controller. A processor (located in a controller module) that is responsible for human-computer interfaces, such as the SMC, and computer-computer interfaces, such as SNMP, and interacts with the Storage Controller. <i>See also</i> EC and SC.
<b>Media Access Control Address</b>	<i>See</i> MAC address.
<b>metadata</b>	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.
<b>MIB</b>	Management Information Base. A database used for managing the entities in SNMP.
<b>mount</b>	To enable access to a volume from a host OS. <i>See also</i> host, map/mapping, and volume.



<b>network port</b>	The Ethernet port on a controller module through which its Management Controller is connected to the network.
<b>network time protocol</b>	See NTP.
<b>NTP</b>	Network time protocol.
<b>NV device</b>	Nonvolatile device. The CompactFlash memory card in a controller module.
<b>object identifier</b>	See OID.
<b>OID</b>	Object Identifier. In SNMP, an identifier for an object in a MIB.
<b>orphan data</b>	See unwritable cache data.
<b>overcommit</b>	A setting that controls whether a virtual pool is allowed to have volumes whose total size exceeds the physical capacity of the pool.
<b>overcommitted</b>	The amount of storage capacity that is allocated to volumes exceeds the physical capacity of the storage system.
<b>page</b>	For virtual storage, a range of contiguous LBAs in a disk group.
<b>paged storage</b>	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.
<b>parent volume</b>	For virtual storage, 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.
<b>partner firmware update</b>	See PFU.
<b>passphrase</b>	A user-created password that allows users to manage lock keys in an FDE-capable system. <i>See also</i> FDE and lock key.
<b>PCBA</b>	Printed circuit board assembly.
<b>PFU</b>	Partner firmware update. The automatic update of the partner controller when the user updates firmware on one controller.
<b>PGR</b>	Persistent group reservations.
<b>PHY</b>	One of two hardware components that form a physical connection between devices in a SAS network that enables transmission of data.
<b>physical layer</b>	See PHY.
<b>point-to-point</b>	Fibre Channel Point-to-Point topology in which two ports are directly connected.
<b>pool</b>	See linear pool and virtual pool.
<b>POST</b>	Power-on self test. Tests that run immediately after a device is powered on.
<b>Power-On Self Test</b>	See POST.
<b>power supply unit</b>	See PSU.
<b>primary system</b>	The storage system that contains a replication set’s primary volume. <i>See also</i> replication set, secondary system.
<b>primary volume</b>	The volume that is the source of data in a replication set and that can be mapped to hosts. The primary volume exists in a primary disk group (linear storage) or pool (virtual storage) in the primary storage system.
<b>proxy volume</b>	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.
<b>PSU</b>	Power supply unit. The power supply FRU.
<b>quick rebuild</b>	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.

<b>RAID head</b>	See controller enclosure.
<b>read cache</b>	For virtual storage, a special disk group using SSDs that can be added to a 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.
<b>read flash cache</b>	See read cache.
<b>recovery</b>	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. <i>See also</i> failover.
<b>remote syslog support</b>	See syslog.
<b>replication</b>	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.
<b>replication image</b>	For linear storage, 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.
<b>replication-prepared volume</b>	For linear storage, a volume created for the purpose of being the secondary volume in a replication set. Replication-prepared volumes are automatically created by the SMC Replication Setup Wizard, or they can be created manually in the CLI or the SMC.
<b>replication set</b>	Associated primary and secondary volumes that are enabled for replication and that typically reside in two physically or geographically separate storage systems. <i>See</i> primary volume and secondary volume.
<b>replication snapshot</b>	For linear storage, a special type of snapshot, created by the 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. <i>See also</i> replication sync point.
<b>replication sync point</b>	For linear storage, 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."
<b>repurpose</b>	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. <i>See also</i> FDE and passphrase.
<b>RFC</b>	Read flash cache. <i>See</i> read cache.
<b>SAS</b>	Serial Attached SCSI interface protocol or disk-drive architecture.
<b>SC</b>	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.
<b>SCSI Enclosure Services</b>	See SES.
<b>secondary system</b>	The storage system that contains a replication set's secondary volume. <i>See also</i> replication set, primary system.
<b>secondary volume</b>	The volume that is the destination for data in a replication set and that is not accessible to hosts. The secondary volume exists in a secondary disk group (linear storage) or pool (virtual storage) in a secondary storage system.
<b>secret</b>	For use with CHAP, a password that is shared between an initiator and a target to enable authentication.

<b>secure hash algorithm</b>	See SHA.
<b>secure shell</b>	See SSH.
<b>Secure Sockets Layer</b>	See SSL.
<b>SED</b>	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.
<b>SEEPROM</b>	Serial electrically erasable programmable ROM. A type of nonvolatile (persistent if power removed) computer memory used as FRU ID devices.
<b>Self-Monitoring Analysis and Reporting Technology</b>	See SMART.
<b>serial electrically erasable programmable ROM</b>	See SEEPROM.
<b>Service Location Protocol</b>	See SLP.
<b>SES</b>	SCSI Enclosure Services. The protocol that allows the initiator to communicate with the enclosure using SCSI commands.
<b>SFCB</b>	Small Footprint CIM Broker.
<b>SFF</b>	Small form factor. A type of disk drive.
<b>SHA</b>	Secure Hash Algorithm. A cryptographic hash function.
<b>SLP</b>	Service Location Protocol. Enables computers and other devices to find services in a local area network without prior configuration.
<b>Small Footprint CIM Broker</b>	See SFCB.
<b>small form factor</b>	See SFF.
<b>SMART</b>	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.
<b>SMC</b>	Storage Management Console. The web application that is embedded in each controller module and is the primary management interface for the storage system.
<b>SMI-S</b>	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.
<b>snap pool</b>	For linear storage, 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.
<b>snapshot</b>	A point-in-time copy of the data in a source volume that preserves the state of the 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.
<b>snapshot tree</b>	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.
<b>SNIA</b>	Storage Networking Industry Association. An association regarding storage networking technology and applications.
<b>source volume</b>	A volume that has snapshots. Used as a synonym for parent volume.
<b>sparse snapshot</b>	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.

<b>SRA</b>	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.
<b>SSD</b>	Solid-state drive.
<b>SSH</b>	Secure Shell. A network protocol for secure data communication.
<b>SSL</b>	Secure Sockets Layer. A cryptographic protocol that provides security over the internet.
<b>standard volume</b>	A volume that can be mapped to initiators and presented as a storage device to a host system, but is not enabled for snapshots.
<b>Storage Controller</b>	<i>See</i> SC.
<b>Storage Management Initiative - Specification</b>	<i>See</i> SMI-S.
<b>Storage Networking Industry Association</b>	<i>See</i> SNIA.
<b>storage system</b>	A controller enclosure with at least one connected drive enclosure. Product documentation and interfaces use the terms storage system and system interchangeably.
<b>syslog</b>	A protocol for sending event messages across an IP network to a logging server.
<b>thin provisioning</b>	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.
<b>tier</b>	For virtual storage, 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: <ul style="list-style-type: none"> <li>• Performance, which uses SAS SSDs (high speed)</li> <li>• Standard, which uses enterprise-class spinning SAS disks (lower speed, higher capacity)</li> <li>• Archive, which uses midline spinning SAS disks (low speed, high capacity).</li> </ul>
<b>tier migration</b>	For virtual storage, 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.
<b>tray</b>	<i>See</i> enclosure.
<b>UCS Transformation Format - 8-bit</b>	<i>See</i> UTF-8.
<b>ULP</b>	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.
<b>undercommitted</b>	The amount of storage capacity that is allocated to volumes is less than the physical capacity of the storage system.
<b>Unified LUN Presentation</b>	<i>See</i> ULP.
<b>unmount</b>	To remove access to a volume from a host OS.
<b>unwritable cache data</b>	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.
<b>UTC</b>	Coordinated Universal Time. The primary time standard by which the world regulates clocks and time. It replaces Greenwich Mean Time.

<b>UTF-8</b>	UCS transformation format - 8-bit. A variable-width encoding that can represent every character in the Unicode character set used for the CLI and SMC interfaces.
<b>v2</b>	The legacy interface for managing linear storage. This is the default for a system that has been upgraded from a previous release.
<b>v3</b>	The new interface for managing virtual and linear storage. This is the default for a new installation.
<b>vdisk</b>	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.
<b>vdisk spare</b>	See dedicated spare.
<b>virtual</b>	The storage-class designation for logical components such as volumes that use paged-storage technology to virtualize data storage. See paged storage.
<b>virtual disk</b>	See vdisk.
<b>virtual disk group</b>	For virtual storage, a set of disk drives that is configured to use a specific RAID type. The number of disks that a 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.
<b>virtual pool</b>	For virtual storage, a container for volumes that is composed of one or more disk groups.
<b>volume</b>	A logical representation of a fixed-size, contiguous span of storage that is presented to host systems for the purpose of storing data.
<b>volume copy</b>	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.
<b>volume group</b>	A user-defined group of volumes for ease of management, such as for mapping operations.
<b>WBEM</b>	Web-Based Enterprise Management. A set of management and internet standard technologies developed to unify the management of enterprise computing environments.
<b>web-based interface/web-browser interface</b>	See WBI.
<b>WBI</b>	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.
<b>Web-Based Enterprise Management</b>	See WBEM.
<b>World Wide Name</b>	See WWN.
<b>World Wide Node Name</b>	See WWNN.
<b>World Wide Port Name</b>	See WWPN.
<b>WWN</b>	World Wide Name. A globally unique 64-bit number that identifies a device used in storage technology.
<b>WWNN</b>	World Wide Node Name. A globally unique 64-bit number that identifies a device.
<b>WWPN</b>	World Wide Port Name. A globally unique 64-bit number that identifies a port.

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