Abstract
This guide provides information about managing an HPE MSA 1040/2040 storage system by using its command-line interface (CLI).
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<td>remote-ports-detail properties</td>
<td>578</td>
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<td>581</td>
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<td>replication-image-params properties</td>
<td>583</td>
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<tr>
<td>replication-set properties</td>
<td>584</td>
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<td>replication-volume properties</td>
<td>585</td>
</tr>
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<td>replication-volume-summary properties</td>
<td>589</td>
</tr>
</tbody>
</table>
1 Using the CLI

This chapter introduces the HPE MSA 1040/2040 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 User Guide.

<table>
<thead>
<tr>
<th>Table 1 Default usernames and passwords</th>
</tr>
</thead>
<tbody>
<tr>
<td>Username</td>
</tr>
<tr>
<td>monitor</td>
</tr>
<tr>
<td>manage</td>
</tr>
</tbody>
</table>

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 2 XML API elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Description and attributes</th>
</tr>
</thead>
</table>
| RESPONSE | The RESPONSE element is the top-level element, which contains all data output for the CLI command that was issued. The response includes:  
  - 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.  
  There is only one RESPONSE element per issued command. |
| OBJECT | In general, an OBJECT element describes a storage-system component such as a disk or a volume. An object has these attributes:  
  - basetype. 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.).  
  - name. The name of the object.  
  - oid. The unique identifier for the object in the scope of the response.  
  The OBJECT element can contain PROPERTY elements. |
| PROPERTY | A PROPERTY element provides detail about the attributes of an OBJECT. A property has these attributes:  
  - name. The unique name for the property within the object.  
  - key. Indicates whether this property is a key value to identify this object.  
  - type. The type of data represented by the element data.  
  - size. Typically the maximum size of the output. Usually only important if the console output is displayed in rows.  
  - draw. Whether to show or hide this data in console format.  
  - sort. The type of sorting that can be applied to this property.  
  - display-name. The label for this data to show in user interfaces. |
| COMP | A COMP (composition) element associates nested objects, such as a task object within a schedule object. A composition element has these attributes:  
  - P. The oid of the part component.  
  - G. The oid of the group component.  
  An alternative to using COMP elements is described in XML API optimization. |
| ASC | The association element provides a simple association description between two objects in the response.  
  - A. First object.  
  - B. 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:

```xml
<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
<?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>
  </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_A1</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">A1</PROPERTY>
    <PROPERTY name="port-type" type="string">FC</PROPERTY>
    ...
  </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.

Parameters enclosed 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 disks

Disks are specified by enclosure ID and slot number. Enclosure IDs increment from 1. Disk IDs increment from 1 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: vdl, "My vdisk"

Specifying disk groups

For virtual storage, you can specify:

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

For virtual storage, you can specify:

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

Specifying volumes

You can specify:

- A volume by its name or serial number. A unique serial number is automatically assigned when a volume is created, and does not change for the life of the volume.
- A list of volume names or serial numbers separated by commas (with no spaces). Not all commands support lists. List example: vdi_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. Controller IDs are not case sensitive.

Port IDs increment from 1 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.*,.*
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 show cli 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 redisplays 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 3  Keyboard shortcuts for command completion, editing, and history

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

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 4 Size representations in base 2 and base 10

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

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

Table 5 Decimal (radix) point character by locale

<table>
<thead>
<tr>
<th>Language</th>
<th>Character</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic, English, Chinese, Japanese, Korean, Russian</td>
<td>Period (.)</td>
<td>146.81 GB 3.0 Gb/s</td>
</tr>
<tr>
<td>Dutch, French, German, Italian, Portuguese, Spanish</td>
<td>Comma (,)</td>
<td>146,81 GB 3,0 Gb/s</td>
</tr>
</tbody>
</table>

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.
# 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>
<thead>
<tr>
<th>Category</th>
<th>Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLI and users</td>
<td>create user, delete user, exit, help, set cli-parameters, set password, set prompt, set user, show cli-parameters, show users</td>
</tr>
<tr>
<td>Disks, disk groups, pools, tiers, and spares</td>
<td>abort scrub, abort verify, add disk-group, add spares, clear disk-metadata, clear fde-keys (MSA 2040 only), create vdisk, delete pools, delete vdisks, dequarantine, expand vdisk, remove spares, rescann, scrub disk-groups, scrub vdisk, set disk (MSA 2040 only), set disk-group, set expander-fault-isolation, set fde-import-key (MSA 2040 only), set fde-lock-key (MSA 2040 only), set fde-state (MSA 2040 only), set led, set pool, set vdisk, show disks, show disk-groups, show fde-state (MSA 2040 only), show pools, show tiers, show vdisks, trust, verify disk-groups, verify vdisk</td>
</tr>
<tr>
<td>Volumes, volume groups, initiators, hosts, host groups, and mapping</td>
<td>add host-group-members, add host-members, add volume-group-members, create host, create host-group, create volume, create volume-group, create volume-set, delete host-groups, delete hosts, delete initiator-nickname, delete volume-groups, delete volumes, expand disk-group, expand volume, map volume, release volume, remove disk-groups, remove host-group-members, remove host-members, remove volume-group-members, scrub volume, set cache-parameters, set host, set host-group, set host-port-mode (MSA 2040 only), set initiator, set volume-group, set cache-parameters, set host-groups, show initiators, show maps, show ports, show unwritable-cache, show volume-groups, show volume-names, show volume-reservations, show volumes, unmap volume</td>
</tr>
<tr>
<td>Snapshots, and snap pools</td>
<td>convert master-to-std, convert std-to-master, create master-volume, create snap-pool, create snapshots, delete all-master-volumes, delete all-snapshots, delete snap-pool, delete snapshot, delete snapshot-write-data, expand snap-pool, reset snapshot, rollback volume, set priorities, set snap-pool-policy, set snap-pool-threshold, set snapshot-space, show master-volumes, show priorities, show snap-pools, show snapshot-space, show snapshots</td>
</tr>
<tr>
<td>Linear volume copy</td>
<td>abort volumecopy, show volumecopy-status, volumecopy</td>
</tr>
<tr>
<td>Virtual volume copy</td>
<td>abort copy, copy volume, show volume-copies</td>
</tr>
<tr>
<td>Scheduled tasks</td>
<td>create schedule, create task, delete schedule, delete task, set schedule, set task, show schedules, show tasks</td>
</tr>
<tr>
<td>Event notification</td>
<td>set email-parameters, set snmp-parameters, set syslog-parameters, show email-parameters, show events, show snmp-parameters, show syslog-parameters, test</td>
</tr>
<tr>
<td>System configuration and utilities</td>
<td>check firmware-upgrade-health, clear cache, create certificate, create chap-record, delete chap-records, ping, reset host-link, restart mc, restart sc, set advanced-settings, set cache-parameters, set chap-record, set controller-date, set disk-parameters, set enclosure, set expander-fault-isolation, set expander-phy, set host-parameters, set host-port-mode (MSA 2040 only), set iscsi-parameters, set led, set network-parameters, set ntp-parameters, set protocols, set system, show advanced-settings, show cache-parameters, show certificate, show chap-records, show configuration, show controller-date, show controllers, show disk-parameters, show enclosures, show expander-status, show fans, show frus, show inquiry, show iscsi-parameters, show license, show network-parameters, show ntp-status, show ports, show power-supplies, show provisioning, show protocols, show redundancy-mode, show sas-link-health, show sensor-status, show shutdown-status, show system, show system-parameters, show versions, shutdown</td>
</tr>
<tr>
<td>Service utilities</td>
<td>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</td>
</tr>
</tbody>
</table>
### 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 7  Deprecated commands**

<table>
<thead>
<tr>
<th>Deprecated command</th>
<th>Replacement command</th>
</tr>
</thead>
<tbody>
<tr>
<td>add global-spare</td>
<td>add spares</td>
</tr>
<tr>
<td>add vdisk-spare</td>
<td>add spares</td>
</tr>
<tr>
<td>delete global-spare</td>
<td>remove spares</td>
</tr>
<tr>
<td>delete host</td>
<td>delete initiator-nickname</td>
</tr>
<tr>
<td>delete master-volume</td>
<td>delete volumes</td>
</tr>
<tr>
<td>delete vdisk-spare</td>
<td>remove spares</td>
</tr>
<tr>
<td>rollback master-volume</td>
<td>rollback volume</td>
</tr>
<tr>
<td>set auto-write-through-trigger</td>
<td>set advanced-settings</td>
</tr>
<tr>
<td>set awt</td>
<td>set advanced-settings</td>
</tr>
<tr>
<td>set global-spare</td>
<td>add spares</td>
</tr>
<tr>
<td>set host-name</td>
<td>set initiator</td>
</tr>
<tr>
<td>set job-parameters</td>
<td>set advanced-settings</td>
</tr>
<tr>
<td>set spares</td>
<td>add spares, remove spares</td>
</tr>
<tr>
<td>set vdisk-spare</td>
<td>add spares</td>
</tr>
<tr>
<td>show auto-write-through-trigger</td>
<td>show advanced-settings</td>
</tr>
<tr>
<td>show awt</td>
<td>show advanced-settings</td>
</tr>
<tr>
<td>show channels</td>
<td>show ports</td>
</tr>
<tr>
<td>show host-maps</td>
<td>show maps</td>
</tr>
<tr>
<td>show host-parameters</td>
<td>show ports</td>
</tr>
</tbody>
</table>
Table 7  Deprecated commands (continued)

<table>
<thead>
<tr>
<th>Deprecated command</th>
<th>Replacement command</th>
</tr>
</thead>
<tbody>
<tr>
<td>show hosts</td>
<td>show initiators</td>
</tr>
<tr>
<td>show job-parameters</td>
<td>show advanced-settings</td>
</tr>
<tr>
<td>show schedule-details</td>
<td>show schedules</td>
</tr>
<tr>
<td>show task-details</td>
<td>show tasks</td>
</tr>
<tr>
<td>show volume-maps</td>
<td>show maps</td>
</tr>
<tr>
<td>versions</td>
<td>show versions</td>
</tr>
</tbody>
</table>

Removed commands

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

Table 8  Commands removed in previous releases

<table>
<thead>
<tr>
<th>Removed command</th>
<th>Replacement command</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear disk metadata</td>
<td>clear disk-metadata</td>
</tr>
<tr>
<td>cls</td>
<td>None</td>
</tr>
<tr>
<td>create host-name</td>
<td>set initiator</td>
</tr>
<tr>
<td>create host-wwn-name</td>
<td>set initiator</td>
</tr>
<tr>
<td>create iscsi-host</td>
<td>set initiator</td>
</tr>
<tr>
<td>delete host-wwn-name</td>
<td>delete initiator-nickname</td>
</tr>
<tr>
<td>delete iscsi-host</td>
<td>delete initiator-nickname</td>
</tr>
<tr>
<td>delete vdisk</td>
<td>delete vdisks</td>
</tr>
<tr>
<td>echo</td>
<td>None</td>
</tr>
<tr>
<td>exec</td>
<td>None</td>
</tr>
<tr>
<td>expand master-volume</td>
<td>expand volume</td>
</tr>
<tr>
<td>history</td>
<td>None</td>
</tr>
<tr>
<td>reset host-channel-link</td>
<td>reset host-link</td>
</tr>
<tr>
<td>set drive-parameters</td>
<td>set disk-parameters</td>
</tr>
<tr>
<td>set host-port-interconnects</td>
<td>None – not applicable to MSA 1040/2040</td>
</tr>
<tr>
<td>set host-wwn-name</td>
<td>set initiator</td>
</tr>
<tr>
<td>set iscsi-host</td>
<td>set initiator</td>
</tr>
<tr>
<td>set output-format</td>
<td>set cli-parameters</td>
</tr>
<tr>
<td>set replication-external-view</td>
<td>set replication-primary-volume</td>
</tr>
<tr>
<td>set snap-pool policy</td>
<td>set snap-pool-policy</td>
</tr>
<tr>
<td>set snap-pool threshold</td>
<td>set snap-pool-threshold</td>
</tr>
<tr>
<td>show drive-parameters</td>
<td>show disk-parameters</td>
</tr>
<tr>
<td>show enclosure-status</td>
<td>show enclosures, show frus, show sensor-status</td>
</tr>
<tr>
<td>show host-port-interconnects</td>
<td>None – not applicable to MSA 1040/2040</td>
</tr>
<tr>
<td>show host-wwn-names</td>
<td>show initiators</td>
</tr>
<tr>
<td>show iscsi-hosts</td>
<td>show initiators</td>
</tr>
<tr>
<td>show lun-maps</td>
<td>show maps</td>
</tr>
</tbody>
</table>
Table 8  Commands removed in previous releases (continued)

<table>
<thead>
<tr>
<th>Removed command</th>
<th>Replacement command</th>
</tr>
</thead>
<tbody>
<tr>
<td>show output-format</td>
<td>show cli-parameters</td>
</tr>
<tr>
<td>show port-wwn</td>
<td>show ports</td>
</tr>
<tr>
<td>show volume copy-status</td>
<td>show volumecopy-status</td>
</tr>
<tr>
<td>stty</td>
<td>None</td>
</tr>
<tr>
<td>tinfo</td>
<td>None</td>
</tr>
</tbody>
</table>
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:

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

Description

Aborts a copy volume operation.

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

Minimum role

manage

Syntax

abort 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
aborted 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 vdi_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|raid1|raid3|raid5|raid6|raid10|raid50|r0|r1|r3|r5|r6|r10|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: \( \text{configured-chunk-size} \times (\text{subgroup-members} - 1) \). 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 22).

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.
add disk-group 39

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 22). 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: ",,<\n
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 1 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 SMU Reference 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 22).

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 SMU or FTP to update firmware, see the SMU Reference 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/UID LED is illuminated amber.

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 22).

**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.

```bash
# clear expander-status enclosure 1
```

**See also**

`show expander-status`
clear fde-keys (MSA 2040 only)

Description

Removes the lock keys used with Full Disk Encryption.

This command clears the lock key ID and import lock ID. The disks in the system will remain in the Secured, Unlocked state until the disk or enclosure is powered off. To regain access to the encrypted disk information, you must restore the lock key ID using the original passphrase. To restore the lock key ID, use the set fde-lock-key (MSA 2040 only) command.

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 to secure the data in this system. After the system is power cycled, the disks will be locked.

    # clear fde-keys current-passphrase myPassphrase

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 (MSA 2040 only)
set fde-lock-key (MSA 2040 only)
set fde-state (MSA 2040 only)
show fde-state (MSA 2040 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

dele 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**
  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

```plaintext
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: ", < \\n- 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 SMU and SMI-S interfaces use the same certificate.

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

Minimum role

manage

Syntax

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

Parameters

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

contents content-string
Optional. A security certificate is generated based on the supplied content. The content becomes the subject of the certificate creation request and must be formatted as /type0=value0/type1=value1/type2=..., where types include CO for country, ST for state or province, L for location, CN for common name, and O for organization. The content string cannot exceed 1024 characters and can include printable UTF-8 characters except space or semicolon. An example is /CO=US/ST=CO/O=MyOrganization/CN=www.mysite.com. You must specify either this parameter or the restore parameter or the unique parameter.
	noprompt
Optional. Suppresses confirmation prompts. Specifying this parameter allows the command to proceed without user interaction.

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

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

Examples

Regenerate the system certificate with a new private key.

# create certificate unique
Create a custom certificate using a content string.

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

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

# create certificate restore

See also

restart mc
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 SMU 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 iqn.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: ", . < \n
- 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: ", < \n
- 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 1 lun 2 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 system. The 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 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.
To replicate between an HP P2000 G3 MSA system and an HPE MSA1040/2040 system, the secondary volume must be exactly the same size as the primary volume. This can be complicated because the P2000 G3 MSA creates volumes that are 64-KB aligned while the MSA1040/2040 creates volumes that are 4-MB aligned. When the volume is created or expanded the size will be decreased to the nearest alignment boundary. Allowing the system to create the secondary volume automatically when creating the replication set ensures the size will be correct. To ensure the size is exactly the same when creating the secondary volume manually, use the CLI and perform the following steps:

1. In the primary system, run `set cli-parameters units MB precision 4 base 2` and then run `show volumes`
   Multiply the size of the source volume by 2048 to get the number of 512-byte blocks to use to create the secondary volume.

2. In the secondary system, create the secondary volume using the `create volume` command with the `prepare-replication-volume` parameter, and use the number of 512-byte blocks for the size without appending a unit indicator.

For example, in a P2000 G3 MSA system as a user with a base preference of 10 you create a 50-GB primary volume:

```bash
# create volume vdisk vd-1 size 50GB PrimaryVol
# set cli-parameters units MB precision 4 base 2
# show volumes PrimaryVol
Vdisk Name    Size          Serial Number ...
----------------------------------------
vд-1  PrimaryVol  47683.6875MiB SN ...
----------------------------------------
```

The number of 512-byte blocks would be 47683.6875(MiB) * 2048 = 97656192. In the MSA1040/2040 system, to create the secondary volume you would run:

```bash
create volume vdisk vd-1 size 97656192 prepare-replication-volume RepVol
```

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|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|K|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: ",,\n• 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: ",,\n• 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=207000c0ffdf52c31,217000c0ffdf52c31 secondary-address wwpn=00c0ffda421f000089b16b4d010000000 remote-volume 00c0ffda421f000089b16b4d010000000 secondary-address wwpn=207000c0ffdf52c31,217000c0ffdf52 MV

For two systems whose Management Controllers 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 00c0ffda421f000089b16b4d010000000 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: ", < \n
- 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: ", < \n
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:

```plaintext
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:

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

To create a task to replicate a virtual volume:

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

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

```plaintext
create task
type EnableDSD
name
```

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

```plaintext
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: ", < \n
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 SMU, 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
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 SMU). This is enabled by default.
- 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
Optional. The display language. The default is English.

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. The default is 1.

privacy-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.
- none: No encryption. This is the default.
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 SMU.

```
# 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 0: 2–16
- RAID 1: 2
- RAID 3: 3–16
- RAID 5: 3–16
- RAID 6: 4–16
- RAID 10: 4–16
- RAID 50: 6–32

For best practices for creating vdisks, see the SMU Reference 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 22).
create vdisk
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 22).

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: ",< \n
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 1.1,1.3 VD1

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

# create vdisk level r50 disks 1.1-3:1.4-6:1.7-9 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.

NOTE: You cannot map LUN 0 for a SAS initiator. You can create a maximum of 1024 volumes, but because the supported LUN range is 1–1023 only 1023 volumes can be mapped using default mapping. Using explicit mapping, all volumes can be mapped.

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**

```plaintext
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 22). 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: ", < \n
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.

NOTE: You cannot map LUN 0 for a SAS initiator. You can create a maximum of 1024 volumes, but because the supported LUN range is 1–1023 only 1023 volumes can be mapped using default mapping. Using explicit mapping, all volumes can be mapped.

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 22). 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.

disk 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.

disk-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

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`.

```bash
# delete pools 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

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 snapshot 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.

deletpriority 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

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**

```plaintext
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

```plaintext
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.

```plaintext
# 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.
- **QTOP** (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:

<table>
<thead>
<tr>
<th>RAID level</th>
<th>Expansion capability</th>
<th>Maximum disks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-RAID</td>
<td>Cannot expand.</td>
<td>1</td>
</tr>
<tr>
<td>0, 3, 5, 6</td>
<td>Can add 1–4 disks at a time.</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>Cannot expand.</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Can add 2 or 4 disks at a time.</td>
<td>16</td>
</tr>
<tr>
<td>50</td>
<td>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.</td>
<td>32</td>
</tr>
</tbody>
</table>

IMPORTANT: Disk group expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors. Before starting expansion, see the HPE website [http://www.hpe.com/support/msa1040_2040/BestPractices](http://www.hpe.com/support/msa1040_2040/BestPractices).

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 22).
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

Depending on several factors, vdisk expansion can take a significant amount of time to complete. The size of the physical disks in the original vdisk, the amount of capacity being added, and the level of I/O activity during expansion will influence the time of completion. It is strongly recommended to review the Best Practices white paper before starting a vdisk expansion. See the online help to access this white paper.

Are you ready to continue? (y/n)

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

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

<table>
<thead>
<tr>
<th>RAID level</th>
<th>Expansion capability</th>
<th>Maximum disks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRAID</td>
<td>Cannot expand.</td>
<td>1</td>
</tr>
<tr>
<td>0, 3, 5, 6</td>
<td>Can add 1–4 disks at a time.</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>Cannot expand.</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Can add 2 or 4 disks at a time.</td>
<td>16</td>
</tr>
<tr>
<td>50</td>
<td>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.</td>
<td>32</td>
</tr>
</tbody>
</table>

IMPORTANT: Vdisk expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors. Before starting expansion, see the HPE website http://www.hpe.com/support/msa1040_2040/BestPractices.

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 22).
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
```

Depending on several factors, vdisk expansion can take a significant amount of time to complete. The size of the physical disks in the original vdisk, the amount of capacity being added, and the level of I/O activity during expansion will influence the time of completion.

It is strongly recommended to review the Best Practices white paper before starting a vdisk expansion. See the online help to access this white paper. Are you ready to continue? (y/n)

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
volume

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
extend 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 volumecopy 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: ", < \n
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
ccontroller a|b

Parameters
ccontroller 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 24).
load license

Description

Used by the SMU 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 LUN 0 for a SAS initiator. You can create a maximum of 1024 volumes, but because the supported LUN range is 1–1023 only 1023 volumes can be mapped using default mapping. Using explicit mapping, all volumes can be mapped.

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

```bash
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 22). 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 22). 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 22).

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 449).

**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.

```bash
# 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**

```plaintext
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.

```plaintext
# 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 22).

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. When the peer communication between the local and remote systems is healthy, 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: " , < \n
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 22). 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 22). 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:

- Depending on the mapping configuration, restarting one Storage Controller may cause loss of access to data.
- If you restart both Storage Controllers, all hosts will lose access to the system and its data until the restart is complete. Additionally, both Management Controllers will be restarted and all users' sessions will need to be restarted.

NOTE: When a Storage Controller is restarted, live performance statistics that it recorded will be reset. Historical performance statistics are not affected. In a dual-controller system, disk statistics may be reduced but will not be reset to zero, because disk statistics are summed between the two controllers. For more information, see help for commands that show statistics.

Minimum role

manage

Syntax

restart sc
  [a|b|both]
  [noprompt]

Parameters

a | b | both
   Optional. The controller module containing the controller to restart. If this parameter is omitted, the command affects the controller being accessed.

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

Output

Messages are displayed when the controller shut down, when failover is initiated, and when the controller has restarted.

Examples

From controller A, restart the Storage Controller in controller B.

# restart sc b

Restart both Storage Controllers.

# restart sc both
See also

restart mc
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 665). 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

```plaintext
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.
- enabled or on: Background disk-group scrub is enabled. This is the default.

background-scrub-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.
- enabled or on: The dynamic spares feature is enabled. This is the default.

dynamic-spares interval  
Optional. Sets the delay in hours between dynamic spares events, from 5 to 3600 seconds. The default is 5 seconds.

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
Not supported.

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 SMU.

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.


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.

```sh
# 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.

```sh
# set cli-parameters api-embed pager off
```

For scripting, display brief XML output in `api-embed` format and disable paging.

```sh
# set cli-parameters api-embed pager off brief on
```

Set the CLI to show output in console format.

```sh
# set cli-parameters console
```

Set the CLI to use the `v3` management mode.

```sh
# 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.
- **dns**: 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 (MSA 2040 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 (MSA 2040 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 22).

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 (MSA 2040 only)
set fde-state (MSA 2040 only)
show disks (with the fde parameter)
show fde-state (MSA 2040 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
e-mail-list email-addresses
[include-logs enabled|disabled|on|off]
notification-level crit|error|warn|info|none
[persistent-alerts enabled|disabled|on|off]
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.

e-mail-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.

persistent-alerts enabled|disabled|on|off
Optional. Sets whether system health alerts will be sent weekly on Sunday at 12:01 AM to configured email addresses. The text of the email message will contain the output of the show system command. This option is enabled by default.
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|sca-b|sca-a|sca-b|sca-a|ingress
|expander-ingress-0|expander-ingress-1|egress|expander-egress-0
|expander-egress-1
[wwn enclosure-WWN]
```

Parameters

controller a|b|both
The I/O module containing the PHY to enable or disable: A, B, or both.

enabled|disabled|on|off
Whether to enable or disable the specified PHY.

encl enclosure-ID
Optional. The enclosure ID of the enclosure containing the PHY. Specify either this parameter or the wwn parameter.

phy phy-ID
The logical PHY number.
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.

**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 (MSA 2040 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 (MSA 2040 only)
- set fde-lock-key (MSA 2040 only)
- set fde-state (MSA 2040 only)
- show fde-state (MSA 2040 only)
set fde-lock-key (MSA 2040 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 (MSA 2040 only)
set fde-import-key (MSA 2040 only)
set fde-state (MSA 2040 only)
show fde-state (MSA 2040 only)
set fde-state (MSA 2040 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 (MSA 2040 only)
set fde-import-key (MSA 2040 only)
set fde-lock-key (MSA 2040 only)
show fde-state (MSA 2040 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: " , < \n• 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 MSA 1040 SAS: Host ports can be configured to use fan-out SAS cables or standard SAS cables. For MSA 2040 SAS: No parameters can be set.

For MSA 1040: For a 2-port controller, host port protocol and speeds are factory configured and cannot be changed. FC host ports support use of qualified 8-Gbit/s SFPs with a maximum link speed of 8-Gbit/s. 1Gbe iSCSI host ports support use of qualified 1-Gbit/s SFPs. 10GbE iSCSI host ports support use of qualified 10-Gbit/s SFPs or qualified Direct Attach Copper (DAC) cables. iSCSI port speeds are auto-negotiated.

For MSA 2040: 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, or qualified 10-Gbit/s Direct Attach Copper (DAC) cables. 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]  (16g applies to MSA 2040 only)
```

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 MSA 1040 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 MSA 1040 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. This is the default.
- `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.

**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). For MSA 2040, 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 22).

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 (* MSA 2040 only)
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. For MSA 2040, 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 an MSA 1040 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 (MSA 2040 only)
set iscsi-parameters
show ports
set host-port-mode (MSA 2040 only)

Description

Changes host-interface characteristics for host ports in an MSA 2040 SAN 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. This is the default.
• 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.
### set job-parameters (Deprecated)

Use `set advanced-settings`.

---

**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 led

Description
Changes the state of the identification LED on a specified device. LEDs are described in the User 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

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 the unit identification LED on the enclosure's right ear.

disk ID
Specifies the disk to locate. For disk syntax, see "Command syntax" (page 22). This affects the Fault/UID LED.

enable|disable|on|off
Specifies to set or unset the LED.

enclosure ID
Specifies the enclosure to locate. This affects the unit identification LED on the enclosure's right ear and the unit locator LED on each I/O module.

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
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: enabled
- 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 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: 0.0.0.0

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
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
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: " ', < > \n- 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 J Doe.
# set password J Doe 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 SMU, 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).
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$ 

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.

debg enabled|disabled|on|off
Optional. Enables or disables debug capabilities, including Telnet debug ports and privileged diagnostic user IDs. This is disabled by default. Enabling the service debug protocol allows remote connection, through incoming ports only, by HPE or HPE’s authorized representatives for troubleshooting. Disabling the service debug protocol removes this access.

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 SMU web server. This is disabled by default.

https enabled|disabled|on|off
Optional. Enables or disables the secure SMU 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 SMU 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 SMU 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.

nenabled|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 disabled by default.

telnet enabled|disabled|on|off
Optional. Enables or disables the secure shell 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 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)
```

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)
```
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|wwn=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. A snap pool's default error policy is autoexpand and default critical policy is deletesnapshots.

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).
  o If the snap pool is successfully expanded, the system will log Informational event 444.
  o 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 SMU, 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: " < > \n- 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: ",,<\n- 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: ",,<\n- 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

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 SMU). 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.
- 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]

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**

```bash
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]
```

**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.

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: ", < \n
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.
• Enabled: Background disk-group scrub is enabled. This is the default.

Vdisk Background Scrub (v2)
Shows whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the Vdisk Background Scrub Interval field.
• Disabled: Background vdisk scrub is disabled.
• Enabled: Background vdisk scrub is enabled. This is the default.

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.
- Enabled: The dynamic spares feature is enabled. This is the default.

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.

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 SMU.

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:

- **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**: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.
- **no-mirror**: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

**Read Ahead Size**: If a volume is specified, its read-ahead cache setting:

- **Disabled**: Read-ahead is disabled.
- **Adaptive**: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.
- **Stripe**: Read-ahead is set to one stripe. The controllers treat NRAID and RAID-1 disk groups internally as if they have a stripe size of 512 KB, even though they are not striped.
- **512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB**: Size selected by a user.

**Examples**

Show the cache parameters for the system and for volume V1.

```plaintext
# 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.

```bash
# 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.

Failed 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:

- 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:

- **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**: 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.

```bash
# show controllers
```

Basetypes

```bash
controllers
status
```

See also

```bash
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 449).

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.
-  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.
-  res2: Removable-component manager debug messages. Disabled by default.
-  raid: RAID debug messages. Enabled by default.
-  cache: Cache 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.
-  resmgr: Reservation Manager debug messages. Disabled by default.
-  ini: 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: \( \text{configured-chunk-size} \times (\text{subgroup-members} - 1) \). For a disk group configured to use 64-KB chunk size and 4-disk subgroups, the value would be 192k (64KB \( \times \) 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.
- **VRFC**: 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 449).

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 (MSA 2040 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 22).
- 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 (MSA 2040 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.

Enc1
Shown by the encl parameter. The number of the enclosure where the disk is located.

FDE State (MSA 2040 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.
- VRBCV: The virtual disk group is being recovered to restore its membership in the virtual pool.
- VREM: 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:

- Online: The disk is operating normally.
- Rebuild: The disk's disk group is being reconstructed.
- Fault: The disk has a fault.
- Pred Fail: The disk has a predictive failure.
- ID: The locator LED is illuminated to identify the disk.
- 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 (MSA 2040 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 disks 295
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 449).

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 22).
Output

<table>
<thead>
<tr>
<th>Live</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td>The disk location in the format <code>disk_enclosure-ID.slot-number</code>.</td>
</tr>
<tr>
<td><strong>Serial Number</strong></td>
</tr>
<tr>
<td>The serial number of the disk.</td>
</tr>
<tr>
<td><strong>Pwr Hrs</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Bps</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>IOPS</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td><strong>Reads</strong></td>
</tr>
<tr>
<td>The number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td><strong>Writes</strong></td>
</tr>
<tr>
<td>The number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td><strong>Data Read</strong></td>
</tr>
<tr>
<td>The amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td><strong>Data Written</strong></td>
</tr>
<tr>
<td>The amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td><strong>Lifetime Read</strong></td>
</tr>
<tr>
<td>The amount of data read from the disk in its lifetime.</td>
</tr>
<tr>
<td><strong>Lifetime Written</strong></td>
</tr>
<tr>
<td>The amount of data written to the disk in its lifetime.</td>
</tr>
<tr>
<td><strong>Reset Time</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Historical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Durable ID</strong></td>
</tr>
<tr>
<td>The disk ID in the form <code>disk_enclosure-number.disk-number</code>.</td>
</tr>
<tr>
<td><strong>Serial Number</strong></td>
</tr>
<tr>
<td>The serial number of the disk.</td>
</tr>
<tr>
<td><strong>Total I/Os</strong></td>
</tr>
<tr>
<td>The total number of read and write operations since the last sampling time.</td>
</tr>
<tr>
<td><strong>Reads</strong></td>
</tr>
<tr>
<td>Shown by the <code>all</code> parameter. The number of read operations since the last sampling time.</td>
</tr>
<tr>
<td><strong>Writes</strong></td>
</tr>
<tr>
<td>Shown by the <code>all</code> parameter. The number of write operations since the last sampling time.</td>
</tr>
<tr>
<td><strong>Data Transferred</strong></td>
</tr>
<tr>
<td>The total amount of data read and written since the last sampling time.</td>
</tr>
</tbody>
</table>
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.

Persistent Alerts
Shows whether system health alerts will be sent weekly on Sunday at 12:01 AM to configured email addresses. This option is enabled by default.

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
- 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.

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:
  o CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem immediately.
  o ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
  o WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.
  o INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
  o 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

Enc1
The enclosure that contains the SAS expander.

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

- 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
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` for a controller enclosure or MSA 1040/2040 drive enclosure, or `Fan fan-unit-ID` for a D2700 enclosure. 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
- Top
- Bottom

**Serial Number**
- (blank): Not applicable.
- The serial number of a fan in a D2700 enclosure.

**Part Number**
- (blank): Not applicable.
- The part number of a fan in a D2700 enclosure.

**Firmware Version**
- (blank): Not applicable.
- The firmware revision of a fan FRU.

**Hardware Version**
- (blank): Not applicable.
- The hardware revision of a fan in a D2700 enclosure.
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 (MSA 2040 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 (MSA 2040 only)
status

See also
clear fde-keys (MSA 2040 only)
set fde-import-key (MSA 2040 only)
set fde-lock-key (MSA 2040 only)
set fde-state (MSA 2040 only)
show frus

Description

Shows SKU and FRU (field-replaceable unit) information for the storage system. Some information is for use by service technicians.

Minimum role

monitor

Syntax

show frus

Output

<table>
<thead>
<tr>
<th>SKU fields:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
</tr>
<tr>
<td>The system part number.</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>The system serial number (also shown by Configuration SN, below).</td>
</tr>
<tr>
<td>Revision</td>
</tr>
<tr>
<td>The system revision level.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FRU fields:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>• CHASSIS_MIDPLANE: Chassis and midplane circuit board</td>
</tr>
<tr>
<td>• RAID_IOM: Controller module</td>
</tr>
<tr>
<td>• BOD_IOM: Expansion module</td>
</tr>
<tr>
<td>• POWER_SUPPLY: Power supply module</td>
</tr>
<tr>
<td>• FAN: Fan module</td>
</tr>
<tr>
<td>• MEMORY CARD: CompactFlash card</td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>The FRU description.</td>
</tr>
<tr>
<td>Part Number</td>
</tr>
<tr>
<td>The FRU part number.</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>The FRU serial number.</td>
</tr>
<tr>
<td>Revision</td>
</tr>
<tr>
<td>The hardware revision level.</td>
</tr>
<tr>
<td>Dash Level</td>
</tr>
<tr>
<td>The FRU template revision number.</td>
</tr>
<tr>
<td>FRU Shortname</td>
</tr>
<tr>
<td>A short description of the FRU.</td>
</tr>
<tr>
<td>Manufacturing Date</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Manufacturing Location</td>
</tr>
<tr>
<td>The city, state/province, and country where the FRU was manufactured.</td>
</tr>
</tbody>
</table>
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.
- UPPER PSU SLOT: Power supply module in the upper slot.
- LOWER PSU SLOT: Power supply module in the lower slot.
- 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 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.

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.
- N/A: The FRU is not present in a D2700 enclosure.

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-sku
closure-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

<table>
<thead>
<tr>
<th>Host group information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Number of Members</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Host information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Number of Members</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initiator information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickname</td>
</tr>
<tr>
<td>Discovered</td>
</tr>
<tr>
<td>Yes: The initiator was discovered and its entry was automatically created.</td>
</tr>
<tr>
<td>No: The initiator was manually created.</td>
</tr>
<tr>
<td>Mapped</td>
</tr>
<tr>
<td>Yes: At least one volume is explicitly mapped to the initiator.</td>
</tr>
<tr>
<td>No: No volumes are explicitly mapped to the initiator.</td>
</tr>
</tbody>
</table>
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 449).

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 22). 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 is purchased and doesn’t expire.
• Number of days remaining for a temporary license.
• Expired. Temporary license has expired and cannot be renewed.
Virtualization
Shows whether the capability to create and manage virtual pools is enabled or disabled.
Virtualization Expires
• Never. License is purchased and doesn’t expire.
Performance Tier
Shows whether the capability to create a Performance tier comprised of SSDs is enabled or disabled.
Performance Tier Expires
• Never. License is purchased and doesn’t expire.
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.

- Never. Always enabled and doesn't expire.

VSS
Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is enabled or disabled.

- Never. Always enabled and doesn't expire.

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

- Never. Always enabled and doesn't expire.

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
ccontroller 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 449).

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 22).

Output

<table>
<thead>
<tr>
<th>Live</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Historical</th>
</tr>
</thead>
</table>

**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.

Writers
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 (MSA 2040 only), 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
MSA 1040 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.
• The part number of a power supply in a D2700 enclosure.

Name
• The power supply identifier and location.
• Voltage Regulator (D2700 only).

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

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 SMU web server is enabled or disabled. The default is Disabled.

Secure Web Browser Interface (HTTPS)
Shows whether the secure SMU 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 Disabled.

Secure Command Line Interface (SSH)
Shows whether the secure shell CLI is enabled or disabled. The default is Enabled.

Storage Management Initiative Specification (SMI-S)
Shows whether the secure SMI-S interface is enabled or disabled. When enabled, this option allows SMI-S clients to communicate with each controller’s embedded SMI-S provider via HTTP port 5989. The default is Enabled.

Unsecure Storage Management Initiative Specification (SMI-S 5988)
Shows whether the secure SMI-S interface is enabled or disabled. When enabled, this option allows SMI-S clients to communicate with each controller’s embedded SMI-S provider via HTTP port 5988. The default is Disabled.

File Transfer Protocol (FTP)
Shows whether the expert interface for performing actions such as updating firmware is enabled or disabled. The default is Enabled.

Simple Network Management Protocol (SNMP)
Shows whether the SNMP interface is enabled or disabled. When this is disabled, all SNMP requests to the MIB are disabled and SNMP traps are disabled. The default is Disabled.

Service Debug
Shows whether the Telnet debug port is enabled or disabled. The default is Disabled. When the service debug protocol is enabled, remote connection is allowed, through incoming ports only, by HPE or HPE’s authorized representatives for troubleshooting. Disabling the service debug protocol removes this access.

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.

```bash
# show protocols
```

Basetypes

```text
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 22). 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 22). 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:

<table>
<thead>
<tr>
<th>Volume</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume name</td>
<td>Blank if the vdisk or pool does not have a volume.</td>
</tr>
<tr>
<td>WWN</td>
<td>Blank if the vdisk or pool does not have a volume.</td>
</tr>
<tr>
<td>Owning controller of the vdisk or pool</td>
<td></td>
</tr>
<tr>
<td>List of disks within a vdisk or pool</td>
<td></td>
</tr>
<tr>
<td>Pool (v3)</td>
<td>Pool name.</td>
</tr>
<tr>
<td>Vdisk (v2)</td>
<td>Vdisk name.</td>
</tr>
<tr>
<td>Health</td>
<td>Health of the associated vdisk or pool:</td>
</tr>
<tr>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>Degraded</td>
<td></td>
</tr>
<tr>
<td>Fault</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>Mapped</td>
<td>Indicates whether the volume is mapped. This is useful when the no-mapping parameter is specified to hide detailed mapping information.</td>
</tr>
<tr>
<td>Yes</td>
<td>The volume is mapped.</td>
</tr>
<tr>
<td>No</td>
<td>The volume is not mapped.</td>
</tr>
</tbody>
</table>
**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 vdisk 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:

- **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**: 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 specified in the example.
- **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 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

<table>
<thead>
<tr>
<th>Replication volume summary information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>• Primary Volume: The volume is the primary volume in a replication set.</td>
</tr>
<tr>
<td>• Secondary Volume: The volume is the secondary volume in a replication set.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replication volume image information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Serial Number</td>
</tr>
<tr>
<td>Image Name</td>
</tr>
<tr>
<td>Snapshot Serial</td>
</tr>
<tr>
<td>Snapshot Name</td>
</tr>
<tr>
<td>Creation Date/Time</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Replication set information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>The replication set name.</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>The replication set serial number.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replication volume information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>The replication volume name.</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>The replication volume serial number.</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Remote link information:</th>
</tr>
</thead>
</table>

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.

NOTE: SAS link health is not supported for D2700 enclosures.

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 except D2700: temperature, voltage, and current for each IOM (controller module or expansion module); temperature, voltage, and current for each PSU (power supply).

Information shown for D2700 enclosures: temperature for each IOM (expansion module) and PSU (power supply).

Normal and error ranges for temperature and voltage are specified in the User Guide.

Minimum role

monitor

Syntax

show sensor-status

Output

Encl
The enclosure 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
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

ccontroller 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 vd disks.

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
Show 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 SMU 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:

<table>
<thead>
<tr>
<th>Task Name</th>
<th>The name of the task.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Type</td>
<td>TakeSnapshot</td>
</tr>
<tr>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>Uninitialized</td>
<td>The task is not yet ready to run.</td>
</tr>
<tr>
<td>Ready</td>
<td>The task is ready to run.</td>
</tr>
<tr>
<td>Active</td>
<td>The task is running.</td>
</tr>
<tr>
<td>Error</td>
<td>The task has an error.</td>
</tr>
<tr>
<td>Invalid</td>
<td>The task is invalid.</td>
</tr>
<tr>
<td>Complete</td>
<td>The task is complete.</td>
</tr>
<tr>
<td>Deleted</td>
<td>The task has been deleted.</td>
</tr>
<tr>
<td>Task State</td>
<td>The current step of the task:</td>
</tr>
<tr>
<td>Start</td>
<td></td>
</tr>
<tr>
<td>VerifyVolume</td>
<td></td>
</tr>
<tr>
<td>ValidateLicensingLimit</td>
<td></td>
</tr>
<tr>
<td>CreateName</td>
<td></td>
</tr>
<tr>
<td>CreateSnap</td>
<td></td>
</tr>
<tr>
<td>VerifySnap</td>
<td></td>
</tr>
<tr>
<td>InspectRetention</td>
<td></td>
</tr>
<tr>
<td>FindOldestSnap</td>
<td></td>
</tr>
<tr>
<td>UnmapSnap</td>
<td></td>
</tr>
<tr>
<td>ResetSnap</td>
<td></td>
</tr>
<tr>
<td>RenameSnap</td>
<td></td>
</tr>
</tbody>
</table>
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.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State
The current step of the task:
- Start
- 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.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State
The current step of the task:
- Start
- VerifyVolume
- 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.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State
The current step of the task:
- Start
- VerifyVolume
- 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.

<table>
<thead>
<tr>
<th>For a Replicate task:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task Name</strong></td>
</tr>
<tr>
<td>The name of the task.</td>
</tr>
<tr>
<td><strong>Task Type</strong></td>
</tr>
<tr>
<td>Replicate</td>
</tr>
<tr>
<td><strong>Status</strong></td>
</tr>
<tr>
<td>Uninitialized: The task is not yet ready to run.</td>
</tr>
<tr>
<td>Ready: The task is ready to run.</td>
</tr>
<tr>
<td>Active: The task is running.</td>
</tr>
<tr>
<td>Error: The task has an error.</td>
</tr>
<tr>
<td>Invalid: The task is invalid.</td>
</tr>
<tr>
<td>Complete: The task is complete.</td>
</tr>
<tr>
<td>Deleted: The task has been deleted.</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Task Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>The name of the task.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For an EnableDSD task:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task Name</strong></td>
</tr>
<tr>
<td>The name of the task.</td>
</tr>
<tr>
<td><strong>Task Type</strong></td>
</tr>
<tr>
<td>EnableDSD</td>
</tr>
</tbody>
</table>
Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.
- Active: The task is running.
- Error: The task has an error.
- Invalid: The task is invalid.
- Complete: The task is complete.
- Deleted: The task has been deleted.

Task State
The current step of the task, 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:

<table>
<thead>
<tr>
<th>Task Name</th>
<th>The name of the task.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Type</td>
<td>DisableDSD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninitialized</td>
<td>The task is not yet ready to run.</td>
</tr>
<tr>
<td>Ready</td>
<td>The task is ready to run.</td>
</tr>
<tr>
<td>Active</td>
<td>The task is running.</td>
</tr>
<tr>
<td>Error</td>
<td>The task has an error.</td>
</tr>
<tr>
<td>Invalid</td>
<td>The task is invalid.</td>
</tr>
<tr>
<td>Complete</td>
<td>The task is complete.</td>
</tr>
<tr>
<td>Deleted</td>
<td>The task has been deleted.</td>
</tr>
</tbody>
</table>

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 449).

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 SMU). 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.
- 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**

```plaintext
show vdisks
[vdisks]
```

**Parameters**

`vdisks`

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

**Output**

**Name**
The vdisk name.

**Size**
The vdisk size.

**Free**
The amount of free (available) space in the vdisk.

**Own**
Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.

**Pref**
The controller that owns the vdisk and its volumes during normal operation.

**RAID**
The vdisk RAID level.

**Class**
- Linear: The vdisk acts as a linear pool.
- Virtual: The disk group is in a virtual pool.

**Disks**
The number of disks in the vdisk.

**Spr**
The number of spares assigned to the vdisk.

**Chk**
- For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk.
- For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).
- For RAID 50, the vdisk chunk size calculated as: `configured-chunk-size x (subvdisk-members - 1)`. For a vdisk configured to use 64-KB chunk size and 4-disk subvdisks, the value would be 192k (64KB x 3).
Status

- **CRIT**: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.
- **DMGD**: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.
- **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.

```bash
# show vdisks
```

Show information about vdisk vdo002.

```bash
# show vdisks vdo002
```

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 449).

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]
[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

<table>
<thead>
<tr>
<th>Live</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>Bps</td>
</tr>
<tr>
<td>IOPS</td>
</tr>
<tr>
<td>Reads</td>
</tr>
<tr>
<td>Writes</td>
</tr>
<tr>
<td>Data Read</td>
</tr>
<tr>
<td>Data Written</td>
</tr>
<tr>
<td>I/O Resp Time</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Historical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Historical, All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
</tbody>
</table>
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

\texttt{show volume-copies}

Parameters

\texttt{Src Volume}
The name of the source volume.

\texttt{Src Type}
The type of the source volume.

\texttt{Src Pool}
The name of the source pool: A or B.

\texttt{Dest Volume}
The name of the destination volume.

\texttt{Dest Type}
The type of the destination volume.

\texttt{Dest Pool}
The name of the destination pool: A or B.

\texttt{Progress}
The percent complete of the operation.

Examples

Show information about in-progress copy volume operations.

\texttt{# show volume-copies}

Basetypes

\texttt{copy-volumes}
\texttt{status}

See also

\texttt{abort copy}
\texttt{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

<table>
<thead>
<tr>
<th>Volume group information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Name</td>
</tr>
<tr>
<td>The name of the volume group.</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>The serial number of the volume group.</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>The group type, which is Volume.</td>
</tr>
<tr>
<td>Number of Members</td>
</tr>
<tr>
<td>The number of volumes in the volume group.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool</td>
</tr>
<tr>
<td>The name of the pool that contains the volume.</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>The name of the volume.</td>
</tr>
<tr>
<td>Total Size</td>
</tr>
<tr>
<td>The total size of the volume.</td>
</tr>
<tr>
<td>Alloc Size</td>
</tr>
<tr>
<td>The amount of space currently allocated to a virtual volume, or the total size of a linear volume.</td>
</tr>
<tr>
<td>Class</td>
</tr>
<tr>
<td>Virtual: The volume is in a virtual pool.</td>
</tr>
</tbody>
</table>
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.

```bash
# show volume-groups
```

Show information about volume groups VGroup1 and VGroup2.

```bash
# 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 vdisks]
       [volumes]

Parameters

details
   Optional. Shows additional information about the volumes.

pool pool
   Optional. The name or serial number of the pool that contains the volumes for which to show information. A name that includes a space must be enclosed in double quotes.

type all|base|snap-pool|mastervolume|snapshot|standard|primary-volume |secondary-volume|replication-volume
   Optional.
   • all: Show all volumes.
   • 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: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.
- no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.

Class
- Linear: The volume is in a linear pool.
- Virtual: The volume is in a virtual pool.

Desc
Shown by the details parameter.

- For HP-UX, a text value (set in-band by a host application) that identifies the volume.
- Blank if not set.

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.

```bash
# show volumes
```

Show detailed information for volume volA.

```bash
# show volumes details volA
```

Basetypes

```text
volumes
status
```

See also

```text
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 449).

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 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

# 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 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

Suspend 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 SC 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**

```text
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`  
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`  
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**

<table>
<thead>
<tr>
<th>Location</th>
<th>The enclosure ID and slot number of the disk.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>The serial number of the disk.</td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>SAS</td>
<td>Enterprise SAS</td>
</tr>
<tr>
<td>SAS MDL</td>
<td>Midline SAS</td>
</tr>
<tr>
<td>sSAS</td>
<td>SAS SSD</td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>AVAIL</td>
<td>Available</td>
</tr>
<tr>
<td>FAILED</td>
<td>The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.</td>
</tr>
<tr>
<td>GLOBAL SP</td>
<td>Global spare</td>
</tr>
<tr>
<td>LEFTOVR</td>
<td>Leftover</td>
</tr>
<tr>
<td>VDISK</td>
<td>Used in a disk group</td>
</tr>
<tr>
<td>VDISK SP</td>
<td>Spare assigned to a disk group</td>
</tr>
<tr>
<td>Partially Recon Target</td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>The disk contains partially reconstructed data.</td>
</tr>
<tr>
<td>False</td>
<td>The disk does not contain partially reconstructed data.</td>
</tr>
<tr>
<td>Out Of Sync</td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>The disk data is out of sync with other disks in the disk group.</td>
</tr>
<tr>
<td>False</td>
<td>The disk data is in sync with other disks in the disk group.</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Location</th>
<th>Serial Number</th>
<th>Type</th>
<th>State</th>
<th>Partially Reconstructed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SAS LEFTOVR</td>
<td>False</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 SN</td>
<td>SAS LEFTOVR</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Out Of Sync</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.4 SN</td>
<td>SAS VIRTUAL POOL</td>
<td>False</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 SN</td>
<td>SAS LEFTOVR</td>
<td>True</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

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 LEPTOVR False               6  
1.4 SN SAS VIRTUAL POOL False         7  
1.5 SN SAS LEPTOVR True              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 22).

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 MSA 2040 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
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 2 (page 19).
- References to embedded or nested basetypes that the output may show.
This basetype is used by `show advanced-settings`.

**Table 9 advanced-settings-table properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>background-scrub</td>
<td>string</td>
<td>Shows whether disks in disk groups are automatically checked for disk defects to ensure system health. The interval between a scrub finishing and starting again is specified by the <code>background-scrub-interval</code> parameter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Background disk-group scrub is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Background disk-group scrub is enabled. This is the default.</td>
</tr>
<tr>
<td>background-scrub-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>background-scrub</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>background-scrub-interval</td>
<td>uint16</td>
<td>Shows the interval between background disk-group scrub finishing and starting again, from 0 to 360 hours. The default is 24 hours.</td>
</tr>
<tr>
<td>partner-firmware-upgrade</td>
<td>string</td>
<td>Shows whether component firmware versions are monitored and will be automatically updated on the partner controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Partner firmware upgrade is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Partner firmware upgrade is enabled. This is the default.</td>
</tr>
<tr>
<td>partner-firmware-upgrade-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>partner-firmware-upgrade</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>utility-priority</td>
<td>string</td>
<td>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 &quot;background&quot; priority.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• High: Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Medium: Utility performance is balanced with host I/O performance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Low: Utilities run at a slower rate with minimal effect on host I/O.</td>
</tr>
<tr>
<td>utility-priority-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>utility-priority</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Low</td>
</tr>
<tr>
<td>smart</td>
<td>string</td>
<td>Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.</td>
</tr>
</tbody>
</table>
### Table 9  advanced-settings-table properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>smart-numeric</strong></td>
<td>uint32</td>
<td>Numeric equivalents for smart values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Detect-Only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Disabled</td>
</tr>
<tr>
<td><strong>dynamic-sparres</strong></td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The dynamic spares feature is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The dynamic spares feature is enabled.</td>
</tr>
<tr>
<td><strong>emp-poll-rate</strong></td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td><strong>host-cache-control</strong></td>
<td>string</td>
<td>Shows whether hosts are allowed to use the SCSI MODE SELECT command to change the storage system's write-back cache setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Host control of caching is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Host control of caching is enabled.</td>
</tr>
<tr>
<td><strong>host-cache-control-numeric</strong></td>
<td>uint32</td>
<td>Numeric equivalents for host-cache-control values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td><strong>sync-cache-mode</strong></td>
<td>string</td>
<td>Shows how the SCSI SYNCHRONIZE CACHE command is handled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Immediate: Good status is returned immediately and cache content is unchanged. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flush To Disk: Good status is returned only after all write-back data for the specified volume is flushed to disk.</td>
</tr>
<tr>
<td><strong>sync-cache-mode-numeric</strong></td>
<td>uint32</td>
<td>Numeric equivalents for sync-cache-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Immediate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Flush to Disk</td>
</tr>
<tr>
<td><strong>independent-cache</strong></td>
<td>string</td>
<td>Not supported.</td>
</tr>
<tr>
<td><strong>independent-cache-numeric</strong></td>
<td>uint32</td>
<td>Numeric equivalents for independent-cache values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td><strong>missing-lun-response</strong></td>
<td>string</td>
<td>Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td><strong>missing-lun-response-numeric</strong></td>
<td>uint32</td>
<td>Numeric equivalents for missing-lun-response values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not Ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Illegal Request</td>
</tr>
</tbody>
</table>
### Table 9  advanced-settings-table properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>controller-failure</td>
<td>string</td>
<td>Shows whether the cache policy will change from write-back to write-through when a controller fails.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The controller failure trigger is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The controller failure trigger is enabled.</td>
</tr>
<tr>
<td>controller-failure-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller-failure values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>super-cap-failure</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The supercapacitor failure trigger is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The supercapacitor failure trigger is enabled.</td>
</tr>
<tr>
<td>super-cap-failure-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for super-cap-failure values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>compact-flash-failure</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The CompactFlash failure trigger is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The CompactFlash failure trigger is enabled.</td>
</tr>
<tr>
<td>compact-flash-failure-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for compact-flash-failure values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>power-supply-failure</td>
<td>string</td>
<td>Shows whether the cache policy will change from write-back to write-through when a power supply fails.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The power-supply failure trigger is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The power-supply failure trigger is enabled.</td>
</tr>
<tr>
<td>power-supply-failure-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for power-supply-failure values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>fan-failure</td>
<td>string</td>
<td>Shows whether the cache policy will change from write-back to write-through when a fan fails.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The fan failure trigger is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The fan failure trigger is enabled.</td>
</tr>
<tr>
<td>fan-failure-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for fan-failure values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
</tbody>
</table>
Table 9  advanced-settings-table properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>temperature-exceeded</td>
<td>string</td>
<td>Shows whether the system will shut down a controller when its temperature exceeds the critical operating range.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The over-temperature trigger is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The over-temperature trigger is enabled.</td>
</tr>
<tr>
<td>temperature-exceeded-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for temperature-exceeded values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>partner-notify</td>
<td>string</td>
<td>Shows whether the partner controller will be notified when a trigger condition occurs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Notification is disabled. The partner controller will continue using its current caching mode. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Notification is enabled. The partner controller will change to write-through mode for better data protection.</td>
</tr>
<tr>
<td>partner-notify-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for partner-notify values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>auto-write-back</td>
<td>string</td>
<td>Shows whether the cache policy will change from write-through to write-back when the trigger condition is cleared.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Auto-write-back is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Auto-write-back is enabled. This is the default.</td>
</tr>
<tr>
<td>auto-write-back-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for auto-write-back values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>disk-dsd-enable</td>
<td>string</td>
<td>Shows whether available disks and global spares will spin down after a period of inactivity shown by the disk-dsd-delay property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Drive spin down for available disks and global spares is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Drive spin down for available disks and global spares is enabled.</td>
</tr>
<tr>
<td>disk-dsd-enable-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for disk-dsd-enable values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>disk-dsd-delay</td>
<td>uint16</td>
<td>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.</td>
</tr>
<tr>
<td>background-disk-scrub</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Background disk scrub is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Background disk scrub is enabled.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>background-disk-scrub-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for background-disk-scrub values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>managed-logs</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The managed logs feature is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The managed logs feature is enabled.</td>
</tr>
<tr>
<td>managed-logs-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for managed-logs values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>single-controller</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Single Controller mode is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Single Controller mode is disabled.</td>
</tr>
<tr>
<td>single-controller-numeric</td>
<td>string</td>
<td>Numeric equivalents for single-controller values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>disk-protection-info</td>
<td>string</td>
<td>Not supported.</td>
</tr>
<tr>
<td>disk-protection-info-numeric</td>
<td>uint32</td>
<td>Not supported.</td>
</tr>
<tr>
<td>auto-stall-recovery</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Auto stall recovery is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Auto stall recovery is enabled.</td>
</tr>
<tr>
<td>auto-stall-recovery-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for auto-stall-recovery values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>restart-on-capi-fail</td>
<td>string</td>
<td>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 SMU.</td>
</tr>
<tr>
<td>restart-on-capi-fail-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for restart-on-capi-fail values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
</tbody>
</table>
### Table 9  advanced-settings-table properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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.  
  - enabled or on: The maximum size for a virtual pool will increase to 512 TiB. The maximum number of volumes per snapshot tree will decrease to 9 (base volume plus 8 snapshots).  
  - disabled or off: The maximum size for a virtual pool will increase to 300 TiB. The maximum number of volumes per snapshot tree will decrease to 255 (base volume plus 254 snapshots). This is the default. |
| large-pools-numeric| uint32  | Numeric equivalents for large-pools values.  
  - 0: Disabled  
  - 1: Enabled                                                                 |
attribute-priorities

This basetype is used by `show priorities`.

Table 10  attribute-priorities properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>attribute-name</td>
<td>string</td>
<td>Snapshot retention attribute.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Standard Snapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replication Snapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Queued Snapshot: A snapshot that was taken for remote replication but is queued waiting for the previous replications to complete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DRM Snapshot: A temporary standard snapshot created from a replication snapshot for the purpose of doing a test failover for disaster recovery management (DRM).</td>
</tr>
<tr>
<td>priority-value</td>
<td>string</td>
<td>Retention priority for the corresponding attribute. Values are shown as hexadecimal numbers.</td>
</tr>
</tbody>
</table>
This basetype is used by `show cache-parameters`, when a volume is specified, to show volume cache properties.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>If a volume is specified, its serial number.</td>
</tr>
<tr>
<td>volume-name</td>
<td>string</td>
<td>If a volume is specified, its name.</td>
</tr>
<tr>
<td>write-policy</td>
<td>string</td>
<td>If a volume is specified, its cache write policy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• write-back: Write-back caching does not wait for data to be completely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>written to disk before signaling the host that the write is complete. This</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is the preferred setting for a fault-tolerant environment because it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>improves the performance of write operations and throughput. This is the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• write-through: Write-through caching significantly impacts performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>by waiting for data to be completely written to disk before signaling the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>host that the write is complete. Use this setting only when operating in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>an environment with low or no fault tolerance.</td>
</tr>
<tr>
<td>write-policy-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>write-policy</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: write-through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: write-back</td>
</tr>
<tr>
<td>cache-optimization</td>
<td>string</td>
<td>If a volume is specified, its cache optimization mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• standard: Optimizes cache for both sequential and random reads. Appropriate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for applications that read and write small files in random order, such as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>transaction-based and database update applications. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no-mirror: When this mode is enabled, each controller stops mirroring its</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cache metadata to the partner controller. This improves write I/O response</td>
</tr>
<tr>
<td></td>
<td></td>
<td>time but at the risk of losing data during a failover. ULP behavior is not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>affected, with the exception that during failover any write data in cache</td>
</tr>
<tr>
<td></td>
<td></td>
<td>will be lost.</td>
</tr>
<tr>
<td>cache-optimization-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>cache-optimization</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: no-mirror</td>
</tr>
</tbody>
</table>
Table 11  cache-parameter properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>read-ahead-size</td>
<td>string</td>
<td>The volume's read-ahead cache setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Read-ahead is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adaptive: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB: Size selected by a user.</td>
</tr>
<tr>
<td>read-ahead-size-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for read-ahead-size values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• -2: Stripe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• -1: Adaptive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 524288: 512 KB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1048576: 1 MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2097152: 2 MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4194304: 4 MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8388608: 8 MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 16777216: 16 MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 33554432: 32 MB</td>
</tr>
</tbody>
</table>
This basetype is used by show cache-parameters to show system cache properties.

Table 12 cache-settings properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>operation-mode</td>
<td>string</td>
<td>The system’s operating mode, also called the cache redundancy mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Active-Active ULP: Both controllers are active using ULP (Unified LUN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Presentation). Data for volumes configured to use write-back cache is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>automatically mirrored between the two controllers to provide fault tolerance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Single Controller: There is only a single controller in the enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Failed Over: Operation has failed over to one controller because its partner is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not operational. The system has lost redundancy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Down: Both controllers are not operational.</td>
</tr>
<tr>
<td>operation-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for operation-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Active-Active ULP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Single Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Failed Over</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Down</td>
</tr>
<tr>
<td>controller-cache-parameters</td>
<td>Embedded; see controller-cache-parameters.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show certificate`.

### Table 13  certificate-status properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>controller</td>
<td>string</td>
<td>• A: Controller A. &lt;br&gt;• B: Controller B.</td>
</tr>
<tr>
<td>controller-numeric</td>
<td>string</td>
<td>Numeric equivalents for <code>controller</code> values.  &lt;br&gt;• 0: A &lt;br&gt;• 1: B</td>
</tr>
<tr>
<td>certificate-status</td>
<td>string</td>
<td>• Customer-supplied: The controller is using a certificate that you have uploaded. &lt;br&gt;• System-generated: The controller is using system-generated certificates. &lt;br&gt;• 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.</td>
</tr>
<tr>
<td>certificate-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>certificate-status</code> values.  &lt;br&gt;• 0: Default &lt;br&gt;• 1: Customer-supplied</td>
</tr>
<tr>
<td>certificate-time</td>
<td>string</td>
<td>The date and time, in the format <code>year-month-day hour:minutes:seconds</code>, when the certificate was created.</td>
</tr>
<tr>
<td>certificate-signature</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>certificate-text</td>
<td>string</td>
<td>The full text of the certificate.</td>
</tr>
</tbody>
</table>
chap-records

This basetype is used by show chap-records.

Table 14  chap-records properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>initiator-name</td>
<td>string</td>
<td>The originator name.</td>
</tr>
<tr>
<td>initiator-secret</td>
<td>string</td>
<td>The secret that the recipient uses to authenticate the originator.</td>
</tr>
<tr>
<td>oname</td>
<td>string</td>
<td>For mutual CHAP, the recipient name.</td>
</tr>
<tr>
<td>osecret</td>
<td>string</td>
<td>For mutual CHAP, the secret that the originator uses to authenticate the recipient.</td>
</tr>
</tbody>
</table>
### cli-parameters

This basetype is used by `show cli-parameters`.

#### Table 15  cli-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>timeout</td>
<td>uint32</td>
<td>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).</td>
</tr>
</tbody>
</table>
| output-format      | string   | • 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. |
| output-format-api  | string   | • console  
• api  
• api-brief  
• api-embed  
• api-embed-brief  
• json  
• json-full |
| output-format-api-numeric | uint32 | Numeric equivalents for `output-format-api` values.  
• 1: console  
• 2: api  
• 3: api-brief  
• 4: api-embed  
• 5: api-embed-brief  
• 6: json  
• 7: json-full |
| brief-mode         | string   | • Enabled: In XML output, this setting shows a subset of attributes of object properties. The name and type attributes are always shown.  
• Disabled: In XML output, this setting shows all attributes of object properties. This is the default. |
| brief-mode-numeric | uint32   | Numeric equivalents for `brief-mode` values.  
• 0: Disabled  
• 1: Enabled |
| base               | uint8    | Alias for `storage-size-base`. |
| pager              | string   | • 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. |
Table 15  cli-parameters properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pager-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for pager values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>locale</td>
<td>string</td>
<td>Display language.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• English (the default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spanish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• French</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• German</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Italian</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Japanese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Korean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dutch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chinese-simplified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chinese-traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Korean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Arabic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Portuguese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Russian</td>
</tr>
<tr>
<td>locale-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for locale values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: English</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Spanish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: French</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: German</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Italian</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Japanese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: Korean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Dutch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Chinese-simplified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: Chinese-traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: Korean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: Arabic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: Portuguese</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12: Russian</td>
</tr>
<tr>
<td>storage-size-base</td>
<td>uint8</td>
<td>Base for entry and display of storage-space sizes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. This is the default.</td>
</tr>
</tbody>
</table>

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. |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>storage-size-units</td>
<td>string</td>
<td>Unit for display of storage-space sizes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Auto: Lets the system determine the proper unit for a size. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MB: Sizes are shown in megabytes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• GB: Sizes are shown in gigabytes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• TB: Sizes are shown in terabytes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>storage-size-units-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-size-units values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: MB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: GB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: TB</td>
</tr>
<tr>
<td>temperature-scale</td>
<td>string</td>
<td>Fahrenheit: Temperatures are shown in degrees Fahrenheit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Celsius: Temperatures are shown in degrees Celsius. This is the default.</td>
</tr>
<tr>
<td>temperature-scale-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for temperature-scale values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Fahrenheit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Celsius</td>
</tr>
<tr>
<td>user-type</td>
<td>string</td>
<td>The logged-in user's experience level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Novice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Standard (the default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Advanced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Diagnostic</td>
</tr>
<tr>
<td>user-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for user-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Novice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Advanced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Diagnostic</td>
</tr>
<tr>
<td>username</td>
<td>string</td>
<td>The logged-in user name.</td>
</tr>
<tr>
<td>management-mode</td>
<td>string</td>
<td>The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• v2: Uses terminology that is oriented to managing linear storage. For example, vdisk for disk groups and pools.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• v3: Uses terminology that is oriented to managing virtual and linear storage. For example, disk group for disk groups and pool for pools.</td>
</tr>
<tr>
<td>management-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for management-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: v2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: v3</td>
</tr>
</tbody>
</table>
code-load-readiness

This basetype is used by check firmware-upgrade-health.

Table 16  code-load-readiness properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>overall-health</td>
<td>string</td>
<td>• Pass: There are no risks to performing firmware upgrade.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fail: At least one condition exists that presents a risk of upgrade failure or loss of availability.</td>
</tr>
<tr>
<td>overall-health-numeric</td>
<td>string</td>
<td>Numeric equivalents for overall-health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Pass</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Fail</td>
</tr>
<tr>
<td>code-load-readiness-reasons</td>
<td>Embedded; see code-load-readiness-reasons.</td>
<td></td>
</tr>
</tbody>
</table>
code-load-readiness-reasons

This basetype is used by check firmware-upgrade-health.

Table 17  code-load-readiness-reasons properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>readiness-reason</td>
<td>string</td>
<td>The condition that was detected.</td>
</tr>
<tr>
<td>failure-risks</td>
<td>string</td>
<td>The problems that are likely to result if you do not resolve the conditions before performing a firmware upgrade.</td>
</tr>
<tr>
<td>failure-risks-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for failure-risks values.</td>
</tr>
</tbody>
</table>
This basetype is used by show controllers.

### Table 18 compact-flash properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>• Ctlr A CF: CompactFlash card in controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ctlr B CF: CompactFlash card in controller B.</td>
</tr>
<tr>
<td>controller-id</td>
<td>string</td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>controller-id-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller-id values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>• Controller A CompactFlash</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Controller B CompactFlash</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>• Not Installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Installed</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not Installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Installed</td>
</tr>
<tr>
<td>cache-flush</td>
<td>string</td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Cache flush is disabled.</td>
</tr>
<tr>
<td>cache-flush-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for cache-flush values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended action to take to resolve the health issue.</td>
</tr>
</tbody>
</table>
controller-cache-parameters

This basetype is used by `show cache-parameters` to show controller cache properties.

Table 19  controller-cache-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>• cache-params-a: Cache parameters for controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• cache-params-b: Cache parameters for controller B.</td>
</tr>
<tr>
<td>controller-id</td>
<td>string</td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>controller-id-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller-id values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>• Controller A Cache Parameters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Controller B Cache Parameters</td>
</tr>
<tr>
<td>write-back-status</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Write-back. This is the normal state.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Write-through.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not up: The controller is not up.</td>
</tr>
<tr>
<td>write-back-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for write-back-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Enabled (write-back)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Disabled (write-through)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Not up</td>
</tr>
<tr>
<td>compact-flash-status</td>
<td>string</td>
<td>• Not Installed: The CompactFlash card is not installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Installed: The CompactFlash card is installed.</td>
</tr>
<tr>
<td>compact-flash-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for compact-flash-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not Installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Installed</td>
</tr>
<tr>
<td>compact-flash-health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>compact-flash-health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for compact-flash-health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
</tbody>
</table>
controller-cache-parameters properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| cache-flush        | string  | • Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.  
• Disabled: Cache flush is disabled. |
| cache-flush-numeric| uint32  | Numeric equivalents for cache-flush values.                                |
|                    |         | • 0: Disabled                                                               |
|                    |         | • 1: Enabled                                                                |
This basetype is used by show configuration and show controllers.

Table 20  controllers properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| durable-id       | string| • controller a  
|                  |       | • controller b |
| controller-id    | string| • A: Controller A.  
|                  |       | • B: Controller B. |
| controller-id-numeric | uint32 | • 0: B  
|                  |       | • 1: A |
| serial-number    | string| • Serial number of the controller module.  
|                  |       | • Not Available: The controller module is down or not installed. |
| hardware-version | string| Controller module hardware version. |
| cpld-version     | string| Complex Programmable Logic Device (CPLD) firmware version. |
| mac-address      | string| Controller network port MAC address. |
| node-wwn         | string| Storage system World Wide Node Name (WWNN). |
| active-version   | uint32| The configured network port IP version.  
|                  |       | • 4: IPv4 |
| 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.  
|                  |       | • SAS |
| drive-bus-type-numeric | uint32 | Numeric equivalent for drive-bus-type value.  
|                  |       | • 8: SAS |
| status           | string| • Operational  
|                  |       | • Down  
|                  |       | • Not installed  
<p>|                  |       | • Unknown |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Not installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td>failed-over</td>
<td>string</td>
<td>Indicates whether the partner controller has failed over to this controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: The partner controller has not failed over to this controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Yes: The partner controller has either failed or been shut down, and its</td>
</tr>
<tr>
<td></td>
<td></td>
<td>responsibilities have been taken over by this controller. There will be a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>delay between the time that the value of the status property becomes Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for one controller and the time that the value of the failed-over property</td>
</tr>
<tr>
<td></td>
<td></td>
<td>becomes Yes for the other controller. This time period is the time that it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>takes for a controller to take over the responsibilities of its partner.</td>
</tr>
<tr>
<td>failed-over-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for failed-over values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Yes</td>
</tr>
<tr>
<td>fail-over-reason</td>
<td>string</td>
<td>If failed-over is Yes, a reason for the failover appears; otherwise, Not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>applicable appears.</td>
</tr>
<tr>
<td>fail-over-reason-</td>
<td>uint32</td>
<td>Numeric equivalents for fail-over-reason values.</td>
</tr>
<tr>
<td>numeric</td>
<td></td>
<td>sc-fw</td>
</tr>
<tr>
<td>vendor</td>
<td>string</td>
<td>Controller manufacturer.</td>
</tr>
<tr>
<td>model</td>
<td>string</td>
<td>Controller model.</td>
</tr>
<tr>
<td>sc-cpu-type</td>
<td>string</td>
<td>Storage Controller processor type.</td>
</tr>
<tr>
<td>sc-cpu-speed</td>
<td>sint32</td>
<td>Storage Controller processor speed.</td>
</tr>
<tr>
<td>internal-serial-</td>
<td>string</td>
<td>Internal serial number of the controller.</td>
</tr>
<tr>
<td>number</td>
<td></td>
<td>cache-lock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to change the storage system's write-back cache setting.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: Hosts are permitted to disable write-back cache.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Yes: Hosts are prevented from disabling write-back cache. This is the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>default.</td>
</tr>
<tr>
<td>cache-lock-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for cache-lock values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Yes</td>
</tr>
<tr>
<td>write-policy</td>
<td>string</td>
<td>The current, system-wide cache policy as determined by auto-write-through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(AWT) logic. This value is not settable by users. If an AWT trigger condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(such as a CompactFlash failure) is met, the cache policy for all volumes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>changes to write-through, overriding the volume-specific settings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the problem is corrected, the cache policy reverts to the value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>configured for each individual volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• write-back: This is the normal state.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• write-through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not up: The controller is not up.</td>
</tr>
</tbody>
</table>
### Table 20  controllers properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>write-policy-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>write-policy</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: write-back</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: write-through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Not up</td>
</tr>
<tr>
<td>description</td>
<td>string</td>
<td>FRU long description.</td>
</tr>
<tr>
<td>part-number</td>
<td>string</td>
<td>Part number for the FRU.</td>
</tr>
<tr>
<td>revision</td>
<td>string</td>
<td>Hardware revision level for the FRU.</td>
</tr>
<tr>
<td>dash-level</td>
<td>string</td>
<td>FRU template revision number.</td>
</tr>
<tr>
<td>fru-shortname</td>
<td>string</td>
<td>FRU short description.</td>
</tr>
<tr>
<td>mfg-date</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when the controller's PCBA was programmed.</td>
</tr>
<tr>
<td>mfg-date-numeric</td>
<td>uint32</td>
<td>Unformatted <code>mfg-date</code> value.</td>
</tr>
<tr>
<td>mfg-location</td>
<td>string</td>
<td>City, state/province, and country where the FRU was manufactured.</td>
</tr>
<tr>
<td>mfg-vendor-id</td>
<td>string</td>
<td>JEDEC ID of the FRU manufacturer.</td>
</tr>
<tr>
<td>locator-led</td>
<td>string</td>
<td>Shows the state of the locator LED on a controller module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On</td>
</tr>
<tr>
<td>locator-led-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for the <code>locator-led</code> property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>ssd-alt-path-io-count</td>
<td>uint8</td>
<td>The ratio of I/Os that alternate between the primary path and the alternate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>path to the SSDs. Thus, if the value is 3, then every third I/O will go to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the alternate path.</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>health</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If <code>Health</code> is not <code>OK</code>, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If <code>Health</code> is not <code>OK</code>, the recommended actions to take to resolve the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>health issue.</td>
</tr>
<tr>
<td>position</td>
<td>string</td>
<td>Position of the controller module, as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bottom</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>position-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for position values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Bottom</td>
</tr>
<tr>
<td>phy-isolation</td>
<td>string</td>
<td>Shows whether the automatic disabling of SAS expander PHVs having high error counts is enabled or disabled for this controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: PHY fault isolation is enabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: PHY fault isolation is disabled.</td>
</tr>
<tr>
<td>phy-isolation-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for phy-isolation values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Disabled</td>
</tr>
<tr>
<td>redundancy-mode</td>
<td>string</td>
<td>The system’s operating mode, also called the cache redundancy mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Single Controller: The enclosure contains a single controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Down: Both controllers are not operational.</td>
</tr>
<tr>
<td>redundancy-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for redundancy-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Active-Active ULP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Single Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Failed Over</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Down</td>
</tr>
<tr>
<td>redundancy-status</td>
<td>string</td>
<td>• Redundant: Both controllers are operational.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Down: This controller is not operational.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: Status information is not available.</td>
</tr>
<tr>
<td>redundancy-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for redundancy-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Operational but not redundant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Redundant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Unknown</td>
</tr>
<tr>
<td>unhealthy-component</td>
<td>Embedded</td>
<td>Embedded; see unhealthy-component.</td>
</tr>
<tr>
<td>ip-address</td>
<td>Embedded</td>
<td>Embedded; see network-parameters.</td>
</tr>
<tr>
<td>port-details</td>
<td>Embedded</td>
<td>Embedded; see port.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>Embedded</td>
<td>Embedded; see expander-ports.</td>
</tr>
<tr>
<td>compact-flash</td>
<td>Embedded</td>
<td>Embedded; see compact-flash.</td>
</tr>
</tbody>
</table>
This basetype is used by `show controller-statistics`.

### Table 21 controller-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| durable-id            | string | • controller a  
<p>|                       |      | • controller b                                                                                                                                  |
| 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 <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. |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>start-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted start-sample-time value.</td>
</tr>
<tr>
<td>stop-sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when sampling stopped for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>stop-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted stop-sample-time value.</td>
</tr>
<tr>
<td>total-power-on-hours</td>
<td>string</td>
<td>The total amount of hours the controller has been powered on in its life time.</td>
</tr>
</tbody>
</table>
copy-volumes

This basetype is used by `show volume-copies`.

Table 22  copy-volumes properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source-volume</td>
<td>string</td>
<td>The name of the source volume.</td>
</tr>
<tr>
<td>source-volume-serial</td>
<td>string</td>
<td>The serial number of the source volume.</td>
</tr>
<tr>
<td>source-type</td>
<td>string</td>
<td>The type of the source volume.</td>
</tr>
<tr>
<td>source-pool-name</td>
<td>string</td>
<td>The name of the source pool: A or B.</td>
</tr>
<tr>
<td>destination-volume</td>
<td>string</td>
<td>The name of the destination volume.</td>
</tr>
<tr>
<td>destination-volume-serial</td>
<td>string</td>
<td>The serial number of the destination volume.</td>
</tr>
<tr>
<td>destination-type</td>
<td>string</td>
<td>The type of the destination volume.</td>
</tr>
<tr>
<td>destination-pool-name</td>
<td>string</td>
<td>The name of the destination pool: A or B.</td>
</tr>
<tr>
<td>progress</td>
<td>string</td>
<td>The percent complete of the operation.</td>
</tr>
</tbody>
</table>
**cs-replicate-tasks**

This basetype is used by `show schedules`.

**Table 23  cs-replicate-tasks properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>replication-set-name</td>
<td>string</td>
<td>The name of the replication set.</td>
</tr>
<tr>
<td>replication-set-serialnum</td>
<td>string</td>
<td>The serial number of the replication set.</td>
</tr>
</tbody>
</table>
This basetype is used by `show replication-sets`.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| replication-state        | string       | • Last Run  
                           • Current Run                                                             |
| replication-state-numeric | uint32       | Numeric equivalents for replication-state values.                          |
|                          |              | • 0: Last Run  
                           • 1: Current Run                                                           |
| image-generation         | int32        | The generation number of the replication. If the replication set is unsynchronized, which means the replication set is ready for replication but no replications have been performed, 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>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>The replication set name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The replication set serial number.</td>
</tr>
<tr>
<td>group</td>
<td>string</td>
<td>• Yes: The replication set is part of a group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: The replication set is not part of a group.</td>
</tr>
<tr>
<td>group-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for group values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Yes</td>
</tr>
<tr>
<td>primary-location</td>
<td>string</td>
<td>The location of the primary volume in the replication set: Local or Remote.</td>
</tr>
<tr>
<td>primary-location-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for primary-location values.</td>
</tr>
<tr>
<td>peer-connection-name</td>
<td>string</td>
<td>The name of the peer connection.</td>
</tr>
<tr>
<td>peer-connection-serial</td>
<td>string</td>
<td>The serial number of the peer connection.</td>
</tr>
<tr>
<td>primary-volume-name</td>
<td>string</td>
<td>The primary volume name. If it is a volume group, it uses the .* notation.</td>
</tr>
<tr>
<td>primary-volume-serial</td>
<td>string</td>
<td>The serial number of the primary volume.</td>
</tr>
<tr>
<td>secondary-volume-name</td>
<td>string</td>
<td>The secondary volume name. If it is a volume group, it uses the .* notation.</td>
</tr>
<tr>
<td>secondary-volume-serial</td>
<td>string</td>
<td>The serial number of the secondary volume.</td>
</tr>
<tr>
<td>sync-job-active</td>
<td>string</td>
<td>• False: No replication is in progress on the replication set.</td>
</tr>
<tr>
<td>sync-job-active-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for sync-job-active values.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>• Not Ready: The replication set is not ready for replications because the system is still preparing the replication set.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unsynchronized: The primary and secondary volumes are unsynchronized because the system has prepared the replication set, but the initial replication has not run.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Running: A replication is in progress.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ready: The replication set is ready for a replication.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suspended: Replications have been suspended.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td>last-success-time</td>
<td>string</td>
<td>The date and time when the system took a snapshot of the primary volume in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>preparation for starting the last successful replication run. The value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shows when the primary and secondary volumes were last known to be in sync.</td>
</tr>
<tr>
<td>last-success-time-numeric</td>
<td>uint32</td>
<td>Unformatted last-success-time value.</td>
</tr>
<tr>
<td>last-success-generation</td>
<td>sint32</td>
<td>The number of times a replication has successfully completed.</td>
</tr>
<tr>
<td>last-run-status</td>
<td>string</td>
<td>The status of the last attempted replication.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: The replication has not yet completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Success: The replication completed successfully.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fail: The replication failed</td>
</tr>
<tr>
<td>last-run-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for last-run-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Success</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fail</td>
</tr>
<tr>
<td>estimated-time-completion</td>
<td>string</td>
<td>For the current run, the date and time when the replication is estimated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to end. If no replication is in progress, N/A.</td>
</tr>
<tr>
<td>estimated-time-completion-numeric</td>
<td>string</td>
<td>Unformatted estimated-time-completion value.</td>
</tr>
<tr>
<td>previous-replication-run</td>
<td>Embedded</td>
<td>see cs-replication.</td>
</tr>
<tr>
<td>current-replication-run</td>
<td>Embedded</td>
<td>see cs-replication.</td>
</tr>
</tbody>
</table>
### debug-log-parameters

This basetype is used by `show debug-log-parameters`.

**Table 26 debug-log-parameters properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host-dbgs</td>
<td>string</td>
<td>Shows whether host interface debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>host-dbgs-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for host values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>disk</td>
<td>string</td>
<td>Shows whether disk interface debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>disk-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for disk values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>mem</td>
<td>string</td>
<td>Shows whether internal memory debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>mem-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for mem values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>fo</td>
<td>string</td>
<td>Shows whether failover and recovery debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>fo-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for fo values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>msg</td>
<td>string</td>
<td>Shows whether inter-controller message debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>msg-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for msg values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ioa</td>
<td>string</td>
<td>Shows whether standard debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>ioa-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for ioa values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>iob</td>
<td>string</td>
<td>Shows whether resource-count debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled.</td>
</tr>
<tr>
<td>iob-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for iob values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>ioc</td>
<td>string</td>
<td>Shows whether upper-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled.</td>
</tr>
<tr>
<td>ioc-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for ioc values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>iod</td>
<td>string</td>
<td>Shows whether lower-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled.</td>
</tr>
<tr>
<td>iod-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for iod values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>misc</td>
<td>string</td>
<td>Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>misc-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for misc values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>rcm</td>
<td>string</td>
<td>Shows whether removable-component manager debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>rcm-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for rcm values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>raid</td>
<td>string</td>
<td>Shows whether RAID debug messages are enabled for inclusion in the Storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>raid-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for raid values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>cache</td>
<td>string</td>
<td>Shows whether cache debug messages are enabled for inclusion in the Storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>cache-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for cache values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>emp</td>
<td>string</td>
<td>Shows whether Enclosure Management Processor debug messages are enabled for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>emp-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for emp values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>capi</td>
<td>string</td>
<td>Shows whether Internal Configuration API debug messages are enabled for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>capi-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for capi values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>mui</td>
<td>string</td>
<td>Shows whether internal service interface debug messages are enabled for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>mui-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for mui values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
</tbody>
</table>
### Table 26  debug-log-parameters properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| bkcfg    | string   | Shows whether internal configuration debug messages are enabled for inclusion in the Storage Controller debug log.  
|          |          | - Off: Disabled.  
|          |          | - On: Enabled. This is the default. |
| bkcfg-numeric | uint32  | Numeric equivalents for bkcfg values.  
|          |          | - 0: Off  
|          |          | - 1: On |
| awt      | string   | Shows whether debug messages for auto-write-through cache triggers are enabled for inclusion in the Storage Controller debug log.  
|          |          | - Off: Disabled. This is the default.  
|          |          | - On: Enabled. |
| awt-numeric | uint32  | Numeric equivalents for awt values.  
|          |          | - 0: Off  
|          |          | - 1: On |
| res2     | string   | Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log.  
|          |          | - Off: Disabled. This is the default.  
|          |          | - On: Enabled. |
| res2-numeric | uint32  | Numeric equivalents for res2 values.  
|          |          | - 0: Off  
|          |          | - 1: On |
| capi2    | string   | Shows whether Internal Configuration API tracing messages are enabled for inclusion in the Storage Controller debug log.  
|          |          | - Off: Disabled. This is the default.  
|          |          | - On: Enabled. |
| capi2-numeric | uint32  | Numeric equivalents for capi2 values.  
|          |          | - 0: Off  
|          |          | - 1: On |
| dms      | string   | Shows whether Snapshot feature debug messages are enabled for inclusion in the Storage Controller debug log.  
|          |          | - Off: Disabled.  
|          |          | - On: Enabled. This is the default. |
| dms-numeric | uint32  | Numeric equivalents for dms values.  
|          |          | - 0: Off  
|          |          | - 1: On |
| fluid    | string   | Shows whether FRU ID debug messages are enabled for inclusion in the Storage Controller debug log.  
|          |          | - Off: Disabled.  
|          |          | - On: Enabled. This is the default. |
Table 26 debug-log-parameters properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fruid-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for fruid values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>resmgr</td>
<td>string</td>
<td>Shows whether Reservation Manager debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled.</td>
</tr>
<tr>
<td>resmgr-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for resmgr values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>init</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>init-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>ps</td>
<td>string</td>
<td>Shows whether paged storage debug messages are enabled for inclusion in the Storage Controller debug log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: Disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: Enabled. This is the default.</td>
</tr>
<tr>
<td>ps-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for ps values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>hb</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>hb-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
</tbody>
</table>
**disk-groups**

This basetype is used by `show configuration`, `show disk-groups`, and `show pools`.

### Table 27  disk-groups properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>The name of the disk group.</td>
</tr>
<tr>
<td>size</td>
<td>uint64</td>
<td>The capacity of the disk group, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint32</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>freespace</td>
<td>uint64</td>
<td>The amount of free space in the disk group, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>freespace-numeric</td>
<td>uint32</td>
<td>Unformatted freespace value in 512-byte blocks.</td>
</tr>
<tr>
<td>raw-size</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>raw-size-numeric</td>
<td>uint64</td>
<td>Unformatted raw-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>storage-type</td>
<td>string</td>
<td>• Linear: The disk group acts as a linear pool.</td>
</tr>
<tr>
<td>storage-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-type values.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>The name of the pool that contains the disk group.</td>
</tr>
<tr>
<td>pool-serial-number</td>
<td>string</td>
<td>The serial number of the pool that contains the disk group.</td>
</tr>
<tr>
<td>storage-tier</td>
<td>string</td>
<td>• Archive: The disk group is in the lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).</td>
</tr>
<tr>
<td>storage-tier-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-tier values.</td>
</tr>
<tr>
<td>total-pages</td>
<td>uint32</td>
<td>For a virtual disk group, the total number of 4-MB pages it contains. For a linear disk group, 0.</td>
</tr>
<tr>
<td>allocated-pages</td>
<td>uint32</td>
<td>For a virtual pool, the number of 4-MB pages that are currently in use. For a linear pool, 0.</td>
</tr>
<tr>
<td>available-pages</td>
<td>uint32</td>
<td>For a virtual pool, the number of 4-MB pages that are still available to be allocated. For a linear pool, 0.</td>
</tr>
<tr>
<td>pool-percentage</td>
<td>uint8</td>
<td>The percentage of pool capacity that the disk group occupies.</td>
</tr>
<tr>
<td>performance-rank</td>
<td>uint8</td>
<td>Disk group performance rank within the virtual pool.</td>
</tr>
</tbody>
</table>
Table 27  disk-groups properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>owner</td>
<td>string</td>
<td>Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>preferred-owner</td>
<td>string</td>
<td>Controller that owns the disk group and its volumes during normal operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>preferred-owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for preferred-owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>raidtype</td>
<td>string</td>
<td>The RAID level of the disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NRAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID50</td>
</tr>
<tr>
<td>raidtype-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for raidtype values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: RAID0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: RAID1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: RAID3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: RAID5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: NRAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: RAID50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: RAID10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: RAID6</td>
</tr>
<tr>
<td>diskcount</td>
<td>uint16</td>
<td>Number of disks in the disk group.</td>
</tr>
<tr>
<td>sparecount</td>
<td>uint16</td>
<td>For a linear disk group, the number of spares assigned to the disk group. For a virtual disk group, 0.</td>
</tr>
<tr>
<td>chunksize</td>
<td>string</td>
<td>• For RAID levels except NRAID, RAID 1, and RAID 50, the chunk size for the disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For NRAID and RAID 1, chunk-size has no meaning and is therefore shown as not applicable (N/A).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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).</td>
</tr>
</tbody>
</table>
### Table 27  disk-groups properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status</td>
<td>string</td>
<td>• CRIT: Critical. The disk group is online but isn't fault tolerant because some of its disks are down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FTDN: Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FTOL: Fault tolerant and online.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OFFL: Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• STOP: The disk group is stopped.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UNKN: Unknown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UP: Up. The disk group is online and does not have fault-tolerant attributes.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: FTOL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: FTDN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: CRIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: OFFL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: QTCR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: QTOF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: QTDN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: STOP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: MSNG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: DMGD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 250: UP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• other: UNKN</td>
</tr>
<tr>
<td>lun</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>min-drive-size</td>
<td>uint64</td>
<td>Minimum disk size that can this disk group can use, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>min-drive-size-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for min-drive-size values.</td>
</tr>
</tbody>
</table>
Table 27  disk-groups properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>create-date</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC), when the disk group was created.</td>
</tr>
<tr>
<td>create-date-numeric</td>
<td>uint32</td>
<td>Unformatted create-date value.</td>
</tr>
<tr>
<td>cache-read-ahead</td>
<td>string</td>
<td>The read-ahead size, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>cache-flush-period</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>read-ahead-enabled</td>
<td>string</td>
<td>Shows whether read-ahead cache is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled</td>
</tr>
<tr>
<td>read-ahead-enabled-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for read-ahead-enabled values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>write-back-enabled</td>
<td>string</td>
<td>Shows the current, system-wide cache policy as determined by auto-write-through logic.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled</td>
</tr>
<tr>
<td>write-back-enabled-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for write-back-enabled values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>job-running</td>
<td>string</td>
<td>Same as current-job.</td>
</tr>
<tr>
<td>current-job</td>
<td>string</td>
<td>Job running on the disk group, if any.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DRSC: A disk is being scrubbed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• EXPD: The disk group is being expanded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• INIT: The disk group is initializing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RCON: The disk group is being reconstructed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VPREP: The virtual disk group is being prepared for use in a virtual pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VREC: The virtual disk group is being recovered to restore its membership in the virtual pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VREM: The disk group and its data are being removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VRFY: The disk group is being verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VRSC: The disk group is being scrubbed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if no job is running.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>current-job-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for current-job values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: (blank)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: INIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: RCON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: VRFY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: EXPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: VRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: DRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: VREMV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12: VPREP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 13: VDRAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 14: VRECV</td>
</tr>
<tr>
<td>current-job-completion</td>
<td>string</td>
<td>• 0%–99%: Percent complete of running job.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• (blank): No job is running (job has completed).</td>
</tr>
<tr>
<td>num-array-partitions</td>
<td>uint32</td>
<td>Number of volumes in the disk group.</td>
</tr>
<tr>
<td>largest-free-partition-space</td>
<td>uint64</td>
<td>The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>largest-free-partition-space-numeric</td>
<td>uint32</td>
<td>Unformatted largest-free-partition-space value in 512-byte blocks.</td>
</tr>
<tr>
<td>num-drives-per-low-level-array</td>
<td>uint8</td>
<td>• For a RAID-10 or RAID-50 disk group, the number of disks in each subgroup.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For other RAID levels, 1.</td>
</tr>
<tr>
<td>num-expansion-partitions</td>
<td>uint8</td>
<td>Not used.</td>
</tr>
<tr>
<td>num-partition-segments</td>
<td>uint8</td>
<td>Number of free segments available for expansion of volumes.</td>
</tr>
<tr>
<td>new-partition-lba</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>array-drive-type</td>
<td>string</td>
<td>Type of disks used in the disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS: Enterprise SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS MDL: Midline SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sSAS: SAS SSD.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MIX: Mixture of enterprise SAS and midline SAS disks.</td>
</tr>
<tr>
<td>array-drive-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for array-drive-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: MIX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: sSAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: SAS MDL</td>
</tr>
</tbody>
</table>
### Table 27  disk-groups properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| is-job-auto-abortable    | string  | • false: The current job must be manually aborted before you can delete the disk group.  
• true: The current job will automatically abort if you delete the disk group. |
| is-job-auto-abortable-numeric | uint32  | Numeric equivalents for is-job-auto-abortable values.                                                                                        |
|                          |         | • 0: false  
• 1: true                                                                                                                                 |
| serial-number            | string  | Disk group serial number.                                                                                                                    |
| blocks                   | uint64  | Unformatted size value in 512-byte blocks.                                                                                                   |
| disk-dsd-enable-vdisk    | string  | • 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. |
| disk-dsd-enable-vdisk-numeric | uint32  | Numeric equivalents for disk-dsd-enable-vdisk values.                                                                                       |
|                          |         | • 0: Disabled  
• 1: Enabled - all spinning  
• 2: Partial spin-down  
• 3: Full spin-down                                                                                   |
| disk-dsd-delay-vdisk     | uint32  | The period of inactivity after which the disk group's disks and dedicated spares automatically spin down, from 1 to 360 minutes. The value 0 means spin down is disabled. |
| scrub-duration-goal      | uint16  | Not applicable.                                                                                                                             |
| pool-sector-format       | string  | 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). |
| pool-sector-format-numeric | uint32  | Numeric equivalents for pool-sector-format values.                                                                                           |
|                          |         | • 0: 512n  
• 1: 512e  
• 3: Mixed                                                                                                                                            |
| health                   | string  | • OK  
• Degraded  
• Fault  
• Unknown  
• N/A                                                                                                                                                    |
Table 27  disk-groups properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>unhealthy-component</td>
<td>Embedded; see unhealthy-component.</td>
<td></td>
</tr>
</tbody>
</table>
**disk-group-statistics**

This basetype is used by `show disk-group-statistics`.

### Table 28  disk-group-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the disk group.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>The name of the disk group.</td>
</tr>
<tr>
<td>time-since-reset</td>
<td>uint32</td>
<td>The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.</td>
</tr>
<tr>
<td>time-since-sample</td>
<td>uint32</td>
<td>The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>Number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>Number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>bytes-per-second</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second-numeric</td>
<td>uint64</td>
<td>Unformatted bytes-per-second value.</td>
</tr>
<tr>
<td>iops</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>avg-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>avg-read-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>avg-write-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>disk-group-statistics-paged</td>
<td>Embedded; see disk-group-statistics-paged.</td>
<td></td>
</tr>
</tbody>
</table>
**disk-group-statistics-paged**

This basetype is used by `show disk-group-statistics` for a virtual disk group.

**Table 29  disk-group-statistics-paged properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the disk group.</td>
</tr>
<tr>
<td>pages-alloc-per-minute</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>pages-dealloc-per-minute</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>pages-reclaimed</td>
<td>uint32</td>
<td>The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).</td>
</tr>
<tr>
<td>num-pages-unmap-per-minute</td>
<td>uint32</td>
<td>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.</td>
</tr>
</tbody>
</table>
disk-hist-statistics

This basetype is used by show disk-statistics when the historical parameter is specified.

Table 30 disk-hist-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>number-of-ios</td>
<td>uint64</td>
<td>Total number of read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>Number of read operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>Number of write operations since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred</td>
<td>uint64</td>
<td>Total amount of data read and written since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred-numeric</td>
<td>uint64</td>
<td>Unformatted total-data-transferred value.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since the last sampling time.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>total-iops</td>
<td>uint64</td>
<td>Total number of read and write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>read-iops</td>
<td>uint64</td>
<td>Number of read operations per second since the last sampling time.</td>
</tr>
<tr>
<td>write-iops</td>
<td>uint64</td>
<td>Number of write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec</td>
<td>uint64</td>
<td>Total data transfer rate, in bytes per second, since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted total-bytes-per-second value.</td>
</tr>
<tr>
<td>read-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>read-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted read-bytes-per-second value.</td>
</tr>
<tr>
<td>write-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for write operations last sampling time.</td>
</tr>
<tr>
<td>write-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted write-bytes-per-second value.</td>
</tr>
<tr>
<td>queue-depth</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>avg-rsp-time</td>
<td>uint64</td>
<td>Average response time, in microseconds, for read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-read-rsp-time</td>
<td>uint64</td>
<td>Average response time, in microseconds, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-write-rsp-time</td>
<td>uint64</td>
<td>Average response time, in microseconds, for write operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-io-size</td>
<td>uint64</td>
<td>Average data size of read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-io-size-numeric</td>
<td>uint64</td>
<td>Unformatted avg-io-size value.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>avg-read-io-size</td>
<td>uint64</td>
<td>Average data size of read operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-read-io-size-numeric</td>
<td>uint64</td>
<td>Unformatted avg-read-io-size value.</td>
</tr>
<tr>
<td>avg-write-io-size</td>
<td>uint64</td>
<td>Average data size of write operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-write-io-size-numeric</td>
<td>uint64</td>
<td>Unformatted avg-write-io-size value.</td>
</tr>
<tr>
<td>number-of-disk-errors</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.</td>
</tr>
<tr>
<td>sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted sample-time value.</td>
</tr>
</tbody>
</table>
**disk-statistics**

This basetype is used by `show disk-statistics` when the historical parameter is omitted.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Disk ID in the form <code>disk_enclosure-number.disk-number</code>.</td>
</tr>
<tr>
<td>location</td>
<td>string</td>
<td>The disk location in the format <code>disk_enclosure-number.disk-number</code>.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Disk serial number.</td>
</tr>
<tr>
<td>power-on-hours</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second-numeric</td>
<td>uint64</td>
<td>Unformatted bytes-per-second value.</td>
</tr>
<tr>
<td>iops</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>Number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>Number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>queue-depth</td>
<td>uint32</td>
<td>Number of pending I/O operations currently being serviced.</td>
</tr>
<tr>
<td>lifetime-data-read</td>
<td>uint64</td>
<td>The amount of data read from the disk in its lifetime.</td>
</tr>
<tr>
<td>lifetime-data-written</td>
<td>uint64</td>
<td>The amount of data written to the disk in its lifetime.</td>
</tr>
<tr>
<td>reset-time</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>reset-time-numeric</td>
<td>uint32</td>
<td>Unformatted reset-time value.</td>
</tr>
<tr>
<td>start-sample-time</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>start-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted start-sample-time value.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>stop-sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when sampling stopped for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>stop-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted stop-sample-time value.</td>
</tr>
<tr>
<td>smart-count-1</td>
<td>uint32</td>
<td>For port 1, the number of SMART events recorded.</td>
</tr>
<tr>
<td>io-timeout-count-1</td>
<td>uint32</td>
<td>For port 1, the number of timeouts accessing the disk.</td>
</tr>
<tr>
<td>no-response-count-1</td>
<td>uint32</td>
<td>For port 1, the number of times the disk did not respond.</td>
</tr>
<tr>
<td>spinup-retry-count-1</td>
<td>uint32</td>
<td>For port 1, the number of attempts by the storage system to spin up the disk.</td>
</tr>
<tr>
<td>number-of-media-errors-1</td>
<td>uint32</td>
<td>For port 1, the number of media errors generated by the disk, as specified by its manufacturer.</td>
</tr>
<tr>
<td>number-of-nonmedia-errors-1</td>
<td>uint32</td>
<td>For port 1, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.</td>
</tr>
<tr>
<td>number-of-block-reassigns-1</td>
<td>uint32</td>
<td>For port 1, the number of times blocks were reassigned to alternate locations.</td>
</tr>
<tr>
<td>number-of-bad-blocks-1</td>
<td>uint32</td>
<td>For port 1, the number of bad blocks encountered.</td>
</tr>
<tr>
<td>smart-count-2</td>
<td>uint32</td>
<td>For port 2, the number of pending I/O operations currently being serviced.</td>
</tr>
<tr>
<td>io-timeout-count-2</td>
<td>uint32</td>
<td>For port 2, the number of SMART events recorded.</td>
</tr>
<tr>
<td>no-response-count-2</td>
<td>uint32</td>
<td>For port 2, the number of timeouts accessing the disk.</td>
</tr>
<tr>
<td>spinup-retry-count-2</td>
<td>uint32</td>
<td>For port 2, the number of times the disk did not respond.</td>
</tr>
<tr>
<td>number-of-media-errors-2</td>
<td>uint32</td>
<td>For port 2, the number of attempts by the storage system to spin up the disk.</td>
</tr>
<tr>
<td>number-of-nonmedia-errors-2</td>
<td>uint32</td>
<td>For port 2, the number of media errors generated by the disk, as specified by its manufacturer.</td>
</tr>
<tr>
<td>number-of-block-reassigns-2</td>
<td>uint32</td>
<td>For port 2, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.</td>
</tr>
<tr>
<td>number-of-bad-blocks-2</td>
<td>uint32</td>
<td>For port 2, the number of times blocks were reassigned to alternate locations.</td>
</tr>
</tbody>
</table>
drive-parameters

This basetype is used by show disk-parameters.

Table 32 drive-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>smart</td>
<td>string</td>
<td>Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Detect-Only: Each disk in the system retains its individual SMART setting, as will new disks added to the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: SMART is disabled for all disks in the system and will be disabled for new disks added to the system.</td>
</tr>
<tr>
<td>smart-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for smart values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Detect-Only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Disabled</td>
</tr>
<tr>
<td>drive-write-back-cache</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>drive-write-back-cache-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for drive-write-back-cache values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Disabled</td>
</tr>
<tr>
<td>drive-timeout-retry-max</td>
<td>uint8</td>
<td>Maximum number of times a timed-out I/O operation can be retried before the operation is failed. The default is 3.</td>
</tr>
<tr>
<td>drive-attempt-timeout</td>
<td>uint8</td>
<td>Number of seconds before an I/O operation is aborted and possibly retried. The default is 8 seconds.</td>
</tr>
<tr>
<td>drive-overall-timeout</td>
<td>uint8</td>
<td>Total time in seconds before an I/O operation is failed regardless of the drive-attempt-timeout and drive-timeout-retry-max settings. The default is 105 seconds.</td>
</tr>
<tr>
<td>disk-dsd-enable</td>
<td>string</td>
<td>Shows whether available disks and global spares will spin down after a period of inactivity shown by the disk-dsd-delay property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Drive spin down for available disks and global spares is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: Drive spin down for available disks and global spares is enabled.</td>
</tr>
<tr>
<td>disk-dsd-enable-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for disk-dsd-enable values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>disk-dsd-enable-pool</td>
<td>string</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>disk-dsd-delay</td>
<td>uint16</td>
<td>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.</td>
</tr>
</tbody>
</table>
drive-summary

This basetype is used by show disk-statistics when the historical parameter is specified.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Disk ID in the form disk_enclosure-number.disk-number.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Disk serial number.</td>
</tr>
<tr>
<td>disk-hist-statistics</td>
<td>Embedded; see disk-hist-statistics.</td>
<td></td>
</tr>
</tbody>
</table>
## drives

This basetype is used by `show configuration` and `show disks`.

### Table 34  drives properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Disk ID in the form <code>disk_enclosure-ID.slot-number</code>.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
<tr>
<td>drawer-id</td>
<td>uint8</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>slot</td>
<td>uint32</td>
<td>Disk slot number.</td>
</tr>
<tr>
<td>location</td>
<td>string</td>
<td>Disk's enclosure ID and slot number.</td>
</tr>
<tr>
<td>port</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>scsi-id</td>
<td>uint32</td>
<td>SCSI ID assigned to this disk for the primary channel.</td>
</tr>
<tr>
<td>blocks</td>
<td>uint64</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Disk serial number.</td>
</tr>
<tr>
<td>vendor</td>
<td>string</td>
<td>Disk vendor.</td>
</tr>
<tr>
<td>model</td>
<td>string</td>
<td>Disk model.</td>
</tr>
<tr>
<td>revision</td>
<td>string</td>
<td>Disk firmware revision level.</td>
</tr>
<tr>
<td>secondary-channel</td>
<td>uint32</td>
<td>SCSI ID assigned to this disk for the secondary channel.</td>
</tr>
<tr>
<td>container-index</td>
<td>uint32</td>
<td>Container index.</td>
</tr>
<tr>
<td>member-index</td>
<td>uint32</td>
<td>Index for this disk in the disk group list.</td>
</tr>
<tr>
<td>description</td>
<td>string</td>
<td>Disk description.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS: Enterprise SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS MDL: Midline SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sSAS: SAS SSD.</td>
</tr>
<tr>
<td>description-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for description values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: sSAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: SAS MDL</td>
</tr>
<tr>
<td>architecture</td>
<td>string</td>
<td>Disk architecture.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HDD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SSD</td>
</tr>
<tr>
<td>architecture-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for architecture values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: SSD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HDD</td>
</tr>
<tr>
<td>interface</td>
<td>string</td>
<td>Disk interface.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS</td>
</tr>
<tr>
<td>interface-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for interface values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: SAS</td>
</tr>
<tr>
<td>single-ported</td>
<td>string</td>
<td>• Disabled: The disk has a dual-port connection to the midplane.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The disk has a single-port connection to the midplane.</td>
</tr>
</tbody>
</table>
Table 34  drives properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>single-ported-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for single-ported values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>type</td>
<td>string</td>
<td>Type of disk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS: Enterprise SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS MDL: Midline SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sSAS: SAS SSD.</td>
</tr>
<tr>
<td>type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: sSAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: SAS MDL</td>
</tr>
<tr>
<td>usage</td>
<td>string</td>
<td>Shows the disk's usage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• AVAIL: The disk is available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DEDICATED SP: The disk is a spare assigned to a linear disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FAILED: The disk is unusable and must be replaced. Reasons for this status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>include: excessive media errors, SMART error, disk hardware failure, or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unsupported disk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• GLOBAL SP: The disk is a global spare.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LEFTOVR: The disk is a leftover.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LINEAR POOL: The disk is a member of a vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UNUSABLE: The disk cannot be used in a disk group because the system is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>secured or the disk is locked to data access.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VDISK: The disk is a member of a vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VDISK SP: The disk is a spare assigned to a vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VIRTUAL POOL: The disk is a member of a disk group in a storage pool.</td>
</tr>
<tr>
<td>usage-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for usage values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: AVAIL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: VDISK or LINEAR POOL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: VDISK SP or DEDICATED SP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: GLOBAL SP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: LEFTOVR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: FAILED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: UNSUSABLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: VIRTUAL POOL</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>job-running</td>
<td>string</td>
<td>Job running on the disk, if any.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- (blank): None.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DRSC: The disk group is being scrubbed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- EXPD: The disk group is being expanded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- INIT: The disk group is being initialized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RCON: The disk group is being reconstructed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VDRAIN: The virtual disk group is being removed and its data is being drained to another disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VPREP: The virtual disk group is being prepared for use in a virtual pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRECV: The virtual disk group is being recovered to restore its membership in the virtual pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VREMV: The disk group and its data are being removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRFY: The disk group is being verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRSC: The disk group is being scrubbed.</td>
</tr>
<tr>
<td>job-running-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for job-running values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: INIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3: RCON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: VRFY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 5: EXPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 6: VRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 7: DRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 9: VREMV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 12: VPREP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 13: VDRAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 14: VRECV</td>
</tr>
<tr>
<td>state</td>
<td>string</td>
<td>Shows the disk's usage value.</td>
</tr>
<tr>
<td>current-job-completion</td>
<td>string</td>
<td>- 0%-99%: Percent complete of running job.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- (blank): No job is running (job has completed).</td>
</tr>
<tr>
<td>blink</td>
<td>uint32</td>
<td>Deprecated; locator LED status now shown by locator-led property.</td>
</tr>
<tr>
<td>locator-led</td>
<td>string</td>
<td>Shows the state of the locator LED on a disk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- On</td>
</tr>
<tr>
<td>locator-led-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for the locator-led property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: On</td>
</tr>
<tr>
<td>speed</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>smart</td>
<td>string</td>
<td>- Disabled: SMART is disabled for this disk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enabled: SMART is enabled for this disk.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>smart-numeric</td>
<td>string</td>
<td>Numeric equivalents for smart values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>dual-port</td>
<td>uint32</td>
<td>• 0: Single-ported disk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Dual-ported disk.</td>
</tr>
<tr>
<td>error</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>fc-p1-channel</td>
<td>uint32</td>
<td>Port 1 channel ID.</td>
</tr>
<tr>
<td>fc-p1-device-id</td>
<td>uint32</td>
<td>Port 1 device ID.</td>
</tr>
<tr>
<td>fc-p1-node-wwn</td>
<td>string</td>
<td>Port 1 WWNN.</td>
</tr>
<tr>
<td>fc-p1-port-wwn</td>
<td>string</td>
<td>Port 1 WWPN.</td>
</tr>
<tr>
<td>fc-p1-unit-number</td>
<td>uint32</td>
<td>Port 1 unit number.</td>
</tr>
<tr>
<td>fc-p2-channel</td>
<td>uint32</td>
<td>Port 2 channel number.</td>
</tr>
<tr>
<td>fc-p2-device-id</td>
<td>uint32</td>
<td>Port 2 device ID.</td>
</tr>
<tr>
<td>fc-p2-node-wwn</td>
<td>string</td>
<td>Port 2 WWNN.</td>
</tr>
<tr>
<td>fc-p2-port-wwn</td>
<td>string</td>
<td>Port 2 WWPN.</td>
</tr>
<tr>
<td>fc-p2-unit-number</td>
<td>uint32</td>
<td>Port 2 unit number.</td>
</tr>
<tr>
<td>drive-down-code</td>
<td>uint8</td>
<td>Numeric code indicating why the disk is down.</td>
</tr>
<tr>
<td>owner</td>
<td>string</td>
<td>Current owner, which is either the preferred owner during normal operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or the partner controller when the preferred owner is offline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>index</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>rpm</td>
<td>uint32</td>
<td>The speed of a spinning disk, in thousands of revolutions per minute, as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>specified by the disk vendor. For an SSD, 0 is shown.</td>
</tr>
<tr>
<td>size</td>
<td>string</td>
<td>Disk capacity, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint64</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>sector-format</td>
<td>string</td>
<td>The disk sector format.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 512n: The disk uses 512-byte native sector size. Each logical block and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>physical block is 512 bytes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 512e: The disk uses 512-byte emulated sector size. Each logical block is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>512 bytes and each physical block is 4096 bytes. Eight logical blocks will</td>
</tr>
<tr>
<td></td>
<td></td>
<td>be stored sequentially in each physical block. Logical blocks may or may</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not be aligned with physical block boundaries.</td>
</tr>
<tr>
<td>sector-format-numeric</td>
<td>string</td>
<td>Numeric equivalents for sector-format values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: 512n</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: 512e</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>transfer-rate</td>
<td>string</td>
<td>Disk data transfer rate in Gbit/s. It is normal behavior for the rate to vary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some 6-Gbit/s disks might not consistently support a 6-Gbit/s transfer rate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If this happens, the controller automatically adjusts transfers to those</td>
</tr>
<tr>
<td></td>
<td></td>
<td>disks to 3 Gbit/s, increasing reliability and reducing error messages with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>little impact on system performance. This rate adjustment persists until the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>controller is restarted or power-cycled.</td>
</tr>
<tr>
<td>transfer-rate-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>attributes</td>
<td>string</td>
<td>Shows which controller a single-ported disk is connected to.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>attributes-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>enclosure-wwn</td>
<td>string</td>
<td>Enclosure WWN.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Disk status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up: The disk is present and is properly communicating with the expander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spun Down: The disk is present and has been spun down by the drive spin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>down feature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Warning: The disk is present but the system is having communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>problems with the disk LED processor. For disk and midplane types where</td>
</tr>
<tr>
<td></td>
<td></td>
<td>this processor also controls power to the disk, power-on failure will result</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in Error status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error: The disk is present but is not detected by the expander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: Initial status when the disk is first detected or powered on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present: The disk slot indicates that no disk is present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unrecoverable: The disk is present but has unrecoverable errors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unavailable: The disk is present but cannot communicate with the expander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unsupported: The disk is present but is an unsupported type.</td>
</tr>
<tr>
<td>recon-state</td>
<td>string</td>
<td>The state of the disk (source or destination) if it is involved in a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reconstruct operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• From: This disk is being used as the source of a reconstruct operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• To: This disk is being used as the target of a reconstruct operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: This disk is not being used in a reconstruct operation.</td>
</tr>
<tr>
<td>recon-state-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for recon-state values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: From</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: To</td>
</tr>
<tr>
<td>copyback-state</td>
<td>string</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>copyback-state-numeric</td>
<td>uint32</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>
### Table 34  drives properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>virtual-disk-serial</td>
<td>string</td>
<td>If the disk is in a linear disk group, the vdisk name. Otherwise, blank.</td>
</tr>
<tr>
<td>disk-group</td>
<td>string</td>
<td>If the disk is in a linear or virtual disk group, the disk group name. Otherwise, blank.</td>
</tr>
<tr>
<td>storage-pool-name</td>
<td>string</td>
<td>If the disk is in a linear or virtual pool, the pool name. Otherwise, blank.</td>
</tr>
</tbody>
</table>
| storage-tier        | string      | • Archive: The disk is in the lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).  
+ N/A: Not applicable.  
+ Performance: The disk is in the highest storage tier, which uses SSDs (high speed).  
+ Read Cache: The disk is an SSD providing high-speed read cache for a storage pool.  
+ Standard: The disk is in the storage tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity). |
| storage-tier-numeric| uint32      | Numeric equivalents for storage-tier values.                                                                                          |
|                    |             | • 0: N/A  
• 1: Performance  
• 2: Standard  
• 4: Archive  
• 8: Read Cache |
| ssd-life-left       | string      | • 100%–0%: For an SSD, this value shows the percentage of disk life remaining. This value is polled every 5 minutes. When the value decreases to 20%, event 502 is logged with Informational severity. Event 502 is logged again with Warning severity when the value decreases to 5%, 2% or 1%, and 0%. If a disk crosses more than one percentage threshold during a polling period, only the lowest percentage will be reported.  
+ N/A: The disk is not an SSD. |
| ssd-life-left-numeric| uint32      | Numeric equivalents for ssd-life-left values.                                                                                          |
|                    |             | • 0–100  
• 255: N/A |
| led-status          | string      | Disk LED status.                                                                                                                        |
|                    |             | • Online: The disk is operating normally.  
• Rebuild: The disk's disk group is being reconstructed.  
• Fault: The disk has a fault.  
• Pred Fail: The disk has a predictive failure.  
• ID: The locator LED is illuminated to identify the disk.  
• Blank if the disk is not part of a disk group or is spun down. |
| led-status-numeric  | string      | Numeric equivalents for led-status values.                                                                                          |
|                    |             | • 1: Online  
• 2: Rebuild  
• 4: Fault  
• 8: Pred Fail  
• 16: ID |
Table 34  drives properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>disk-dsd-count</td>
<td>uint32</td>
<td>Number of times the DSD feature has spun down this disk.</td>
</tr>
<tr>
<td>spun-down</td>
<td>uint32</td>
<td>Shows whether the disk is spun down by the DSD feature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not spun down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Spun down.</td>
</tr>
<tr>
<td>number-of-ios</td>
<td>uint64</td>
<td>Total number of I/O operations (reads and writes).</td>
</tr>
<tr>
<td>total-data-transferred</td>
<td>uint64</td>
<td>The total number of bytes transferred.</td>
</tr>
<tr>
<td>total-data-transferred-numeric</td>
<td>uint64</td>
<td>Unformatted total-data-transferred value.</td>
</tr>
<tr>
<td>avg-rsp-time</td>
<td>uint64</td>
<td>Average I/O response time in microseconds.</td>
</tr>
<tr>
<td>fde-state</td>
<td>string</td>
<td>The FDE state of the disk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: The FDE state is unknown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not FDE Capable: The disk is not FDE-capable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Secured: The disk is not secured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secured, Unlocked: The system is secured and the disk is unlocked.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secured, Locked: The system is secured and the disk is locked to data access, preventing its use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FDE Protocol Failure: A temporary state that can occur while the system is securing the disk.</td>
</tr>
<tr>
<td>fde-state-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for fde-state values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not FDE Capable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Not Secured</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Secured, Unlocked</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Secure, Locked</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: FDE Protocol Failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Unknown</td>
</tr>
<tr>
<td>lock-key-id</td>
<td>string</td>
<td>Current lock ID, or 00000000 if not set.</td>
</tr>
<tr>
<td>import-lock-key-id</td>
<td>string</td>
<td>Import lock ID, or 00000000 if not set.</td>
</tr>
<tr>
<td>fde-config-time</td>
<td>string</td>
<td>If the system is secured, the time at which the current lock ID was set in the format year-month-day hour:minutes:seconds (UTC). Otherwise, N/A.</td>
</tr>
<tr>
<td>fde-config-time-numeric</td>
<td>uint32</td>
<td>Unformatted fde-config-time value.</td>
</tr>
<tr>
<td>temperature</td>
<td>string</td>
<td>Temperature of the disk.</td>
</tr>
<tr>
<td>temperature-numeric</td>
<td>uint32</td>
<td>Numeric equivalent for the temperature value.</td>
</tr>
<tr>
<td>temperature-status</td>
<td>string</td>
<td>• OK: The disk sensor is present and detects no error condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Warning: The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Critical: The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: The disk sensor is present but status is not available.</td>
</tr>
</tbody>
</table>
### Table 34  drives properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>temperature-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for temperature-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Critical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other: Unknown</td>
</tr>
<tr>
<td>pi-formatted</td>
<td>string</td>
<td>Not supported.</td>
</tr>
<tr>
<td>pi-formatted-numeric</td>
<td>uint32</td>
<td>Not supported.</td>
</tr>
<tr>
<td>power-on-hours</td>
<td>unit32</td>
<td>The total number of hours that the disk has been powered on since it was</td>
</tr>
<tr>
<td></td>
<td></td>
<td>manufactured. This value is stored in disk metadata and is updated in 30-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>minute increments.</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>Disk health.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>issue.</td>
</tr>
</tbody>
</table>
This basetype is used by `show email-parameters`.

### Table 35 email-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>email-notification</td>
<td>string</td>
<td>Shows whether email (SMTP) notification of events is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Disabled: Email notification is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enabled: Email notification is enabled.</td>
</tr>
<tr>
<td>email-notification-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>email-notification</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Enabled</td>
</tr>
<tr>
<td>email-notification-filter</td>
<td>string</td>
<td>The minimum severity for which the system should send notifications:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- crit: Sends notifications for Critical events only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- error: Sends notifications for Error and Critical events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- warn: Sends notifications for Warning, Error, and Critical events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- info: Sends notifications for all events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- none: Disables email notification. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This parameter does not apply to managed-logs notifications.</td>
</tr>
<tr>
<td>email-notification-filter-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>email-notification-filter</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 8: crit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: warn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: info</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: none</td>
</tr>
<tr>
<td>email-notify-address-1</td>
<td>string</td>
<td>Up to three email addresses for recipients of event notifications. Blank by default.</td>
</tr>
<tr>
<td>email-notify-address-2</td>
<td>string</td>
<td></td>
</tr>
<tr>
<td>email-notify-address-3</td>
<td>string</td>
<td></td>
</tr>
<tr>
<td>email-notify-address-4</td>
<td>string</td>
<td>Shows the email address for the log-collection system used by the log-management feature. Blank by default.</td>
</tr>
<tr>
<td>email-server</td>
<td>string</td>
<td>The IP address of the SMTP mail server to use for the email messages. Blank by default.</td>
</tr>
<tr>
<td>email-domain</td>
<td>string</td>
<td>The domain name that, with the sender name, forms the “from” address for remote notification. Blank by default.</td>
</tr>
<tr>
<td>email-sender</td>
<td>string</td>
<td>The sender name that, with the domain name, forms the “from” address for remote notification. Blank by default.</td>
</tr>
<tr>
<td>persistent-alerts</td>
<td>string</td>
<td>Shows whether weekly alerts about system health issues will be sent to configured email addresses until corrective action has been taken and the system health value has returned to OK. This option is enabled by default.</td>
</tr>
<tr>
<td>persistent-alerts-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>persistent-alerts</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Enabled</td>
</tr>
</tbody>
</table>
### Table 35  email-parameters properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>include-logs</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>include-logs-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for include-logs values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
</tbody>
</table>

This basetype is used by `show configuration` and `show frus`.

### Table 36 enclosure-fru properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>FRU name.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CHASSIS_MIDPLANE: Chassis and midplane circuit board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID_IOM: Controller module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• BOD_IOM: Expansion module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• POWER_SUPPLY: Power supply module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MEMORY CARD: CompactFlash card</td>
</tr>
<tr>
<td>description</td>
<td>string</td>
<td>FRU long description.</td>
</tr>
<tr>
<td>part-number</td>
<td>string</td>
<td>FRU part number.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>FRU serial number.</td>
</tr>
<tr>
<td>revision</td>
<td>string</td>
<td>FRU hardware revision level.</td>
</tr>
<tr>
<td>dash-level</td>
<td>string</td>
<td>FRU template revision number.</td>
</tr>
<tr>
<td>fru-shortname</td>
<td>string</td>
<td>FRU short description.</td>
</tr>
<tr>
<td>mfg-date</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day</code> <code>hour:minutes:seconds</code> (UTC),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when a PCBA was programmed or a power supply module was manufactured.</td>
</tr>
<tr>
<td>mfg-date-numeric</td>
<td>uint32</td>
<td>Unformatted <code>mfg-date</code> value.</td>
</tr>
<tr>
<td>mfg-location</td>
<td>string</td>
<td>City, state/province, and country where the FRU was manufactured.</td>
</tr>
<tr>
<td>mfg-vendor-id</td>
<td>string</td>
<td>JEDEC ID (global manufacturing code) of the FRU manufacturer.</td>
</tr>
<tr>
<td>fru-location</td>
<td>string</td>
<td>Location of the FRU in the enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MID-PLANE SLOT: Chassis midplane.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UPPER IOM SLOT: Controller module or expansion module A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LOWER IOM SLOT: Controller module or expansion module B.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UPPER PSU SLOT: Power supply module in the upper slot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LOWER PSU SLOT: Power supply module in the lower slot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LEFT PSU SLOT: Power supply module on the left, as viewed from the back.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RIGHT PSU SLOT: Power supply module on the right, as viewed from the back.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CONTROLLER A: Controller module A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CONTROLLER B: Controller module B.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UPPER IOM MEMORY CARD SLOT: Memory card slot in controller module A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LOWER IOM MEMORY CARD SLOT: Memory card slot in controller module B.</td>
</tr>
<tr>
<td>configuration-serialnumber</td>
<td>string</td>
<td>Configuration serial number.</td>
</tr>
<tr>
<td>fru-status</td>
<td>string</td>
<td>• Absent: The FRU is not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault: The FRU's health is Degraded or Fault.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Invalid Data: The FRU ID data is invalid. The FRU's EEPROM is improperly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>programmed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK: The FRU is operating normally.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Power OFF: The FRU is powered off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: The FRU is not present in a D2700 enclosure.</td>
</tr>
</tbody>
</table>
### Table 36  enclosure-fru properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>original-serialnumber</td>
<td>string</td>
<td>For a power supply module, the original manufacturer serial number. Otherwise, N/A.</td>
</tr>
<tr>
<td>original-partnumber</td>
<td>string</td>
<td>For a power supply module, the original manufacturer part number. Otherwise, N/A.</td>
</tr>
<tr>
<td>original-revision</td>
<td>string</td>
<td>For a power supply module, the original manufacturer hardware revision. Otherwise, N/A.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
</tbody>
</table>
enclosure-list

This basetype is used by show configuration, and by show disks when the encl parameter is specified.

Table 37  enclosure-list properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status</td>
<td>string</td>
<td>Disk slot status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up: The disk is present and is properly communicating with the expander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spun Down: The disk is present and has been spun down by the drive spin down feature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error: The disk is present but is not detected by the expander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: Initial status when the disk is first detected or powered on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present: The disk slot indicates that no disk is present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unrecoverable: The disk is present but has unrecoverable errors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unavailable: The disk is present but cannot communicate with the expander.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unsupported: The disk is present but is an unsupported type.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Unsupported</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Unrecoverable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Unavailable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20: Spun Down</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
<tr>
<td>slot</td>
<td>uint32</td>
<td>Disk slot number.</td>
</tr>
<tr>
<td>vendor</td>
<td>string</td>
<td>Disk vendor.</td>
</tr>
<tr>
<td>model</td>
<td>string</td>
<td>Disk model.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Disk serial number.</td>
</tr>
<tr>
<td>size</td>
<td>string</td>
<td>Disk capacity, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint32</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
</tbody>
</table>
This basetype is used by `show configuration` and `show enclosures`.

Table 38 enclosures properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Enclosure ID in the form <code>enclosure_number</code>.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint8</td>
<td>Enclosure ID.</td>
</tr>
<tr>
<td>enclosure-wwn</td>
<td>string</td>
<td>Enclosure WWN.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>Enclosure name.</td>
</tr>
<tr>
<td>type</td>
<td>string</td>
<td>Internal name for the enclosure type.</td>
</tr>
<tr>
<td>type-numeric</td>
<td>string</td>
<td>Numeric equivalents for type values.</td>
</tr>
<tr>
<td>iom-type</td>
<td>string</td>
<td>I/O module type.</td>
</tr>
<tr>
<td>iom-type-numeric</td>
<td>string</td>
<td>Numeric equivalents for iom-type values.</td>
</tr>
<tr>
<td>location</td>
<td>string</td>
<td>Enclosure location, or blank if not set.</td>
</tr>
<tr>
<td>rack-number</td>
<td>uint8</td>
<td>Number of the rack that contains the enclosure.</td>
</tr>
<tr>
<td>rack-position</td>
<td>uint8</td>
<td>Position of the enclosure in the rack.</td>
</tr>
<tr>
<td>number-of-coolings-elements</td>
<td>uint8</td>
<td>Number of fan units in the enclosure.</td>
</tr>
<tr>
<td>number-of-disks</td>
<td>uint8</td>
<td>Number of disk slots (not installed disks) in the enclosure.</td>
</tr>
<tr>
<td>number-of-power-supplies</td>
<td>uint8</td>
<td>Number of power supplies in the enclosure.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Disk slot status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unsupported</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unrecoverable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unavailable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spun Down</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Unsupported</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Unrecoverable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Unavailable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20: Spun Down</td>
</tr>
<tr>
<td>midplane-serial-number</td>
<td>string</td>
<td>Midplane serial number.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>vendor</td>
<td>string</td>
<td>Enclosure vendor.</td>
</tr>
<tr>
<td>model</td>
<td>string</td>
<td>Enclosure model.</td>
</tr>
<tr>
<td>fru-shortname</td>
<td>string</td>
<td>FRU short description.</td>
</tr>
<tr>
<td>fru-location</td>
<td>string</td>
<td>FRU location.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MID-PLANE SLOT: Chassis midplane.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td>part-number</td>
<td>string</td>
<td>FRU part number.</td>
</tr>
<tr>
<td>mfg-date</td>
<td>string</td>
<td>Date and time, in the format $\text{year-month-day \ hour:minutes:seconds}$ (UTC), when a PCBA was programmed or a power supply module was manufactured.</td>
</tr>
<tr>
<td>mfg-date-numeric</td>
<td>string</td>
<td>Unformatted mfg-date value.</td>
</tr>
<tr>
<td>mfg-location</td>
<td>string</td>
<td>City, state/province, and country where the FRU was manufactured.</td>
</tr>
<tr>
<td>description</td>
<td>string</td>
<td>FRU long description.</td>
</tr>
<tr>
<td>revision</td>
<td>string</td>
<td>Hardware revision level for the FRU.</td>
</tr>
<tr>
<td>dash-level</td>
<td>string</td>
<td>FRU template revision number.</td>
</tr>
<tr>
<td>emp-a-rev</td>
<td>string</td>
<td>Firmware revision of controller A's EMP.</td>
</tr>
<tr>
<td>emp-b-rev</td>
<td>string</td>
<td>Firmware revision of controller B's EMP.</td>
</tr>
<tr>
<td>rows</td>
<td>uint8</td>
<td>Number of rows of disk slots.</td>
</tr>
<tr>
<td>columns</td>
<td>uint8</td>
<td>Number of columns of disk slots.</td>
</tr>
<tr>
<td>slots</td>
<td>uint8</td>
<td>Number of disk slots in this enclosure.</td>
</tr>
<tr>
<td>locator-led</td>
<td>string</td>
<td>Shows the state of the locator LED on an enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On</td>
</tr>
<tr>
<td>locator-led-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for locator-led values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>drive-orientation</td>
<td>string</td>
<td>• vertical: Disks are oriented vertically.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• horizontal: Disks are oriented horizontally.</td>
</tr>
<tr>
<td>drive-orientation-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for drive-orientation values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: vertical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: horizontal</td>
</tr>
<tr>
<td>enclosure-arrangement</td>
<td>string</td>
<td>• vertical: Disks are numbered vertically (by column from top to bottom, proceeding rightward).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• horizontal: Disks are numbered horizontally (by row from left to right, proceeding downward).</td>
</tr>
<tr>
<td>enclosure-arrangement-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for enclosure-arrangement values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: vertical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: horizontal</td>
</tr>
<tr>
<td>emp-a-busid</td>
<td>string</td>
<td>SCSI channel ID of controller A's EMP.</td>
</tr>
<tr>
<td>emp-a-targetid</td>
<td>string</td>
<td>SCSI target ID of controller A's EMP.</td>
</tr>
<tr>
<td>emp-b-busid</td>
<td>string</td>
<td>SCSI channel ID of controller B's EMP.</td>
</tr>
</tbody>
</table>
### Table 38  enclosures properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>emp-b-targetid</td>
<td>string</td>
<td>SCSI target ID of controller B's EMP.</td>
</tr>
<tr>
<td>emp-a</td>
<td>string</td>
<td>Shows the field name EMP A in console format.</td>
</tr>
<tr>
<td>emp-a-ch-id-rev</td>
<td>string</td>
<td>SCSI address and firmware revision of controller A's EMP.</td>
</tr>
<tr>
<td>emp-b</td>
<td>string</td>
<td>Shows the field name EMP B in console format.</td>
</tr>
<tr>
<td>emp-b-ch-id-rev</td>
<td>string</td>
<td>SCSI address and firmware revision of controller B's EMP.</td>
</tr>
<tr>
<td>midplane-type</td>
<td>string</td>
<td>Enclosure midplane type.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2U24-6Gv2: Midplane for 2U, reduced-depth, 24-disk enclosure with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-Gbit/s maximum data rate to disks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2U24-6G: Midplane for 2U, 24-disk enclosure with 6-Gbit/s maximum data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rate to disks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2U12-6Gv2: Midplane for 2U, reduced-depth, 12-disk enclosure with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-Gbit/s maximum data rate to disks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2U12-6G: Midplane for 2U, 12-disk enclosure with 6-Gbit/s maximum data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rate to disks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- N/A: Other type of midplane</td>
</tr>
<tr>
<td>midplane-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for midplane-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: 2U12-3G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: 2U24-3G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: 2U12-6G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3: 2U24-6G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 5, 9, 13: 2U24-6Gv2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 6, 10: 2U12-6Gv2</td>
</tr>
<tr>
<td>midplane-rev</td>
<td>uint8</td>
<td>Midplane revision number.</td>
</tr>
<tr>
<td>enclosure-power</td>
<td>string</td>
<td>Enclosure power in watts.</td>
</tr>
<tr>
<td>pcie2-capable</td>
<td>string</td>
<td>• False: Enclosure is not capable of using PCI Express version 2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• True: Enclosure is capable of using PCI Express version 2.</td>
</tr>
<tr>
<td>pcie2-capable-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for pcie2-capable values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: False</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: True</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
</tbody>
</table>
Table 38  enclosures properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>unhealthy-component</td>
<td>Embedded; see unhealthy-component.</td>
<td></td>
</tr>
<tr>
<td>controllers</td>
<td>Embedded; see controllers, io-modules.</td>
<td></td>
</tr>
<tr>
<td>power-supplies</td>
<td>Embedded; see power-supplies.</td>
<td></td>
</tr>
<tr>
<td>fan-details</td>
<td>Embedded; see fan.</td>
<td></td>
</tr>
</tbody>
</table>
enclosure-sku

This basetype is used by show frus.

Table 39  enclosure-sku properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sku-partnumber</td>
<td>string</td>
<td>System part number.</td>
</tr>
<tr>
<td>sku_serialnumber</td>
<td>string</td>
<td>System serial number.</td>
</tr>
<tr>
<td>sku-revision</td>
<td>string</td>
<td>System revision level.</td>
</tr>
</tbody>
</table>
**events**

This basetype is used by *show events*.

---

### Table 40  events properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>time-stamp</td>
<td>string</td>
<td>Date and time, in the format <strong>year-month-day hour:minutes:seconds</strong> (UTC), when this event was detected.</td>
</tr>
<tr>
<td>time-stamp-numeric</td>
<td>uint32</td>
<td>Unformatted time-stamp value.</td>
</tr>
<tr>
<td>event-code</td>
<td>string</td>
<td>Event code. For event-code descriptions, see the Event Descriptions Reference Guide.</td>
</tr>
<tr>
<td>event-id</td>
<td>string</td>
<td>Event ID.</td>
</tr>
<tr>
<td>model</td>
<td>string</td>
<td>Controller model.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Controller serial number.</td>
</tr>
</tbody>
</table>
| controller       | string     | • A: Controller A.  
• B: Controller B.                                                                                                                           |
| controller-numeric | uint32   | Numeric equivalents for controller values.                                                                                                  |
| controller-numeric | uint32   | • 0: B  
• 1: A                                                                                                                                     |
| severity         | string     | 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.                                                                 |
| severity-numeric | uint32     | Numeric equivalents for severity values.                                                                                                     |
| severity-numeric | uint32     | • 0: INFORMATIONAL  
• 1: WARNING  
• 2: ERROR  
• 3: CRITICAL  
• 4: RESOLVED                                                                                                                                          |
| message          | string     | Brief description of the event that occurred. For some events, the message includes data about affected components.                             |
| 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>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>event-id</td>
<td>string</td>
<td>Event ID prefaced by A or B to identify the controller that logged the event.</td>
</tr>
<tr>
<td>time-stamp</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC), when this event was detected.</td>
</tr>
<tr>
<td>time-stamp-numeric</td>
<td>string</td>
<td>Unformatted time-stamp value.</td>
</tr>
<tr>
<td>event-code</td>
<td>string</td>
<td>Event code identifying the type of event to help diagnose problems.</td>
</tr>
<tr>
<td>severity</td>
<td>string</td>
<td>Event severity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem immediately.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RESOLVED: A condition that caused an event to be logged has been resolved.</td>
</tr>
<tr>
<td>severity-numeric</td>
<td>string</td>
<td>Numeric equivalents for severity values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: INFORMATIONAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: WARNING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: ERROR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: CRITICAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: RESOLVED</td>
</tr>
<tr>
<td>message</td>
<td>string</td>
<td>Message giving details about the event.</td>
</tr>
</tbody>
</table>
This basetype is used by `show sas-link-health`.

### Table 42 expander-ports properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Expander port ID.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
</tbody>
</table>
| controller         | string | • A: Controller A.  
                     • B: Controller B.                                                       |
| controller-numeric | uint32 | Numeric equivalents for controller values.  
                     • 0: B  
                     • 1: A |
| sas-port-type      | string | • Expansion Port Egress  
                     • Expansion Port Ingress                                                 |
| sas-port-type-numeric | uint32 | Numeric equivalents for sas-port-type values.  
                     • 3: Expansion Port Egress  
                     • 4: Expansion Port Ingress |
| sas-port-index     | uint32 | The expander port index. For an IOM with two expansion ports, this value differentiates the two egress ports (1–2) and two ingress ports (1–2) for each path A and B. This value is appended to the port's durable-id value. |
| name               | string | • Out Port: Egress (expansion) port on controller module or an expansion module. Can be connected to an ingress port in an expansion module.  
                     • In Port: Ingress port on an expansion module. Can be connected to an egress (expansion) port in a controller module or an expansion module. |
| name-numeric       | uint32 | • 2: In Port  
                     • 3: Out Port |
| status             | string | Expander port 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. |
| status-numeric     | uint32 | Numeric equivalents for status values.  
                     • 0: Up  
                     • 1: Warning  
                     • 2: Error  
                     • 3: Not Present  
                     • 4: Unknown  
                     • 6: Disconnected |
### Table 42  expander-ports properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| health              | string    | • OK
|                     |           | • Degraded                                           |
|                     |           | • Fault                                               |
|                     |           | • N/A                                                 |
|                     |           | • Unknown                                             |
| health-numeric      | uint32    | Numeric equivalents for health values.               |
|                     |           | • 0: OK                                               |
|                     |           | • 1: Degraded                                         |
|                     |           | • 2: Fault                                            |
|                     |           | • 3: Unknown                                          |
|                     |           | • 4: N/A                                              |
| health-reason       | string    | If Health is not OK, the reason for the health state. |
| health-recommendation| string   | If Health is not OK, the recommended actions to take to resolve the health issue. |
This basetype is used by `show fans` and `show power-supplies`.

**Table 43  Fan properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Fan unit ID in the form <code>fan_enclosure-ID.fan-number</code>.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>Fan unit name in the form <code>Fan loc:position-PSU power-supply-ID</code> for a controller enclosure or MSA 1040/2040 drive enclosure, or <code>Fan fan-unit-ID</code> for a D2700 enclosure. The position is as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td>location</td>
<td>string</td>
<td>Fan location in the form <code>Enclosure enclosure-ID - position</code>. The position is as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td>status-ses</td>
<td>string</td>
<td>Fan status.</td>
</tr>
<tr>
<td>status-ses-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>status-ses</code> values.</td>
</tr>
<tr>
<td>extended-status</td>
<td>uint32</td>
<td>A numeric value that provides additional information to supplement the standard SES status shown by the <code>status</code> and <code>status-numeric</code> properties. The <code>extended-status</code> value is a bitwise value computed from the values of five status bits, and may be one of the following values or a combination of these values.</td>
</tr>
</tbody>
</table>

- 1: The fan has reported a failure.
- 2: The fan is off.
- 4: The fan FRU is not installed.
- 8: The fan status cannot be determined.
- 16: The fan is requested to be on (not off). This is the default status and represents normal operation.
- 17: Fan has failed.
- 18: Fan is off.
- 19: Fan has failed and is off.
- 24: Fan status is unknown, which could represent an I2C communication issue.
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status</td>
<td>string</td>
<td>Fan unit status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Missing</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Missing</td>
</tr>
<tr>
<td>speed</td>
<td>uint32</td>
<td>Fan speed (revolutions per minute).</td>
</tr>
<tr>
<td>position</td>
<td>string</td>
<td>Fan position, as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Left</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Right</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bottom</td>
</tr>
<tr>
<td>position-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for position values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Left</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Right</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Bottom</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Serial number of a fan in a D2700 enclosure.</td>
</tr>
<tr>
<td>part-number</td>
<td>string</td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Part number of a fan in a D2700 enclosure.</td>
</tr>
<tr>
<td>fw-revision</td>
<td>string</td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Firmware revision of a fan FRU.</td>
</tr>
<tr>
<td>hw-revision</td>
<td>string</td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hardware revision of a fan in a D2700 enclosure.</td>
</tr>
<tr>
<td>locator-led</td>
<td>string</td>
<td>Shows the state of the locator LED on a fan unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On</td>
</tr>
<tr>
<td>locator-led-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for the locator-led property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
</tbody>
</table>
Table 43  fan properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Unknown</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
</tbody>
</table>
fc-port

This basetype is used by show ports for a Fibre Channel port.

Table 44 fc-port properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>configured-topology</td>
<td>string</td>
<td>Configured topology.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Loop: Fibre Channel arbitrated loop (public or private).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PTP: Fibre Channel point-to-point. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Auto: Loop preferred, otherwise point-to-point, based on the detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>connection type.</td>
</tr>
<tr>
<td>primary-loop-id</td>
<td>string</td>
<td>If the port is using loop topology and the port status is Up, this field</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shows the primary loop ID. If the port is not using loop topology or the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>port status is not Up, this field shows N/A.</td>
</tr>
<tr>
<td>sfp-status</td>
<td>string</td>
<td>SFP status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not present: No SFP is inserted in this port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not compatible: The SFP in this port is not qualified for use in this</td>
</tr>
<tr>
<td></td>
<td></td>
<td>system. When this condition is detected, event 464 is logged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incorrect protocol: The SFP protocol does not match the port protocol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When this condition is detected, event 464 is logged.</td>
</tr>
<tr>
<td>sfp-present</td>
<td>string</td>
<td>Shows whether the port contains an SFP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Present</td>
</tr>
<tr>
<td>sfp-present-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for sfp-present values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Present</td>
</tr>
<tr>
<td>sfp-vendor</td>
<td>string</td>
<td>The SFP vendor.</td>
</tr>
<tr>
<td>sfp-part-number</td>
<td>string</td>
<td>The SFP part number.</td>
</tr>
<tr>
<td>sfp-revision</td>
<td>string</td>
<td>The SFP revision.</td>
</tr>
<tr>
<td>sfp-supported-speeds</td>
<td>string</td>
<td>The link speeds that the SFP supports.</td>
</tr>
</tbody>
</table>
fde-state (MSA 2040 only)

This basetype is used by show fde-state (MSA 2040 only).

Table 45  fde-state properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fde-security-status</td>
<td>string</td>
<td>Shows whether the system is secured or unsecured:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unsecured: The system has not been secured with a passphrase.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secured: The system has been secured with a passphrase.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secured, Lock Ready: The system has been secured and lock keys are clear.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The system will become locked after the next power cycle.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secured, Locked: The system is secured and the disks are locked to data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>access, preventing their use.</td>
</tr>
<tr>
<td>fde-security-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for fde-security-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Unsecured</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Secured</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Secured, Lock Ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Secured, Locked</td>
</tr>
<tr>
<td>lock-key-id</td>
<td>string</td>
<td>Current lock ID.</td>
</tr>
<tr>
<td>import-lock-key-id</td>
<td>string</td>
<td>The previous or import lock ID.</td>
</tr>
<tr>
<td>fde-config-time</td>
<td>string</td>
<td>If the system is secured, the time at which the current lock ID was set in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the format year-month-day hour:minutes:seconds (UTC).</td>
</tr>
<tr>
<td>fde-config-time-numeric</td>
<td>uint32</td>
<td>Unformatted fde-config-time value.</td>
</tr>
</tbody>
</table>
This basetype is used by `show host-groups`.

### Table 46  host properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Host ID.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>The name of the host.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the host.</td>
</tr>
<tr>
<td>member-count</td>
<td>uint32</td>
<td>The number of initiators in the host.</td>
</tr>
<tr>
<td>host-group</td>
<td>string</td>
<td>If the host is a member of a host group, the serial number of the host group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Otherwise, <code>UNGROUPEDHOSTS</code>.</td>
</tr>
<tr>
<td>group-key</td>
<td>string</td>
<td>If the host is a member of a host group, the durable ID of the host group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Otherwise, <code>HGU</code>.</td>
</tr>
<tr>
<td>initiator</td>
<td>Embedded; see initiator</td>
<td></td>
</tr>
</tbody>
</table>
host-group

This basetype is used by show host-groups.

Table 47  host-group properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Host group ID.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>The name of the host group.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the host group.</td>
</tr>
<tr>
<td>member-count</td>
<td>uint32</td>
<td>The number of hosts in the host group.</td>
</tr>
<tr>
<td>host</td>
<td>Embedded; see host.</td>
<td></td>
</tr>
</tbody>
</table>
host-group-view

This basetype is used by show maps when the initiator parameter is specified.

Table 48 host-group-view properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Host group ID.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the host group.</td>
</tr>
<tr>
<td>group-name</td>
<td>string</td>
<td>The name of the host group in the format host-group.<em>.</em>, where the first * represents all hosts in the group and the second * represents all initiators in those hosts.</td>
</tr>
<tr>
<td>host-view-mappings</td>
<td>Embedded; see host-view-mappings.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show host-port-statistics`.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Host port ID in the form <code>hostport_controller-ID-and-port-number</code>.</td>
</tr>
<tr>
<td>bytes-per-second</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second-numeric</td>
<td>uint64</td>
<td>Unformatted bytes-per-second value.</td>
</tr>
<tr>
<td>iops</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint32</td>
<td>Number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint32</td>
<td>Number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>queue-depth</td>
<td>uint32</td>
<td>The number of pending I/O operations currently being serviced.</td>
</tr>
<tr>
<td>avg-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>avg-read-rsp-time</td>
<td>uint32</td>
<td>Average response time, in microseconds, for all read operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>avg-write-rsp-time</td>
<td>uint32</td>
<td>Average response time, in microseconds, for all write operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>reset-time</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>reset-time-numeric</td>
<td>uint32</td>
<td>Unformatted reset-time value.</td>
</tr>
<tr>
<td>start-sample-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code>, when sampling started for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>start-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted start-sample-time value.</td>
</tr>
<tr>
<td>stop-sample-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code>, when sampling stopped for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>stop-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted stop-sample-time value.</td>
</tr>
</tbody>
</table>
This basetype is used by show hosts (Deprecated).

### Table 50  hosts properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host-id</td>
<td>string</td>
<td>FC or SAS host port WWN, or iSCSI host initiator node name (typically the IQN).</td>
</tr>
<tr>
<td>host-name</td>
<td>string</td>
<td>User-defined name of the host port, or blank.</td>
</tr>
<tr>
<td>host-discovered</td>
<td>string</td>
<td>• Yes: The host was discovered and its entry was automatically created.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: The host entry was manually created.</td>
</tr>
<tr>
<td>host-mapped</td>
<td>string</td>
<td>• Yes: At least one volume is explicitly mapped to the host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: No volumes are explicitly mapped to the host.</td>
</tr>
<tr>
<td>host-profile</td>
<td>string</td>
<td>• Standard: Default profile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HP-UX: The host uses Flat Space Addressing.</td>
</tr>
<tr>
<td>host-profile-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of host-profile values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HP-UX</td>
</tr>
<tr>
<td>host-bus-type</td>
<td>string</td>
<td>• If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If the host entry was manually created: Undefined.</td>
</tr>
<tr>
<td>host-bus-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of host-bus-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: UNKNOWN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: FC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: iSCSI</td>
</tr>
<tr>
<td>host-port-bits-a</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>host-port-bits-b</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
</tbody>
</table>
This basetype is used by `show host-maps (Deprecated)`.

### Table 51 host-view properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>string</td>
<td>FC or SAS host port WWN, or iSCSI host initiator node name (typically the IQN).</td>
</tr>
<tr>
<td>hba-nickname</td>
<td>string</td>
<td>User-defined name of the host port, or blank.</td>
</tr>
<tr>
<td>host-profile</td>
<td>string</td>
<td>• Standard: Default profile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HP-UX: The host uses Flat Space Addressing.</td>
</tr>
<tr>
<td>host-profile-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of host-profile values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HP-UX</td>
</tr>
<tr>
<td>host-view-mapping</td>
<td>Embedded</td>
<td>see <code>host-view-mappings</code>.</td>
</tr>
</tbody>
</table>
host-view-mappings

This basetype is used by show maps when the initiator parameter is specified.

Table 52  host-view-mappings properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume-name</td>
<td>string</td>
<td>Volume name.</td>
</tr>
<tr>
<td>volume-serial</td>
<td>string</td>
<td>Volume serial number.</td>
</tr>
<tr>
<td>lun</td>
<td>string</td>
<td>LUN assigned to the mapping.</td>
</tr>
<tr>
<td>access</td>
<td>string</td>
<td>Type of host access to the volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• read-write: Read and write.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• read-only: Read only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no-access: No access (masked).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• not-mapped: Not mapped.</td>
</tr>
<tr>
<td>access-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of access values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: not-mapped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: no-access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: read-only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: read-write</td>
</tr>
<tr>
<td>ports</td>
<td>string</td>
<td>Controller host ports assigned to the mapping.</td>
</tr>
</tbody>
</table>
This basetype is used by show initiators.

### Table 53  Initiator properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Initiator ID.</td>
</tr>
<tr>
<td>nickname</td>
<td>string</td>
<td>The nickname of the initiator, or blank.</td>
</tr>
<tr>
<td>discovered</td>
<td>string</td>
<td>• Yes: The initiator was discovered and its entry was automatically created.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: The initiator was manually created.</td>
</tr>
<tr>
<td>mapped</td>
<td>string</td>
<td>• Yes: At least one volume is explicitly mapped to the initiator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No: No volumes are explicitly mapped to the initiator.</td>
</tr>
<tr>
<td>profile</td>
<td>string</td>
<td>• Standard: Default profile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HP-UX: The host uses Flat Space Addressing.</td>
</tr>
<tr>
<td>profile-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of profile values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HP-UX</td>
</tr>
<tr>
<td>host-bus-type</td>
<td>string</td>
<td>• If the host was discovered and its entry was automatically created, its host interface type: FC; iSCSI; SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If the host entry was manually created: Undefined.</td>
</tr>
<tr>
<td>host-bus-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of host-bus-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: UNKNOWN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: FC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: iSCSI</td>
</tr>
<tr>
<td>id</td>
<td>string</td>
<td>• For an FC initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a SAS initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For an iSCSI initiator, its node name (typically the IQN).</td>
</tr>
<tr>
<td>host-id</td>
<td>string</td>
<td>If the initiator is a member of a host, the serial number of the host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Otherwise, NOHOST.</td>
</tr>
<tr>
<td>host-key</td>
<td>string</td>
<td>If the initiator is a member of a host, the durable ID of the host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Otherwise, HU.</td>
</tr>
<tr>
<td>host-port-bits-a</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>host-port-bits-b</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
</tbody>
</table>
initiator-view

This basetype is used by `show maps` when the `initiator` parameter is specified.

Table 54  initiator-view properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>string</td>
<td>• For an FC initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a SAS initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For an iSCSI initiator, its node name (typically the IQN).</td>
</tr>
<tr>
<td>hba-nickname</td>
<td>string</td>
<td>The nickname of the initiator.</td>
</tr>
<tr>
<td>host-profile</td>
<td>string</td>
<td>• Standard: Default profile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HP-UX: The host uses Flat Space Addressing.</td>
</tr>
<tr>
<td>host-profile-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of host-profile values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HP-UX</td>
</tr>
<tr>
<td>host-view-mappings</td>
<td>Embedded; see host-view-mappings.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show inquiry`.

### Table 55  inquiry properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mc-fw</td>
<td>string</td>
<td>Management Controller firmware version.</td>
</tr>
<tr>
<td>mc-loader</td>
<td>string</td>
<td>Management Controller loader firmware version.</td>
</tr>
<tr>
<td>sc-fw</td>
<td>string</td>
<td>Storage Controller firmware version.</td>
</tr>
<tr>
<td>sc-loader</td>
<td>string</td>
<td>Storage Controller loader firmware version.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Controller serial number.</td>
</tr>
<tr>
<td>mac-address</td>
<td>string</td>
<td>Controller network port MAC address.</td>
</tr>
<tr>
<td>ip-address</td>
<td>string</td>
<td>Controller network port IP address.</td>
</tr>
<tr>
<td>nvram-defaults</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
</tbody>
</table>
io-modules

This basetype is used by `show enclosures` for an expansion module.

**Table 56  io-modules properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Expansion module ID.</td>
</tr>
<tr>
<td>controller-id</td>
<td>string</td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>controller-id-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller-id values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>FRU name.</td>
</tr>
<tr>
<td>description</td>
<td>string</td>
<td>FRU long description.</td>
</tr>
<tr>
<td>part-number</td>
<td>string</td>
<td>FRU part number.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>FRU serial number.</td>
</tr>
<tr>
<td>revision</td>
<td>string</td>
<td>FRU hardware revision level.</td>
</tr>
<tr>
<td>dash-level</td>
<td>string</td>
<td>FRU template revision number.</td>
</tr>
<tr>
<td>fru-shorthname</td>
<td>string</td>
<td>FRU short description.</td>
</tr>
<tr>
<td>mfg-date</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when the controller's PCBA was programmed or a power supply module was</td>
</tr>
<tr>
<td></td>
<td></td>
<td>manufactured.</td>
</tr>
<tr>
<td>mfg-date-numeric</td>
<td>uint32</td>
<td>Unformatted mfg-date value.</td>
</tr>
<tr>
<td>mfg-location</td>
<td>string</td>
<td>City, state/province, and country where the FRU was manufactured.</td>
</tr>
<tr>
<td>mfg-vendor-id</td>
<td>string</td>
<td>JEDEC ID of the FRU manufacturer.</td>
</tr>
<tr>
<td>position</td>
<td>string</td>
<td>FRU position, as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Left</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Right</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bottom</td>
</tr>
<tr>
<td>position-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for position values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Left</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Right</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Bottom</td>
</tr>
<tr>
<td>configuration-serialnumber</td>
<td>string</td>
<td>Configuration serial number.</td>
</tr>
<tr>
<td>phy-isolation</td>
<td>string</td>
<td>Shows whether the automatic disabling of SAS expander PHYs having high error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>counts is enabled or disabled for this controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: PHY fault isolation is enabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: PHY fault isolation is disabled.</td>
</tr>
</tbody>
</table>
Table 56  io-modules properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>phy-isolation-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for phy-isolation values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Disabled</td>
</tr>
<tr>
<td>locator-led</td>
<td>string</td>
<td>Shows the state of the locator LED on an expansion module.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On</td>
</tr>
<tr>
<td>locator-led-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for the locator-led property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>• Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Not installed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended action to take to resolve the health issue.</td>
</tr>
<tr>
<td>unhealthy-component</td>
<td>Embedded; see unhealthy-component.</td>
<td></td>
</tr>
<tr>
<td>enclosure-id</td>
<td>Embedded; see expander-ports.</td>
<td></td>
</tr>
</tbody>
</table>
iscsi-parameters

This basetype is shown by `show iscsi-parameters`.

**Table 57  iscsi-parameters properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>chap</td>
<td>string</td>
<td>Shows whether Challenge-Handshake Authentication Protocol (CHAP) is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enabled: CHAP is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Disabled: CHAP is disabled. This is the default.</td>
</tr>
<tr>
<td>chap-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>chap</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Enabled</td>
</tr>
<tr>
<td>jumbo-frames</td>
<td>string</td>
<td>Shows whether support for jumbo frames is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enabled: Jumbo-frame support is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Disabled: Jumbo-frame support is disabled. This is the default.</td>
</tr>
<tr>
<td>jumbo-frames-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>jumbo-frames</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Enabled</td>
</tr>
<tr>
<td>isns</td>
<td>string</td>
<td>Shows whether support for Internet Storage Name Service (iSNS) is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enabled: iSNS is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Disabled: iSNS is disabled. This is the default.</td>
</tr>
<tr>
<td>isns-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>isns</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Enabled</td>
</tr>
<tr>
<td>isns-ip</td>
<td>string</td>
<td>Address of the iSNS server. The default address is all zeroes.</td>
</tr>
<tr>
<td>isns-alt-ip</td>
<td>string</td>
<td>Address of the alternate iSNS server. The default address is all zeroes.</td>
</tr>
<tr>
<td>iscsi-speed</td>
<td>string</td>
<td>iSCSI host port link speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- auto: The proper speed is auto-negotiated. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td>iscsi-speed-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>iscsi-speed</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: 1Gbps</td>
</tr>
<tr>
<td>iscsi-ip-version</td>
<td>uint8</td>
<td>iSCSI IP version.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: iSCSI host port addresses use IPv4 format. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 6: iSCSI host port addresses use IPv6 format.</td>
</tr>
</tbody>
</table>
This basetype is used by show ports for an iSCSI host port.

**Table 58  iscsi-port properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ip-version</td>
<td>string</td>
<td>iSCSI IP version.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IPv4: iSCSI host port addresses use IPv4 format. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IPv6: iSCSI host port addresses use IPv6 format.</td>
</tr>
<tr>
<td>ip-address</td>
<td>string</td>
<td>Assigned port IP address.</td>
</tr>
<tr>
<td>gateway</td>
<td>string</td>
<td>For IPv4, gateway IP address for assigned IP address.</td>
</tr>
<tr>
<td>netmask</td>
<td>string</td>
<td>For IPv4, subnet mask for assigned IP address.</td>
</tr>
<tr>
<td>default-router</td>
<td>string</td>
<td>For IPv6, default router for the assigned IP address.</td>
</tr>
<tr>
<td>link-local-address</td>
<td>string</td>
<td>For IPv6, the link-local address that is automatically generated from the MAC address and assigned to the port.</td>
</tr>
<tr>
<td>mac-address</td>
<td>string</td>
<td>Unique Media Access Control (MAC) hardware address, also called the physical address.</td>
</tr>
<tr>
<td>sfp-status</td>
<td>string</td>
<td>SFP status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not present: No SFP is inserted in this port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not compatible: The SFP in this port is not qualified for use in this system. When this condition is detected, event 464 is logged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incorrect protocol: The SFP protocol does not match the port protocol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When this condition is detected, event 464 is logged.</td>
</tr>
<tr>
<td>sfp-present</td>
<td>string</td>
<td>Shows whether the port contains an SFP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Present</td>
</tr>
<tr>
<td>sfp-present-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for sfp-present values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Present</td>
</tr>
<tr>
<td>sfp-vendor</td>
<td>string</td>
<td>The SFP vendor.</td>
</tr>
<tr>
<td>sfp-part-number</td>
<td>string</td>
<td>The SFP part number.</td>
</tr>
<tr>
<td>sfp-revision</td>
<td>string</td>
<td>The SFP revision.</td>
</tr>
<tr>
<td>sfp-10G-compliance</td>
<td>string</td>
<td>The SFP’s 10G compliance code, if supported, or No Support.</td>
</tr>
<tr>
<td>sfp-ethernet-compliance</td>
<td>string</td>
<td>The SFP’s Ethernet compliance code, if supported, or No Support.</td>
</tr>
<tr>
<td>sfp-cable-technology</td>
<td>string</td>
<td>Shows whether the SFP supports active or passive cable technology.</td>
</tr>
<tr>
<td>sfp-cable-length</td>
<td>uint8</td>
<td>The link length (in meters) that is supported by the SFP while operating in compliance with applicable standards for the cable type.</td>
</tr>
</tbody>
</table>
This basetype is used by show license.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>license-key</td>
<td>string</td>
<td>• key: License is installed and valid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• not installed: License is invalid or is not installed.</td>
</tr>
<tr>
<td>license-serial-number</td>
<td>string</td>
<td>The serial number to use when requesting a license.</td>
</tr>
<tr>
<td>platform-max-snapshots</td>
<td>uint32</td>
<td>Maximum number of snapshots that the highest-level license allows.</td>
</tr>
<tr>
<td>base-max-snapshots</td>
<td>uint32</td>
<td>Maximum number of snapshots allowed without an installed license.</td>
</tr>
<tr>
<td>max-snapshots</td>
<td>uint32</td>
<td>Maximum number of snapshots allowed by the installed license.</td>
</tr>
<tr>
<td>in-use-snapshots</td>
<td>uint32</td>
<td>Number of existing licensed snapshots.</td>
</tr>
<tr>
<td>max-snapshots-expiry</td>
<td>string</td>
<td>Shows when the snapshot license will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: License is purchased and doesn't expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• days: Number of days remaining for a temporary license.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expired: Temporary license has expired and cannot be renewed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expired/Renewable: Temporary license has expired and can be renewed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: No license installed.</td>
</tr>
<tr>
<td>max-snapshots-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for max-snapshots-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 254: Expired/Renewable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 255: Expired</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• days: Number of days remaining</td>
</tr>
<tr>
<td>virtualization</td>
<td>string</td>
<td>Shows whether the capability to create and manage virtual pools is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The capability is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The capability is enabled.</td>
</tr>
<tr>
<td>virtualization-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for virtualization values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>virtualization-expiry</td>
<td>string</td>
<td>Shows when the virtualization license will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: License is purchased and doesn't expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: No license installed.</td>
</tr>
<tr>
<td>virtualization-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for virtualization-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>performance-tier</td>
<td>string</td>
<td>Shows whether the capability to create a Performance tier comprised of SSDs is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The capability is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The capability is enabled.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>performance-tier-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for performance-tier values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>performance-tier-expiry</td>
<td>string</td>
<td>Shows when the performance tier license will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: License is purchased and doesn't expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: No license installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>volume-copy</td>
<td>string</td>
<td>Shows whether the capability to copy volumes is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The capability is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The capability is enabled.</td>
</tr>
<tr>
<td>volume-copy-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for volume-copy values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>volume-copy-expiry</td>
<td>string</td>
<td>Shows when the volume copy license will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: Always enabled and doesn't expire.</td>
</tr>
<tr>
<td>volume-copy-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for volume-copy-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>remote-snapshot-replication</td>
<td>string</td>
<td>Shows whether the capability to replicate volumes to a remote system is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The capability is disabled.</td>
</tr>
<tr>
<td>remote-snapshot-replication-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for remote-snapshot-replication values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>remote-snapshot-replication-expiry</td>
<td>string</td>
<td>Shows when the volume replication feature will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: License is purchased and doesn't expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• days: Number of days remaining for a temporary license.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expired: Temporary license has expired and cannot be renewed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expired/Renewable: Temporary license has expired and can be renewed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: No license installed.</td>
</tr>
<tr>
<td>remote-snapshot-replication-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for remote-snapshot-replication values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>vds</td>
<td>string</td>
<td>Shows whether the VDS (Virtual Disk Service) Hardware Provider is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: VDS is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: VDS is enabled.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>vds-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for vds values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>vds-expiry</td>
<td>string</td>
<td>Shows when the VDS (Virtual Disk Service) Hardware Provider will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: Always enabled and doesn't expire.</td>
</tr>
<tr>
<td>vds-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for vds-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>vss</td>
<td>string</td>
<td>Shows whether the VSS (Volume Shadow Copy Service) Hardware Provider is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: VSS is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: VSS is enabled.</td>
</tr>
<tr>
<td>vss-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for vss values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>vss-expiry</td>
<td>string</td>
<td>Shows when the VSS (Volume Shadow Copy Service) Hardware Provider will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: Always enabled and doesn't expire.</td>
</tr>
<tr>
<td>vss-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for vss-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>dsd</td>
<td>string</td>
<td>Shows whether the Drive Spin Down (DSD) feature is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: DSD is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: DSD is enabled.</td>
</tr>
<tr>
<td>dsd-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for dsd values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>dsd-expiry</td>
<td>string</td>
<td>Shows when the Drive Spin Down (DSD) feature will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: Always enabled and doesn't expire.</td>
</tr>
<tr>
<td>dsd-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for dsd-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
<tr>
<td>sra</td>
<td>string</td>
<td>Shows whether Storage Replication Adapter (SRA) support is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: SRA is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: SRA is enabled.</td>
</tr>
<tr>
<td>sra-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for sra values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>sra-expiry</td>
<td>string</td>
<td>Shows when the SRA feature will expire.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Never: Always enabled and doesn't expire.</td>
</tr>
<tr>
<td>sra-expiry-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for sra-expiry values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Never</td>
</tr>
</tbody>
</table>
local-ports

This basetype is used by show peer-connections.

Table 60  local-ports properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-host-port</td>
<td>string</td>
<td>The ID of the port in the local system.</td>
</tr>
<tr>
<td>port-address</td>
<td>string</td>
<td>The assigned port IP address.</td>
</tr>
</tbody>
</table>
local-ports-detail

This basetype is used by show peer-connections when the verify-links parameter is specified.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-host-port</td>
<td>string</td>
<td>The ID of the port in the local system.</td>
</tr>
<tr>
<td>port-address</td>
<td>string</td>
<td>The assigned port IP address.</td>
</tr>
<tr>
<td>remote-links</td>
<td>string</td>
<td>The IDs of linked ports in the remote system.</td>
</tr>
</tbody>
</table>
**log-header-table**

This basetype is used in the log file downloaded from the system by using the SMU or FTP.

**Table 62  log-header-table properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>log-contact</td>
<td>string</td>
<td>Contact person's name, if specified in the SMU Save Logs panel.</td>
</tr>
<tr>
<td>log-email</td>
<td>string</td>
<td>Contact's email address, if specified in the SMU Save Logs panel.</td>
</tr>
<tr>
<td>log-phone</td>
<td>string</td>
<td>Contact's phone number, if specified in the SMU Save Logs panel.</td>
</tr>
<tr>
<td>log-comments</td>
<td>string</td>
<td>Comments describing the problem and specifying the date and time when the problem occurred, if specified in the SMU Save Logs panel.</td>
</tr>
<tr>
<td>log-content</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>log-timestamp</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>, when log content was saved to the file.</td>
</tr>
<tr>
<td>log-timestamp-numeric</td>
<td>uint32</td>
<td>Unformatted log-timestamp value.</td>
</tr>
</tbody>
</table>
**master-volumes**

This basetype is shown by `show master-volumes`.

**Table 63 master-volumes properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>virtual-disk-name</td>
<td>string</td>
<td>Vdisk name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Master volume serial number.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>Master volume name.</td>
</tr>
<tr>
<td>size</td>
<td>string</td>
<td>Master volume size, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint32</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Master volume status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Available: The master volume is available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unavailable: The master volume is not available.</td>
</tr>
<tr>
<td>status-reason</td>
<td>string</td>
<td>More information about the status value.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MV Not Accessible: Master volume is not accessible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MV Not Found: Master volume is not found.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RV: Replication volume (either a primary volume or a secondary volume).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RV Prepared: Replication-prepared volume, which could become a secondary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>volume in a replication set.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SP Not Accessible: Snap pool is not accessible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SP Not Found: Snap pool is not found.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ---: The master volume is available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown Reason</td>
</tr>
<tr>
<td>snap-pool-name</td>
<td>string</td>
<td>Snap-pool name.</td>
</tr>
<tr>
<td>snapshots</td>
<td>string</td>
<td>Number of snapshots that exist for the master volume.</td>
</tr>
<tr>
<td>snap-data</td>
<td>string</td>
<td>Amount of snap-pool space occupied by this master volume for its associated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>snapshots (preserved and write data).</td>
</tr>
<tr>
<td>rollback</td>
<td>string</td>
<td>• value: Percent complete if a rollback is in progress.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ---: No rollback is in progress.</td>
</tr>
</tbody>
</table>
This basetype is used by show network-parameters.

### Table 64 network-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Controller network port ID in the form mgmtport_controller-ID</td>
</tr>
<tr>
<td>active-version</td>
<td>uint32</td>
<td>The configured network port IP version.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: IPv4</td>
</tr>
<tr>
<td>ip-address</td>
<td>string</td>
<td>Controller network port IP address.</td>
</tr>
<tr>
<td>gateway</td>
<td>string</td>
<td>Controller network port gateway IP address</td>
</tr>
<tr>
<td>subnet-mask</td>
<td>string</td>
<td>Controller network port IP subnet mask</td>
</tr>
<tr>
<td>mac-address</td>
<td>string</td>
<td>Controller network port MAC address.</td>
</tr>
<tr>
<td>addressing-mode</td>
<td>string</td>
<td>• Manual: Network settings are set manually (statically).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DHCP: DHCP is used to set network parameters.</td>
</tr>
<tr>
<td>addressing-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for addressing-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Manual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: DHCP</td>
</tr>
<tr>
<td>link-speed</td>
<td>string</td>
<td>• Unknown: For a system operating in Single Controller mode, this controller module is not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10mbps: The network port link speed is set to 10 Mb/s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 100mbps: The network port link speed is set to 100 Mb/s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1000mbps: The network port link speed is set to 1000 Mb/s.</td>
</tr>
<tr>
<td>link-speed-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for link-speed values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: 10mbps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: 100mbps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: 1000mbps</td>
</tr>
<tr>
<td>duplex-mode</td>
<td>string</td>
<td>• Undefined: For a system operating in Single Controller mode, this controller module is not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Half: The network port duplex mode is set to half duplex.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Full: The network port duplex mode is set to full duplex.</td>
</tr>
<tr>
<td>duplex-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for duplex-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: full</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: half</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Undefined</td>
</tr>
<tr>
<td>auto-negotiation</td>
<td>string</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>auto-negotiation-numeric</td>
<td>uint32</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>The health of the network connection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>ping-broadcast</td>
<td>string</td>
<td>• Enabled: The system will respond to a broadcast ping.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The system will not respond to a broadcast ping.</td>
</tr>
<tr>
<td>ping-broadcast-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for ping-broadcast values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
</tbody>
</table>
The basetype is used by `show ntp-status`.

Table 65  ntp-status properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ntp-status</td>
<td>string</td>
<td>Shows whether use of Network Time Protocol (NTP) is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• activated: NTP is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• deactivated: NTP is disabled. This is the default.</td>
</tr>
<tr>
<td>ntp-server-address</td>
<td>string</td>
<td>• The current NTP server IP address if NTP is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The last-set NTP server IP address if NTP was enabled and has been disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0.0.0.0 if the NTP server IP address has not been set.</td>
</tr>
<tr>
<td>ntp-contact-time</td>
<td>string</td>
<td>• Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), of the last message received from the NTP server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• none: No contact.</td>
</tr>
</tbody>
</table>
peer-connection-info

This basetype is used by `query peer-connection`.

Table 66  peer-connection-info properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>system-name</td>
<td>string</td>
<td>The name of the system. The default is Uninitialized Name.</td>
</tr>
<tr>
<td>system-contact</td>
<td>string</td>
<td>The name of the person who administers the system. The default is Uninitialized Contact.</td>
</tr>
<tr>
<td>system-location</td>
<td>string</td>
<td>The location of the system. The default is Uninitialized Location.</td>
</tr>
<tr>
<td>system-information</td>
<td>string</td>
<td>A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.</td>
</tr>
<tr>
<td>midplane-serial-number</td>
<td>string</td>
<td>The serial number of the controller enclosure midplane.</td>
</tr>
<tr>
<td>vendor-name</td>
<td>string</td>
<td>The vendor name.</td>
</tr>
<tr>
<td>product-id</td>
<td>string</td>
<td>The product model identifier.</td>
</tr>
<tr>
<td>product-key through</td>
<td>See license.</td>
<td></td>
</tr>
<tr>
<td>sra-expiry</td>
<td>See license.</td>
<td></td>
</tr>
<tr>
<td>peer-controllers</td>
<td>Embedded; see peer-controller.</td>
<td></td>
</tr>
</tbody>
</table>
**peer-connections**

This basetype is used by `show peer-connections`.

**Table 67  peer-connections properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>peer-connection-name</td>
<td>string</td>
<td>The name of the peer connection.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the peer connection.</td>
</tr>
<tr>
<td>connection-type</td>
<td>string</td>
<td>The type of ports being used for the peer connection:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI</td>
</tr>
<tr>
<td>connection-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>connection-type</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: iSCSI</td>
</tr>
<tr>
<td>connection-status</td>
<td>string</td>
<td>• Online: The systems have a valid connection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline: No connection is available to the remote system.</td>
</tr>
<tr>
<td>connection-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>connection-status</code> values.</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>health</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If <code>Health</code> is not <code>OK</code>, this field shows the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If <code>Health</code> is not <code>OK</code>, this field shows recommended actions to take to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>resolve the health issue.</td>
</tr>
<tr>
<td>local-ports</td>
<td>Embedded;</td>
<td>see <code>local-ports</code>.</td>
</tr>
<tr>
<td>remote-ports</td>
<td>Embedded;</td>
<td>see <code>remote-ports</code>.</td>
</tr>
</tbody>
</table>
peer-controllers

This basetype is used by query peer-connection.

Table 68  peer-controllers properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| controller | string   | • A: Controller A.  
|           |          | • B: Controller B.  |
| sc-fw    | string   | Storage Controller firmware version.            |
| sc-loader | string   | Storage Controller loader firmware version.     |
| mc-fw    | string   | Management Controller firmware version.         |
| mc-loader | string   | Management Controller loader firmware version.  |
| ec-fw    | string   | Controller firmware version.                    |
| pld-rev  | string   | Programmable Logic Device (CPLD) firmware version. |
| hw-rev   | string   | Controller hardware version.                    |
| ip-address | string   | Controller network port IP address.             |
| local-ports | Embedded; see peer-ports.                  |
peer-ports

This basetype is used by query peer-connection.

Table 69 peer-ports properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-host-port</td>
<td>string</td>
<td>The ID of the port in the local system.</td>
</tr>
<tr>
<td>connection-type</td>
<td>string</td>
<td>The type of ports being used for the peer connection:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI</td>
</tr>
<tr>
<td>host-port-health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>port-address</td>
<td>string</td>
<td>The assigned port IP address.</td>
</tr>
<tr>
<td>local-links</td>
<td>string</td>
<td>The IDs of linked ports in the local system.</td>
</tr>
</tbody>
</table>
This basetype is used by show snap-pools.

### Table 70  policy-threshold properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>threshold</td>
<td>string</td>
<td>Snap pool threshold level:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>Warning:</strong> The snap pool is moderately full. When this threshold is reached, an event is generated to alert the administrator. The default is 75%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>Error:</strong> 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%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>Critical:</strong> 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.</td>
</tr>
<tr>
<td>percent-usage</td>
<td>string</td>
<td>Percent of snap pool space used that triggers the threshold's policy.</td>
</tr>
<tr>
<td>policy</td>
<td>string</td>
<td>Recovery policy to invoke when threshold value is reached:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>autoexpand:</strong> 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).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‣ If the snap pool is successfully expanded, the system will log Informational event 444.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‣ 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>deleteoldestsnapshot:</strong> Delete the oldest snapshot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>deletesnapshots:</strong> Delete all snapshots.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>haltwrites:</strong> Halt writes to the snap pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>notifyonly:</strong> Generates an event to notify the administrator.</td>
</tr>
<tr>
<td>size-to-expand</td>
<td>string</td>
<td>• <code>size</code>: For the <code>autoexpand</code> policy, the size (formatted to use the current base, precision, and units) by which to expand the snap pool when the threshold is reached.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: The policy is not set to <code>autoexpand</code>.</td>
</tr>
<tr>
<td>size-to-expand-numeric</td>
<td>uint32</td>
<td>Unformatted size-to-expand value in 512-byte blocks.</td>
</tr>
</tbody>
</table>
This basetype is used by show pool-statistics when the historical parameter is specified.

### Table 71  pool-hist-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>number-of-ios</td>
<td>uint64</td>
<td>The total number of read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>The number of read operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>The number of write operations since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred</td>
<td>uint64</td>
<td>The total amount of data read and written since the last sampling time.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>The amount of data read since the last sampling time.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>The amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>The amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>The amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>total-iops</td>
<td>uint64</td>
<td>The total number of read and write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>read-iops</td>
<td>uint64</td>
<td>The number of read operations per second since the last sampling time.</td>
</tr>
<tr>
<td>write-iops</td>
<td>uint64</td>
<td>The number of write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec</td>
<td>uint64</td>
<td>The total data transfer rate, in bytes per second, since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted total-bytes-per-second value.</td>
</tr>
<tr>
<td>read-bytes-per-sec</td>
<td>uint64</td>
<td>The data transfer rate, in bytes per second, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>read-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted read-bytes-per-second value.</td>
</tr>
<tr>
<td>write-bytes-per-sec</td>
<td>uint64</td>
<td>The data transfer rate, in bytes per second, for write operations since the last sampling time.</td>
</tr>
<tr>
<td>write-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted write-bytes-per-second value.</td>
</tr>
<tr>
<td>number-of-allocated-pages</td>
<td>uint64</td>
<td>The number of 4-MB pages allocated to volumes in the pool.</td>
</tr>
<tr>
<td>sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.</td>
</tr>
<tr>
<td>sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted sample-time value.</td>
</tr>
</tbody>
</table>
pool-statistics

This basetype is used by show pool-statistics.

Table 72 pool-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.</td>
</tr>
<tr>
<td>sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted sample-time value.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the pool.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>The name of the pool.</td>
</tr>
<tr>
<td>pages-alloc-per-minute</td>
<td>uint32</td>
<td>The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data.</td>
</tr>
<tr>
<td>pages-dealloc-per-minute</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>num-pages-unmap-per-minute</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>resettable-statistics</td>
<td>Embedded</td>
<td>see resettable-statistics.</td>
</tr>
<tr>
<td>tier-statistics</td>
<td>Embedded</td>
<td>see tier-statistics.</td>
</tr>
</tbody>
</table>
pool-summary

This basetype is used by `show pool-statistics` when the `historical` parameter is specified.

### Table 73  pool-summary properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the pool.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>The name of the pool.</td>
</tr>
<tr>
<td>pool-hist-statistics</td>
<td>Embedded; see pool-hist-statistics.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show configuration` and `show pools`.

### Table 74 pools properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>The name of the pool.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the pool.</td>
</tr>
<tr>
<td>storage-type</td>
<td>string</td>
<td>• Linear: Linear pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Virtual: Virtual pool.</td>
</tr>
<tr>
<td>storage-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>storage-type</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Linear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Virtual</td>
</tr>
<tr>
<td>total-size</td>
<td>string</td>
<td>The total capacity of the pool.</td>
</tr>
<tr>
<td>total-size-numeric</td>
<td>unit64</td>
<td>Unformatted <code>total-size</code> value in 512-byte blocks.</td>
</tr>
<tr>
<td>total-avail</td>
<td>string</td>
<td>The available capacity in the pool.</td>
</tr>
<tr>
<td>total-avail-numeric</td>
<td>unit64</td>
<td>Unformatted <code>total-avail</code> value in 512-byte blocks.</td>
</tr>
<tr>
<td>snap-size</td>
<td>string</td>
<td>The pool capacity used by linear snap pools or virtual snapshots.</td>
</tr>
<tr>
<td>snap-size-numeric</td>
<td>unit64</td>
<td>Unformatted <code>snap-size</code> value in 512-byte blocks.</td>
</tr>
<tr>
<td>allocated-pages</td>
<td>uint32</td>
<td>For a virtual pool, the number of 4-MB pages that are currently in use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For a linear pool, 0.</td>
</tr>
<tr>
<td>available-pages</td>
<td>uint32</td>
<td>For a virtual pool, the number of 4-MB pages that are still available to be allocated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For a linear pool, 0.</td>
</tr>
<tr>
<td>overcommit</td>
<td>string</td>
<td>• Disabled: The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: Not applicable (linear pool).</td>
</tr>
<tr>
<td>overcommit-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>overcommit</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: N/A</td>
</tr>
<tr>
<td>over-committed</td>
<td>string</td>
<td>• True: The pool is overcommitted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• False: The pool is not overcommitted.</td>
</tr>
<tr>
<td>over-committed-numeric</td>
<td>uint16</td>
<td>Numeric equivalents for <code>over-committed</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>disk-groups</td>
<td>uint16</td>
<td>The number of disk groups in the pool.</td>
</tr>
<tr>
<td>volumes</td>
<td>uint16</td>
<td>The number of volumes in the pool.</td>
</tr>
<tr>
<td>page-size</td>
<td>string</td>
<td>The page size, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>page-size-numeric</td>
<td>unit64</td>
<td>Unformatted <code>page-size</code> value in 512-byte blocks.</td>
</tr>
<tr>
<td>low-threshold</td>
<td>string</td>
<td>The low threshold for page allocation as a percentage of pool capacity.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>middle-threshold</td>
<td>string</td>
<td>The middle threshold for page allocation as a percentage of pool capacity.</td>
</tr>
<tr>
<td>high-threshold</td>
<td>string</td>
<td>The high threshold for page allocation as a percentage of pool capacity.</td>
</tr>
<tr>
<td>utility-running</td>
<td>string</td>
<td>Job running on the disk, if any.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- (blank): None.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DRSC: The disk group is being scrubbed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- EXPD: The disk group is being expanded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- INIT: The disk group is being initialized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RCON: The disk group is being reconstructed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VDRAIN: The virtual disk group is being removed and its data is being</td>
</tr>
<tr>
<td></td>
<td></td>
<td>drained to another disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VPREP: The virtual disk group is being prepared for use in a virtual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRBCV: The virtual disk group is being recovered to restore its membership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the virtual pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VREMV: The disk group and its data are being removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRFY: The disk group is being verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRSC: The disk group is being scrubbed.</td>
</tr>
<tr>
<td>utility-running-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for job-running values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: INIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3: RCON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: VRFY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 5: EXPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 6: VRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 7: DRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 9: VREMV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 12: VPREP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 13: VDRAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 14: VRBCV</td>
</tr>
<tr>
<td>preferred-owner</td>
<td>string</td>
<td>Controller that owns the disk group and its volumes during normal operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- B: Controller B.</td>
</tr>
<tr>
<td>preferred-owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for preferred-owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: A</td>
</tr>
<tr>
<td>owner</td>
<td>string</td>
<td>Current owner, which is either the preferred owner during normal operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or the partner controller when the preferred owner is offline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- B: Controller B.</td>
</tr>
</tbody>
</table>
Table 74 pools properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>rebalance</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>rebalance-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>migration</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>migration-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>zero-scan</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>zero-scan-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>idle-page-check</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>idle-page-check-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>read-flash-cache</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>read-flash-cache-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>metadata-vol-size</td>
<td>string</td>
<td>The size of the pool's metadata volume, formatted to use the current base,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>precision, and units. This needs to be taken into consideration to account</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for all pages in the pool that are used.</td>
</tr>
<tr>
<td>metadata-vol-size-numeric</td>
<td>uint64</td>
<td>Unformatted metadata-vol-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>total-rfc-size</td>
<td>string</td>
<td>The total size in blocks of the read cache in the pool.</td>
</tr>
<tr>
<td>total-rfc-size-numeric</td>
<td>uint64</td>
<td>Unformatted total-rfc-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>available-rfc-size</td>
<td>string</td>
<td>The unused read-cache space in blocks that is available for use by the pool.</td>
</tr>
<tr>
<td>available-rfc-size-numeric</td>
<td>uint64</td>
<td>Unformatted available-rfc-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>reserved-size</td>
<td>string</td>
<td>The total number of pages that are reserved for virtual volumes in the pool.</td>
</tr>
<tr>
<td>reserved-size-numeric</td>
<td>uint64</td>
<td>Unformatted reserved-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>reserved-unalloc-size</td>
<td>string</td>
<td>The total number of pages that are reserved, but not yet allocated, for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>virtual volumes in the pool.</td>
</tr>
<tr>
<td>reserved-unalloc-size-numeric</td>
<td>uint64</td>
<td>Unformatted reserved-unalloc-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>pool-sector-format</td>
<td>string</td>
<td>The sector format of disks in the disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 512n: All disks use 512-byte native sector size. Each logical block and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>physical block is 512 bytes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 512e: All disks use 512-byte emulated sector size. Each logical block is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>512 bytes and each physical block is 4096 bytes. Eight logical blocks will</td>
</tr>
<tr>
<td></td>
<td></td>
<td>be stored sequentially in each physical block. Logical blocks may or may</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not be aligned with physical block boundaries.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mixed: The disk group contains a mix of 512n and 512e disks. This is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>supported, but for consistent and predictable performance, do not mix</td>
</tr>
<tr>
<td></td>
<td></td>
<td>disks of different sector size types (512n, 512e).</td>
</tr>
</tbody>
</table>
### Table 74 pools properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pool-sector-format-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for pool-sector-numeric values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: 512n</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: 512e</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Mixed</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>disk-groups</td>
<td>Embedded; see disk-groups.</td>
<td></td>
</tr>
<tr>
<td>tiers</td>
<td>Embedded; see tiers.</td>
<td></td>
</tr>
<tr>
<td>unhealthy-component</td>
<td>Embedded; see unhealthy-component.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show configuration` and `show ports`.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Controller host port ID in the form <code>hostport_controller-ID-and-port-number</code>.</td>
</tr>
<tr>
<td>controller</td>
<td>string</td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>controller-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>port</td>
<td>string</td>
<td>Controller ID and port number.</td>
</tr>
<tr>
<td>port-type</td>
<td>string</td>
<td>• FC: Fibre Channel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI: Internet SCSI.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS: Serial Attached SCSI.</td>
</tr>
<tr>
<td>port-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for port-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: UNKNOWN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: FC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: iSCSI</td>
</tr>
<tr>
<td>media</td>
<td>string</td>
<td>• FC(P): Fibre Channel Point-to-Point.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FC(L): Fibre Channel-Arbitrated Loop (public or private).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FC(-): Not applicable, as when the port is disconnected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS: Serial Attached SCSI.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI: Internet SCSI.</td>
</tr>
<tr>
<td>target-id</td>
<td>string</td>
<td>Port WWN or IQN.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Port status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up: The port is cabled and has an I/O link.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Warning: Not all of the port's PHYs are up.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error: The port is reporting an error condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present: The controller module is not installed or is down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disconnected: Either no I/O link is detected or the port is not cabled.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Disconnected</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>actual-speed</td>
<td>string</td>
<td>Actual link speed in Mbit/s or Gbit/s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10Mb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 100Mb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 16Gb (MSA 2040 only)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• (blank): Port is disconnected.</td>
</tr>
<tr>
<td>actual-speed-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for actual-speed values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: 1Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: 4Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: 6Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: 8Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: 10Mb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: 100Mb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: 12Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12: 16Gb (MSA 2040 only)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 255: Port is disconnected.</td>
</tr>
<tr>
<td>configured-speed</td>
<td>string</td>
<td>Configured host-port link speed in Gbit/s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Auto (the default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 16Gb (MSA 2040 only)</td>
</tr>
<tr>
<td>configured-speed-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for configured-speed values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: 1Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: 4Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Auto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: 8Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: 12Gb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12: 16Gb (MSA 2040 only)</td>
</tr>
<tr>
<td>fan-out</td>
<td>uint8</td>
<td>Applicable to a MSA 1040 SAS controller module only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The port is configured to use a standard cable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The port is configured to use a fan-out cable.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>port-details</td>
<td>Embedded; see fc-port, iscsi-port, sas-port.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show power-supplies`.

### Table 76 power-supplies properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Power supply ID in the form <code>psu_enclosure-ID.power-supply-number</code>.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Power supply serial number.</td>
</tr>
<tr>
<td>part-number</td>
<td>string</td>
<td>FRU part number.</td>
</tr>
<tr>
<td>description</td>
<td>string</td>
<td>FRU long description.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>• Power supply identifier and location.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Voltage Regulator (D2700 only).</td>
</tr>
<tr>
<td>fw-revision</td>
<td>string</td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Firmware revision of the power supply.</td>
</tr>
<tr>
<td>revision</td>
<td>string</td>
<td>FRU hardware revision level.</td>
</tr>
<tr>
<td>model</td>
<td>string</td>
<td>Power supply model.</td>
</tr>
<tr>
<td>vendor</td>
<td>string</td>
<td>Power supply vendor.</td>
</tr>
<tr>
<td>location</td>
<td>string</td>
<td>Power supply location in the form <code>Enclosure enclosure-ID - position</code>, where the position is as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td>position</td>
<td>string</td>
<td>Power supply position, as viewed from the back of the enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Left</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Right</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bottom</td>
</tr>
<tr>
<td>position-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>position</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Left</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Right</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Top</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Bottom</td>
</tr>
<tr>
<td>dash-level</td>
<td>string</td>
<td>FRU template revision number.</td>
</tr>
<tr>
<td>fru-shortname</td>
<td>string</td>
<td>FRU short description.</td>
</tr>
<tr>
<td>mfg-date</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC), when the power supply module was manufactured.</td>
</tr>
<tr>
<td>mfg-date-numeric</td>
<td>uint32</td>
<td>Unformatted <code>mfg-date</code> value.</td>
</tr>
<tr>
<td>mfg-location</td>
<td>string</td>
<td>City, state/province, and country where the FRU was manufactured.</td>
</tr>
<tr>
<td>mfg-vendor-id</td>
<td>string</td>
<td>JEDEC ID of the FRU manufacturer.</td>
</tr>
<tr>
<td>configuration-serialnumber</td>
<td>string</td>
<td>Configuration serial number.</td>
</tr>
<tr>
<td>dc12v</td>
<td>uint32</td>
<td>Voltage of the 12-volt power supply, in 100th of a volt.</td>
</tr>
<tr>
<td>dc5v</td>
<td>uint32</td>
<td>Voltage of the 5-volt power supply, in 100th of a volt.</td>
</tr>
<tr>
<td>dc33v</td>
<td>uint32</td>
<td>Voltage of the 3.3-volt power supply, in 100th of a volt.</td>
</tr>
<tr>
<td>dc12i</td>
<td>uint32</td>
<td>Voltage of the 12-volt power supply, in 100th of a volt.</td>
</tr>
</tbody>
</table>
Table 76  power-supplies properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc5i</td>
<td>uint32</td>
<td>Voltage of the 5-volt power supply, in 100th of a volt.</td>
</tr>
<tr>
<td>dctemp</td>
<td>uint32</td>
<td>Power supply temperature.</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommend</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Power supply status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Not Present</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Unknown</td>
</tr>
<tr>
<td>unhealthy-component</td>
<td>Embedded; see unhealthy-component.</td>
<td></td>
</tr>
<tr>
<td>fan-details</td>
<td>Embedded; see fan.</td>
<td></td>
</tr>
</tbody>
</table>

Table continues on the next page.
product-info

This basetype is used by show inquiry.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vendor-name</td>
<td>string</td>
<td>Vendor name.</td>
</tr>
<tr>
<td>product-id</td>
<td>string</td>
<td>Product model identifier.</td>
</tr>
<tr>
<td>scsi-vendor-id</td>
<td>string</td>
<td>Vendor name returned by the SCSI INQUIRY command.</td>
</tr>
</tbody>
</table>
provisioning

This basetype is used by `show provisioning`.

Table 78  provisioning properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| volume             | string   | • Volume name.  
|                    |          | • Blank if the vdisk or pool does not have a volume.                       |
| volume-serial      | string   | Volume serial number.                                                      |
| wwn                | string   | • Volume World Wide Name.  
|                    |          | • Blank if the vdisk or pool does not have a volume.                       |
| controller         | string   | Owning controller of the vdisk or pool.  
|                    |          | • A: Controller A.  
|                    |          | • B: Controller B.                                                        |
| controller-numeric | uint32   | Numeric equivalents for controller values.  
|                    |          | • 0: B  
|                    |          | • 1: A                                                                    |
| disk-display       | string   | Shorthand list of the disks within a vdisk or pool.                        |
| disk-display-full  | string   | List or range of the disks in the vdisk or pool specified by the 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.  
|                    |          | • OK  
|                    |          | • Degraded  
|                    |          | • Fault  
|                    |          | • N/A  
|                    |          | • Unknown                                                                  |
| health-numeric     | uint32   | Numeric equivalents for health values.  
|                    |          | • 0: OK  
|                    |          | • 1: Degraded  
|                    |          | • 2: Fault  
|                    |          | • 3: Unknown  
|                    |          | • 4: N/A                                                                   |
| mapped             | string   | • Yes: The volume is mapped.  
|                    |          | • No: The volume is not mapped.                                            |
| lun-view           | Embedded | see `volume-view-mappings`.                                                 |
This basetype is used by `show pool-statistics` when the historical parameter is specified.

Table 79  readcache-hist-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>number-of-ios</td>
<td>uint64</td>
<td>The total number of read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>The number of read operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>The number of write operations since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred</td>
<td>uint64</td>
<td>The total amount of data read and written since the last sampling time.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>The amount of data read since the last sampling time.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>The amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>The amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>The amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>total-iops</td>
<td>uint64</td>
<td>The total number of read and write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>read-iops</td>
<td>uint64</td>
<td>The number of read operations per second since the last sampling time.</td>
</tr>
<tr>
<td>write-iops</td>
<td>uint64</td>
<td>The number of write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec</td>
<td>uint64</td>
<td>The total data transfer rate, in bytes per second, since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted total-bytes-per-second value.</td>
</tr>
<tr>
<td>read-bytes-per-sec</td>
<td>uint64</td>
<td>The data transfer rate, in bytes per second, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>read-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted read-bytes-per-second value.</td>
</tr>
<tr>
<td>write-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for write operations since the last sampling time.</td>
</tr>
<tr>
<td>write-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted write-bytes-per-second value.</td>
</tr>
<tr>
<td>number-of-allocated-pages</td>
<td>uint64</td>
<td>The number of 4-MB pages allocated to volumes in the pool.</td>
</tr>
<tr>
<td>number-of-pages-copied</td>
<td>uint64</td>
<td>The number of pages copied to read cache in the sample time period.</td>
</tr>
<tr>
<td>number-of-pages-discarded</td>
<td>uint64</td>
<td>The number of pages discarded from read cache (to make room for new hot data) in the sample time period.</td>
</tr>
<tr>
<td>sample-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code>, when the data sample was taken.</td>
</tr>
<tr>
<td>sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted sample-time value.</td>
</tr>
</tbody>
</table>
This basetype is used by `show redundancy-mode`.

### Table 80  redundancy properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| redundancy-mode             | string| The system’s operating mode, also called the cache redundancy mode.  
  • Active-Active ULP: Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.  
  • Single Controller: The enclosure contains a single controller.  
  • Failed Over: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.  
  • Down: Both controllers are not operational. |
| redundancy-mode-numeric     | uint32| Numeric equivalents for redundancy-mode values.  
  • 2: Active-Active ULP  
  • 3: Single Controller  
  • 4: Failed Over  
  • 5: Down |
| redundancy-status           | string| • Redundant: Both controllers are operational.  
  • Operational but not redundant: In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.  
  • Down: This controller is not operational.  
  • Unknown: Status information is not available. |
| redundancy-status-numeric   | uint32| Numeric equivalents for redundancy-status values.  
  • 1: Redundant  
  • 3: Operational but not redundant  
  • 4: Down  
  • 5: Unknown |
| controller-a-status         | string| • Operational: The controller is operational.  
  • Down: The controller is installed but not operational.  
  • Not Installed: The controller is not installed. |
| controller-a-status-numeric | uint32| Numeric equivalents for controller-a-status values.  
  • 0: Operational  
  • 1: Down  
  • 2: Not Installed |
| controller-a-serial-number  | string| • Controller module serial number  
  • Not Available: The controller is down or not installed. |
| controller-b-status         | string| • Operational: The controller is operational.  
  • Down: The controller is installed but not operational.  
  • Not Installed: The controller is not installed. |
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>controller-b-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller-b-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Not Installed</td>
</tr>
<tr>
<td>controller-b-serial-number</td>
<td>string</td>
<td>• Controller module serial number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Available: The controller is down or not installed.</td>
</tr>
<tr>
<td>other-MC-status</td>
<td>string</td>
<td>The operational status of the Management Controller in the partner controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This is not factored into system health.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Communicating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td>other-MC-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for other-mc-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1524: Not Communicating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3231: Not Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4749: Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1496: Unknown</td>
</tr>
</tbody>
</table>
refresh-counters

This basetype is used by `show refresh-counters`.

Table 81  refresh-counters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>basetype-name</td>
<td>(Not shown)</td>
<td>Shows when the data represented by the base type was last updated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: The data has never been updated and is not cached.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• nonzero-number: A timestamp indicating that the data has been updated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the value has changed since the last time you called this command then</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the data has changed.</td>
</tr>
</tbody>
</table>
remote-addresses

This basetype is used by `show replication-volumes`.

**Table 82 remote-addresses properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| connected-ports | string | • For a remote primary or secondary volume, this shows the ID of the port in the local system that is being used for communication with the remote system. To determine this, the system first probes all host ports on the controller that owns the replication set to find communication paths to a remote address. After all host ports are probed, if at least one path is found, the IDs of host ports found are shown and the probing stops. If no path is found, the system will repeat this process on the partner controller.  
• For a local primary or secondary volume, this shows N/A. |
| remote-address | string | The address of each host port in the remote system through which the volume is accessible.                                                                                                                   |
This basetype is used by verify links and verify remote-link.

**Table 83  remote-links properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-host-port</td>
<td>string</td>
<td>Controller host port ID in the local system, in the form <code>hostport_controller-ID-and-port-number</code>.</td>
</tr>
<tr>
<td>type</td>
<td>string</td>
<td>• Unknown: Port type is unknown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FC: FC port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI: iSCSI port.</td>
</tr>
<tr>
<td>type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: FC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: iSCSI</td>
</tr>
<tr>
<td>remote-links</td>
<td>string</td>
<td>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.</td>
</tr>
</tbody>
</table>
remote-ports

This basetype is used by show peer-connections.

Table 84  remote-ports properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>remote-host-port</td>
<td>string</td>
<td>The ID of the port in the remote system.</td>
</tr>
<tr>
<td>port-address</td>
<td>string</td>
<td>The assigned port IP address.</td>
</tr>
</tbody>
</table>
remote-ports-detail

This basetype is used by show peer-connections when the verify-links parameter is specified.

Table 85  remote-ports-detail properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>remote-host-port</td>
<td>string</td>
<td>The ID of the port in the remote system.</td>
</tr>
<tr>
<td>port-address</td>
<td>string</td>
<td>The assigned port IP address.</td>
</tr>
<tr>
<td>local-links</td>
<td>string</td>
<td>The IDs of linked ports in the local system.</td>
</tr>
</tbody>
</table>
### remote-system

This basetype is used by `show remote-systems`.

#### Table 86  remote-system properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>string</td>
<td>Remote system ID.</td>
</tr>
<tr>
<td>system-name</td>
<td>string</td>
<td>• The name of the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uninitialized Name: The default value.</td>
</tr>
<tr>
<td>system-contact</td>
<td>string</td>
<td>• The name of the person who administers the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uninitialized Contact: The default value.</td>
</tr>
<tr>
<td>system-location</td>
<td>string</td>
<td>• The location of the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uninitialized Location: The default value.</td>
</tr>
<tr>
<td>system-information</td>
<td>string</td>
<td>• A brief description of the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uninitialized Info: The default value.</td>
</tr>
<tr>
<td>vendor-name</td>
<td>string</td>
<td>The vendor name of the remote system.</td>
</tr>
<tr>
<td>product-id</td>
<td>string</td>
<td>The product model identifier of the remote system.</td>
</tr>
<tr>
<td>product-brand</td>
<td>string</td>
<td>The brand name of the remote system.</td>
</tr>
<tr>
<td>ip-address-a</td>
<td>string</td>
<td>• The IP address of the network port in controller A in the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present</td>
</tr>
<tr>
<td>ip-address-b</td>
<td>string</td>
<td>• The IP address of the network port in controller B in the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Present</td>
</tr>
<tr>
<td>username</td>
<td>string</td>
<td>The name of a user that is configured in the remote system. This must be a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>user with the manage role to remotely configure or provision that system.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>• Uninitialized: This system hasn't communicated with the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ready: This system has contacted the remote system and it is ready to use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Connected: This system is transferring data to the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Connected: The system is not connected to the remote system.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Uninitialized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Connected</td>
</tr>
<tr>
<td>last-connected</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when successful communication was last established between the MC in the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>local system and the MC in the remote system. This value does not indicate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when connection status was last determined, and will not be updated if the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>remote MC is not accessible or if the connection status is Not Connected.</td>
</tr>
<tr>
<td>interfaces</td>
<td>string</td>
<td>• FC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hybrid: FC and iSCSI.</td>
</tr>
</tbody>
</table>
Table 86  remote-system properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>interfaces-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for interfaces values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: FC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: iSCSI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Hybrid</td>
</tr>
<tr>
<td>storage-model</td>
<td>string</td>
<td>LINEAR</td>
</tr>
<tr>
<td>storage-model-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-model values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: LINEAR</td>
</tr>
<tr>
<td>isvalid-ip-a</td>
<td>string</td>
<td>• False: The IP address is not valid for controller module A in the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• True: The IP address is valid for controller module A in the remote system.</td>
</tr>
<tr>
<td>isvalid-ip-a-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for isvalid-ip-a values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: False</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: True</td>
</tr>
<tr>
<td>isvalid-ip-b</td>
<td>string</td>
<td>• False: The IP address is not valid for controller B in the remote system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• True: The IP address is valid for controller B in the remote system.</td>
</tr>
<tr>
<td>isvalid-ip-b-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for isvalid-ip-b values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: False</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: True</td>
</tr>
</tbody>
</table>
replicate-volume-tasks

This basetype is used by show tasks for a ReplicateVolume task.

Table 87  replicate-volume-tasks properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary-volume-name</td>
<td>string</td>
<td>Primary volume name.</td>
</tr>
<tr>
<td>primary-volume-serial</td>
<td>string</td>
<td>Primary volume serial number.</td>
</tr>
<tr>
<td>snapshot-prefix</td>
<td>string</td>
<td>A label to identify snapshots created by this task.</td>
</tr>
</tbody>
</table>
| replication-mode   | string    | • new-snapshot: Replicate a new snapshot of the volume to the remote system. This is the default.  
|                    |           | • last-snapshot: Replicate the last (most recent existing) snapshot of the volume to the remote system. |
| retention-count    | uint32    | Number of snapshots to retain with this prefix, from 3 to 32. The default is 3. |
| last-created       | string    | • The name of the last snapshot created by the task.                         |
|                    |           | • Blank if the task has not created a snapshot.                              |
| last-used          | string    | For a task whose replication mode is last-snapshot, the name of the last snapshot used for replication. Otherwise, N/A. |
| snapshot           | Embedded; | see snap-tasks.                                                              |
|                    |           |                                                                             |
replication-image

This basetype is used by show replication-images.

Table 88 replication-image properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>image-key</td>
<td>string</td>
<td>Replication image ID.</td>
</tr>
<tr>
<td>replication-volume-serial-number</td>
<td>string</td>
<td>Replication volume serial number.</td>
</tr>
<tr>
<td>image-serial-number</td>
<td>string</td>
<td>Replication image serial number.</td>
</tr>
<tr>
<td>replication-image-source</td>
<td>string</td>
<td>Name of the source replication image.</td>
</tr>
<tr>
<td>snapshot-serial</td>
<td>string</td>
<td>Replication snapshot serial number associated with the image. The replication snapshot is associated with the replication volume specified in the request.</td>
</tr>
<tr>
<td>snapshot-name</td>
<td>string</td>
<td>Replication snapshot name associated with the image. For a secondary image, this value is not filled in until the replication is completed.</td>
</tr>
<tr>
<td>creation-date-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC), when the replication image was created on the replication volume.</td>
</tr>
<tr>
<td>creation-date-time-numeric</td>
<td>uint32</td>
<td>Unformatted creation-date-time value.</td>
</tr>
<tr>
<td>image-details</td>
<td>Embedded; see replication-image-params.</td>
<td></td>
</tr>
</tbody>
</table>
**replication-image-params**

This basetype is used by `show replication-images`.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>status</td>
<td>string</td>
<td>Replication image status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A: The image information is not valid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Queued: The image is known to exist in the primary-view volume but replication has not started.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replicating: The image is being replicated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suspended: The image is being replicated but replication is suspended.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Complete: The image is created, fully replicated, and available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Create-Snapshot: The image is fully replicated but a snapshot of the image is being created.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline: The image has been replicated but is unusable due to an error.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Queued</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Replicating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Suspended</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Create-Snapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Complete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Offline</td>
</tr>
<tr>
<td>progress</td>
<td>string</td>
<td>The percentage complete if the image is being replicated. Applies only to secondary volumes.</td>
</tr>
<tr>
<td>start-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>, when the replication operation started on the replication volume.</td>
</tr>
<tr>
<td>start-time-numeric</td>
<td>uint32</td>
<td>Unformatted start-time value.</td>
</tr>
<tr>
<td>update-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>, when the replication operation status was last updated.</td>
</tr>
<tr>
<td>update-time-numeric</td>
<td>uint32</td>
<td>Unformatted update-time value.</td>
</tr>
<tr>
<td>suspended-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>, when the replication operation was suspended or resumed.</td>
</tr>
<tr>
<td>suspended-time-numeric</td>
<td>uint32</td>
<td>Unformatted suspended-time value.</td>
</tr>
<tr>
<td>est-completion-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>, when the replication operation is estimated to complete.</td>
</tr>
<tr>
<td>est-completion-time-numeric</td>
<td>uint32</td>
<td>Unformatted est-completion-time value.</td>
</tr>
<tr>
<td>time</td>
<td>string</td>
<td>Total time of replication, in the format <code>hour:minutes:seconds (UTC)</code>, including any suspension time.</td>
</tr>
</tbody>
</table>
replication-set

This basetype is used by show replication-sets for a linear replication set.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Replication set name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Replication set serial number.</td>
</tr>
<tr>
<td>primary</td>
<td>Embedded</td>
<td>see replication-volume.</td>
</tr>
</tbody>
</table>
This basetype is used by show replication-volumes.

Table 91 replication-volume properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Replication volume name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Replication volume serial number.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Replication volume status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Initializing: The initial (full) replication to the volume is in progress.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Online: The volume is online and is consistent with the last replicated image.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inconsistent: The volume is online but is in an inconsistent state. A full replication is required to initialize it.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replicating: The volume is online and replication is in progress.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replicate-delay: The volume is online but the in-progress replication has been temporarily delayed. A retry is occurring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suspended: The volume is online but the in-progress replication has been suspended.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline: The volume cannot be accessed and is unusable due to an error.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Detached: The volume is detached for removal.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Initializing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Inconsistent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Replicating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Replicate-Delay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Suspended</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Offline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Establishing proxy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: Detached</td>
</tr>
<tr>
<td>status-reason</td>
<td>string</td>
<td>More information about the status value.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Record Missing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adding Volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Changing Primary</td>
</tr>
<tr>
<td>status-reason-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status-reason values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Record Missing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Adding Volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Changing Primary</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>monitor</td>
<td>string</td>
<td>Replication volume monitoring status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK: Communication to the remote volume is successfully occurring on the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Failed: Communication to the remote volume has failed because of a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>communication issue or because the remote volume has gone offline.</td>
</tr>
<tr>
<td>monitor-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for monitor values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• other: Failed</td>
</tr>
<tr>
<td>location</td>
<td>string</td>
<td>Local: The replication volume is in the local system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remote: The replication volume is in a remote system.</td>
</tr>
<tr>
<td>location-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for location values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Local</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Remote</td>
</tr>
<tr>
<td>ip-address-a</td>
<td>string</td>
<td>IP address of the network port in controller A in the remote system.</td>
</tr>
<tr>
<td>ip-address-b</td>
<td>string</td>
<td>IP address of the network port in controller B in the remote system.</td>
</tr>
<tr>
<td>primary-volume-name</td>
<td>string</td>
<td>Primary volume name.</td>
</tr>
<tr>
<td>primary-volume-serial</td>
<td>string</td>
<td>Primary volume serial number.</td>
</tr>
<tr>
<td>primary-volume-status</td>
<td>string</td>
<td>Primary volume status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conflict</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline</td>
</tr>
<tr>
<td>primary-volume-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for primary-volume-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Conflict</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Offline</td>
</tr>
<tr>
<td>max-queue</td>
<td>uint32</td>
<td>Maximum number of replication images to consider when determining the next</td>
</tr>
<tr>
<td></td>
<td></td>
<td>image to replicate. Used only if the collision-policy property is set to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oldest. The default is 32.</td>
</tr>
<tr>
<td>max-retry-time</td>
<td>uint32</td>
<td>Maximum amount of time in seconds that the replication volume should retry a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replication operation on any specific image when errors occur. Used only if</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the error-policy property is set to Retry. The default is 1800.</td>
</tr>
<tr>
<td>error-policy</td>
<td>string</td>
<td>Determines the action to take when an error occurs during replication.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Retry: Retry the replication for the time specified by the max-retry-time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>property. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suspend: Suspend the replication until the error is resolved automatically</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or through user intervention.</td>
</tr>
<tr>
<td>error-policy-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for error-policy values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Retry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Suspend</td>
</tr>
</tbody>
</table>
Table 91  replication-volume properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>link-type</td>
<td>string</td>
<td>Type of ports used to link the primary and secondary volumes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FC: FC ports.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• iSCSI: iSCSI ports.</td>
</tr>
<tr>
<td>link-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for link-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: FC WWNN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 16: FC WWPN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 64: iSCSI IPv4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 128: iSCSI IPv6</td>
</tr>
<tr>
<td>collision-policy</td>
<td>string</td>
<td>Determines the next image to replicate when multiple replication images are queued.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Newest: Only the latest replication image should be considered for the next replication operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oldest: Only the latest ( n ) replication images should be considered for the next replication operation, where ( n ) is defined by the ( \text{max-queue} ) property and the oldest of these images should be considered first. This is the default.</td>
</tr>
<tr>
<td>collision-policy-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for collision-policy values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Oldest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Newest</td>
</tr>
<tr>
<td>monitor-interval</td>
<td>uint32</td>
<td>Interval in seconds at which the primary volume should query the secondary volume. The default is 300.</td>
</tr>
<tr>
<td>priority</td>
<td>string</td>
<td>Priority of the replication operation with respect to I/O operations competing for the system's processors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• High: Replication has higher priority than host I/O. This can cause heavy I/O to be slower than normal. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Medium: Replication performance is balanced with host I/O performance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>priority-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for priority values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Low</td>
</tr>
<tr>
<td>connection-status</td>
<td>string</td>
<td>• Not Attempted: Communication has not been attempted to the remote volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Online: The volumes in the replication set have a valid connection but communication is not currently active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Active: Communication is currently active to the remote volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline: No connection is available to the remote system.</td>
</tr>
<tr>
<td>connection-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for connection-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Not Attempted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Active</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Offline</td>
</tr>
</tbody>
</table>
### Table 91  replication-volume properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>connection-time</td>
<td>string</td>
<td>Date and time of the last communication with the remote volume, or N/A.</td>
</tr>
<tr>
<td>connection-time-numeric</td>
<td>uint32</td>
<td>Unformatted connection-time value.</td>
</tr>
<tr>
<td>replication-set</td>
<td>string</td>
<td>Replication set serial number.</td>
</tr>
<tr>
<td>local-volume-serial-number</td>
<td>string</td>
<td>Local replication volume serial number.</td>
</tr>
<tr>
<td>remote-address</td>
<td>Embedded; see remote-addresses.</td>
<td></td>
</tr>
<tr>
<td>image-details</td>
<td>Embedded; see replication-image.</td>
<td></td>
</tr>
</tbody>
</table>
This basetype is used by `show replication-images`.

**Table 92 replication-volume-summary properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Replication volume name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Replication volume serial number.</td>
</tr>
<tr>
<td>volume-type</td>
<td>string</td>
<td>• Primary Volume: The volume is the primary volume in a replication set.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secondary Volume: The volume is the secondary volume in a replication set.</td>
</tr>
<tr>
<td>volume-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for volume-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Secondary Volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Primary Volume</td>
</tr>
<tr>
<td>images</td>
<td>Embedded</td>
<td>see replication-image.</td>
</tr>
</tbody>
</table>
reset-snapshot-tasks

This basetype is used by show tasks for a ResetSnapshot task.

Table 93  reset-snapshot-tasks properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>snapshot-name</td>
<td>string</td>
<td>Name of the snapshot to reset.</td>
</tr>
<tr>
<td>snapshot-serial</td>
<td>string</td>
<td>Serial number of the snapshot to reset.</td>
</tr>
</tbody>
</table>
resettable-statistics

This basetype is used by show pool-statistics and show tier-statistics.

Table 94  resettable-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the pool or tier.</td>
</tr>
<tr>
<td>time-since-reset</td>
<td>uint32</td>
<td>The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.</td>
</tr>
<tr>
<td>time-since-sample</td>
<td>uint32</td>
<td>The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>The number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>The number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>The amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>The amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>bytes-per-second</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second-numeric</td>
<td>uint64</td>
<td>Unformatted bytes-per-second value.</td>
</tr>
<tr>
<td>iops</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>avg-rsp-time</td>
<td>uint32</td>
<td>The average response time, in microseconds, for read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-read-rsp-time</td>
<td>uint32</td>
<td>The average response time, in microseconds, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>avg-write-rsp-time</td>
<td>uint32</td>
<td>The average response time, in microseconds, for write operations since the last sampling time.</td>
</tr>
</tbody>
</table>
**sas-host-phy-statistics**

This basetype is used by `show host-phy-statistics`.

Table 95  sas-host-phy-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>port</td>
<td>string</td>
<td>The controller ID and port number.</td>
</tr>
<tr>
<td>phy</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>disparity-errors</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>lost-dwords</td>
<td>uint32</td>
<td>The number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.</td>
</tr>
<tr>
<td>invalid-dwords</td>
<td>uint32</td>
<td>The number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.</td>
</tr>
<tr>
<td>reset-error-counter</td>
<td>uint32</td>
<td>The number of times the PHY Reset sequence has failed.</td>
</tr>
</tbody>
</table>
sas-port

This basetype is used by show ports for a SAS host port.

Table 96  sas-port properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>configured-topology</td>
<td>string</td>
<td>• Direct</td>
</tr>
<tr>
<td>width</td>
<td>uint8</td>
<td>Number of PHY lanes in the SAS port.</td>
</tr>
<tr>
<td>sas-lanes-expected</td>
<td>uint8</td>
<td>Expected number of PHY lanes in the SAS port.</td>
</tr>
<tr>
<td>sas-active-lanes</td>
<td>uint8</td>
<td>Number of active lanes in the SAS port. If the port is connected and fewer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lanes are active than are expected, the port status will change to Warning,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the health will change to Degraded, and event 354 will be logged.</td>
</tr>
<tr>
<td>sas-disabled-lanes</td>
<td>uint8</td>
<td>Number of disabled lanes in the SAS port. If the fan-out setting does not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>match the type of cable connected to the port, event 569 will report two</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lanes in the port are disabled. This field can be used to identify those</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lanes.</td>
</tr>
</tbody>
</table>
sas-status-controller-a

This basetype is used by `show expander-status` for controller A and controller B.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
<tr>
<td>expander-type</td>
<td>string</td>
<td>The expander type.</td>
</tr>
<tr>
<td>expander-type-numeric</td>
<td>string</td>
<td>Numeric equivalents for expander-type values.</td>
</tr>
<tr>
<td>drawer-id</td>
<td>uint8</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>drawer-id-numeric</td>
<td>uint8</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>controller</td>
<td>string</td>
<td>• A: Controller A. • B: Controller B.</td>
</tr>
<tr>
<td>controller-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for controller values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B • 1: A</td>
</tr>
<tr>
<td>wide-port-index</td>
<td>uint32</td>
<td>The wide-port index.</td>
</tr>
<tr>
<td>phy-index</td>
<td>uint32</td>
<td>The PHY index.</td>
</tr>
<tr>
<td>wide-port-role</td>
<td>string</td>
<td>The wide-port role.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Drive • Expansion Egress • Expansion Ingress • SC Primary • SC Alternate • Inter Expander • Unused • Unused</td>
</tr>
<tr>
<td>wide-port-role-numeric</td>
<td>string</td>
<td>Numeric equivalents for wide-port-role values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Unknown • 1: Drive • 4: Expansion Egress • 5: Expansion Ingress • 6: SC Primary • 7: SC Alternate • 8: Inter Expander • 9: Unused</td>
</tr>
<tr>
<td>wide-port-num</td>
<td>uint32</td>
<td>The wide-port number.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>type</td>
<td>string</td>
<td>The PHY type.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Drive: Drive slot PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Egress: Expansion port egress PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expander-Egress-0: Expansion port 0 egress PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expander-Egress-1: Expansion port 1 egress PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expander-Ingress-0: Expansion port 0 ingress PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expander-Ingress-1: Expansion port 1 ingress PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ingress: Expansion port ingress PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inter-Exp: Inter-expander PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SC: Storage Controller PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SC-0: Storage Controller primary PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SC-1: Storage Controller alternate PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SCA-A: Storage Controller A alternate PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SCA-P: Storage Controller A primary PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SCB-A: Storage Controller B alternate PHY.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SCB-P: Storage Controller B primary PHY.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>PHY status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unavailable: No status information is available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled - Healthy: The PHY is enabled and healthy.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled - Degraded: The PHY is enabled but degraded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: The PHY has been disabled by a user or by the system.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Unavailable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled - Healthy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Enabled - Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Disabled</td>
</tr>
<tr>
<td>elem-status</td>
<td>string</td>
<td>The SES status that corresponds to the PHY status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Critical condition is detected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error: Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK: Element is installed and no error conditions are known.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Non-critical: Non-critical condition is detected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not Used: Element is not installed in enclosure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: Either:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Element is installed with no known errors, but the element has not been turned on or set into operation.</td>
</tr>
</tbody>
</table>
### Table 97  sas-status-controller-a properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>elem-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for elem-status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Non-critical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Not Used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: Unknown</td>
</tr>
<tr>
<td>elem-disabled</td>
<td>string</td>
<td>• Enabled: PHY is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: PHY is disabled.</td>
</tr>
<tr>
<td>elem-disabled-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for elem-disabled values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Disabled</td>
</tr>
<tr>
<td>elem-reason</td>
<td>string</td>
<td>More information about the status value.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if elem-status is OK.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error count interrupts: PHY disabled because of error-count interrupts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PHY control: PHY disabled by a SES control page as a result of action by a Storage Controller or user.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Drive removed: PHY disabled because drive slot is empty.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unused - disabled by default: PHY is disabled by default because it is not used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Excessive PHY changes: PHY is disabled because of excessive PHY change counts.</td>
</tr>
<tr>
<td>elem-reason-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for elem-reason values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: (blank)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 32769: Error count interrupts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 32771: PHY control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 32772: Not ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 32774: Drive removed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 32775: Unused - disabled by default</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 32776: Excessive PHY changes</td>
</tr>
<tr>
<td>change-counter</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>code-violations</td>
<td>uint32</td>
<td>Number of times the PHY received an unrecognized or unexpected signal.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>disparity-errors</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>crc-errors</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>conn-crc-errors</td>
<td>uint32</td>
<td>Number of times the lane between two expanders experienced a communication error.</td>
</tr>
<tr>
<td>lost-dwords</td>
<td>uint32</td>
<td>Number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.</td>
</tr>
<tr>
<td>invalid-dwords</td>
<td>uint32</td>
<td>Number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.</td>
</tr>
<tr>
<td>reset-error-counter</td>
<td>uint32</td>
<td>Number of times the expander performed a reset of error counters.</td>
</tr>
<tr>
<td>flag-bits</td>
<td>uint32</td>
<td>PHY status flag bits.</td>
</tr>
</tbody>
</table>
schedules

This basetype is used by `show schedules`.

Table 98  schedules properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Schedule name.</td>
</tr>
<tr>
<td>schedule-specification</td>
<td>string</td>
<td>Schedule settings for running the associated task.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Schedule status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uninitialized: The schedule is not yet ready to run.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ready: The schedule is ready to run at the next scheduled time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Suspended: The schedule had an error and is holding in its current state.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Expired: The schedule has exceeded a constraint and will not run again.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Invalid: The schedule is invalid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Deleted: The task has been deleted.</td>
</tr>
<tr>
<td>next-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code> (UTC),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when the schedule will next run, or N/A if the schedule has expired.</td>
</tr>
<tr>
<td>next-time-numeric</td>
<td>uint32</td>
<td>Unformatted next-time value.</td>
</tr>
<tr>
<td>task-to-run</td>
<td>string</td>
<td>Name of the task that the schedule runs.</td>
</tr>
<tr>
<td>error-message</td>
<td>string</td>
<td>• If an error occurred while running the schedule, the error message.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if no error occurred.</td>
</tr>
<tr>
<td>task</td>
<td>Embedded; see tasks.</td>
<td></td>
</tr>
</tbody>
</table>
security-communications-protocols

This basetype is used by `show protocols`.

Table 99  security-communications-protocols properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wbi-http</td>
<td>string</td>
<td>• Disabled: The standard SMU web server is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The standard SMU web server is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>wbi-https</td>
<td>string</td>
<td>• Disabled: The secure SMU web server is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The secure SMU web server is enabled. This is the default.</td>
</tr>
<tr>
<td>wbi-https-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for wbi-https values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>cli-telnet</td>
<td>string</td>
<td>• Disabled: The standard CLI is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The standard CLI is enabled.</td>
</tr>
<tr>
<td>cli-telnet-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for cli-telnet values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>cli-ssh</td>
<td>string</td>
<td>• Disabled: The secure shell CLI is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The secure shell CLI is enabled.</td>
</tr>
<tr>
<td>cli-ssh-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for cli-ssh values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>smis</td>
<td>string</td>
<td>• Disabled: The secure SMI-S interface is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>smis-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for smis values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>usmis</td>
<td>string</td>
<td>• Disabled: The unsecure SMI-S interface is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>usmis-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for smis values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>ftp</td>
<td>string</td>
<td>• Disabled: The FTP interface is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The FTP interface is enabled.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ftp-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for ftp values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>snmp</td>
<td>string</td>
<td>• Disabled: The SNMP interface is disabled. All SNMP requests to the MIB are disabled and SNMP traps are disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The SNMP interface is enabled.</td>
</tr>
<tr>
<td>snmp-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for snmp values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>debug-interface</td>
<td>string</td>
<td>• Disabled: The Telnet debug port is disabled. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The Telnet debug port is enabled. Remote connection is allowed, through incoming ports only, by HPE or HPE's authorized representatives for troubleshooting. Disabling the service debug protocol removes this access.</td>
</tr>
<tr>
<td>debug-interface-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for debug-interface values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>inband-ses</td>
<td>string</td>
<td>• Disabled: The in-band SES interface is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: The in-band SES interface is enabled. This is the default.</td>
</tr>
<tr>
<td>inband-ses-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for inband-ses values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>activity-progress</td>
<td>string</td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: Access to the activity progress interface via HTTP port 8081 is disabled. This is the default.</td>
</tr>
<tr>
<td>activity-progress-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for activity-progress values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>management-mode</td>
<td>string</td>
<td>The management mode, which controls the terminology used in command output and system messages, that is being used in the current CLI session.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• v2: Uses terminology that is oriented to managing linear storage. For example, vdisk for disk groups and pools.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• v3: Uses terminology that is oriented to managing virtual and linear storage. For example, disk group for disk groups and pool for pools.</td>
</tr>
<tr>
<td>management-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for management-mode values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: v2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: v3</td>
</tr>
</tbody>
</table>
This basetype is used by `show sensor-status`.

**Table 100 sensors properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Sensor ID. For example: <code>sensor_temp_ctrl_controller-ID.sensor-number</code> and <code>sensor_volt_ctrl_controller-ID.sensor-number</code>.</td>
</tr>
<tr>
<td>enclosure-id</td>
<td>uint32</td>
<td>Enclosure ID.</td>
</tr>
<tr>
<td>sensor-name</td>
<td>string</td>
<td>Sensor name and location.</td>
</tr>
</tbody>
</table>
| value           | string | • For a sensor, its value.  
                     • For overall unit status, one of the status values below. |
| status          | string | • OK: The sensor is present and detects no error condition.  
                     • Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds.  
                     • Critical: The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold.  
                     • Unavailable: The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup.  
                     • Unrecoverable: The enclosure management processor (EMP) cannot communicate with the sensor.  
                     • Unknown: The sensor is present but status is not available.  
                     • Not Installed: The sensor is not present.  
                     • Unsupported: Status detection is not implemented. |
| status-numeric  | uint32 | Numeric equivalents for status values.                                      |
| sensor-location | uint32 | Superseded by the container property.                                       |
| container       | string | Hardware component that contains the sensor.                                |

- controllers
- enclosures
- fan
- iom
- midplane
- power-supplies
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>container-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for container values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 17: enclosures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 18: midplane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 19: controllers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20: iom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 21: power-supplies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 22: fan</td>
</tr>
<tr>
<td>sensor-type</td>
<td>string</td>
<td>• Temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Charge Capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown Type</td>
</tr>
<tr>
<td>sensor-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for sensor-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Current</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Charge capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: Unknown Type</td>
</tr>
</tbody>
</table>
show-other-mc-status

This basetype is used by `show shutdown-status`.

**Table 101  show-other-mc-status properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>other-mc</td>
<td>string</td>
<td>Other MC Status</td>
</tr>
</tbody>
</table>
| other-mc-status   | string  | The operational status of the Management Controller in the partner controller. This is not factored into system health.  
|                   |         | • Not Communicating  
|                   |         | • Not Operational  
|                   |         | • Operational  
|                   |         | • Unknown                                                                |
| other-mc-status-numeric | uint32 | Numeric equivalents for `other-mc-status` values.  
|                   |         | • 1524: Not Communicating  
|                   |         | • 3231: Not Operational  
|                   |         | • 4749: Operational  
|                   |         | • 1496: Unknown                                                             |
### shutdown-status

This basetype is used by `show shutdown-status`.

#### Table 102 shutdown-status properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| controller   | string | • **A**: Controller A.  
• **B**: Controller B.                                                              |
| status       | string | • **up**: The controller is operational.  
• **down**: The controller is shut down.  
• **not installed**: The controller is not installed. |
| status-numeric| uint32 | Numeric equivalents for status values.  
• 0: **up**  
• 1: **down**  
• 2: **not installed** |
This basetype is used by `show snap-pools`.

### Table 103 snap-pools properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>virtual-disk-name</td>
<td>string</td>
<td>Vdisk name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Snap pool serial number.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>Snap pool name.</td>
</tr>
<tr>
<td>size</td>
<td>string</td>
<td>Snap pool size, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint32</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>free</td>
<td>string</td>
<td>Amount of free space in this snap pool, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>free-numeric</td>
<td>uint32</td>
<td>Unformatted free value in 512-byte blocks.</td>
</tr>
<tr>
<td>free-percent-size</td>
<td>string</td>
<td>Amount of free space in this snap pool as a percentage of total space in the snap pool.</td>
</tr>
<tr>
<td>master-volumes</td>
<td>string</td>
<td>Number of master volumes associated with this snap pool.</td>
</tr>
<tr>
<td>snapshots</td>
<td>string</td>
<td>Number of snapshots using this snap pool.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>• Available: The snap pool is available for use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Offline: The snap pool is not available for use, as in the case where its disks are not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Corrupt: The snap pool's data integrity has been compromised. The snap pool can no longer be used.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bitmask with second significant digit set: Offline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bitmask with third significant digit set: Corrupt</td>
</tr>
<tr>
<td>policy</td>
<td>Embedded</td>
<td>See policy-threshold.</td>
</tr>
</tbody>
</table>
This basetype is used by `show snapshot-space`.

Table 104  snap-space properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pool</td>
<td>string</td>
<td>The pool for which information is displayed (A or B).</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the pool.</td>
</tr>
<tr>
<td>snap-limit-threshold</td>
<td>string</td>
<td>The percentage of the pool that can be used for snapshots (the snapshot space).</td>
</tr>
<tr>
<td>snap-limit-size</td>
<td>uint16</td>
<td>The actual size of the snapshot space.</td>
</tr>
<tr>
<td>snap-limit-size-numeric</td>
<td>uint64</td>
<td>Numeric equivalents for <code>snap-limit-size</code> values.</td>
</tr>
<tr>
<td>allocated-percent-pool</td>
<td>string</td>
<td>The percentage of the pool currently used by snapshots.</td>
</tr>
<tr>
<td>allocated-percent-snapspace</td>
<td>string</td>
<td>The percentage of the snapshot space currently used by snapshots.</td>
</tr>
<tr>
<td>allocated-size</td>
<td>uint16</td>
<td>The actual amount of space currently used by snapshots.</td>
</tr>
<tr>
<td>allocated-size-numeric</td>
<td>uint64</td>
<td>Numeric equivalents for <code>allocated-size</code> values.</td>
</tr>
<tr>
<td>snap-low-threshold</td>
<td>string</td>
<td>A percentage of the snapshot space designated as the low threshold.</td>
</tr>
<tr>
<td>snap-middle-threshold</td>
<td>string</td>
<td>A percentage of the snapshot space designated as the middle threshold.</td>
</tr>
<tr>
<td>snap-high-threshold</td>
<td>string</td>
<td>A percentage of the snapshot space designated as the high threshold.</td>
</tr>
<tr>
<td>limit-policy</td>
<td>string</td>
<td>The limit policy for when the percentage of the pool designated for snapshots is reached.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• notify-only: When the snapshot space is reached an event is generated and logged. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• delete: When the snapshot space is reached an event is generated and logged and automatic deletion of snapshots occurs.</td>
</tr>
<tr>
<td>limit-policy-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for <code>limit-policy</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: notify-only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: delete</td>
</tr>
</tbody>
</table>


This basetype is used by show snapshots.

### Table 105 snapshots properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Snapshot ID.</td>
</tr>
<tr>
<td>virtual-disk-name</td>
<td>string</td>
<td>The name of the vdisk or pool that contains the snapshot.</td>
</tr>
<tr>
<td>storage-pool-name</td>
<td>string</td>
<td>The name of the vdisk or pool that contains the snapshot.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Snapshot serial number.</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>Snapshot name.</td>
</tr>
<tr>
<td>creation-date-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC), when the snapshot was prepared or committed.</td>
</tr>
<tr>
<td>creation-date-time-numeric</td>
<td>uint32</td>
<td>Unformatted creation-date-time value.</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Snapshot status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unavailable: See the status-reason value.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>• 0: Available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nonzero: Unavailable</td>
</tr>
<tr>
<td>status-reason</td>
<td>string</td>
<td>Shows N/A for Available status, or one of the following reasons for Unavailable status:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• snapshot not found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• snap pool not found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• master volume not found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• snapshot pending (not yet committed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• snap pool not accessible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• master volume not accessible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Volume copy with modified data is in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rollback with modified data is in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown reason</td>
</tr>
<tr>
<td>status-reason-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status-reason values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: snapshot pending (not yet committed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: snap pool not accessible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: master volume not accessible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Rollback with modified data is in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Volume copy with modified data is in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: snapshot not found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: snap pool not found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: master volume not found</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 254: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• hex-code: Unknown reason</td>
</tr>
<tr>
<td>master-volume-name</td>
<td>string</td>
<td>Name of the volume of which the snapshot was taken.</td>
</tr>
<tr>
<td>volume-parent</td>
<td>string</td>
<td>The name of the volume of which the snapshot was taken.</td>
</tr>
</tbody>
</table>
### Table 105    snapshots properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>base-volume</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>base-serial-number</td>
<td>string</td>
<td>The serial number of the base volume.</td>
</tr>
<tr>
<td>num-children</td>
<td>uint32</td>
<td>The number of child snapshots (snapshots taken of this snapshot).</td>
</tr>
<tr>
<td>num-snaps-tree</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>snap-pool-name</td>
<td>string</td>
<td>• The name of the snap pool for linear snapshots.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank for virtual snapshots.</td>
</tr>
<tr>
<td>snap-data</td>
<td>string</td>
<td>The total amount of write data associated with the snapshot.</td>
</tr>
<tr>
<td>uniquedata</td>
<td>string</td>
<td>The amount of write data that is unique to the snapshot.</td>
</tr>
<tr>
<td>uniquedatum-numeric</td>
<td>uint32</td>
<td>Unformatted uniquedatum value in 512-byte blocks.</td>
</tr>
<tr>
<td>shareddata</td>
<td>string</td>
<td>The amount of write data that is shared between this snapshot and other snapshots.</td>
</tr>
<tr>
<td>shareddata-numeric</td>
<td>uint32</td>
<td>Unformatted shareddata value in 512-byte blocks.</td>
</tr>
<tr>
<td>retention-priority</td>
<td>string</td>
<td>The retention priority for the snapshot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• never-delete: Snapshots will never be deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• high: Snapshots may be deleted after all eligible medium-priority snapshots have been deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• medium: Snapshots may be deleted after all eligible low-priority snapshots have been deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• low: Snapshots may be deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Snapshots that are mapped or are not leaves of a volume's snapshot tree are not eligible for automatic deletion.</td>
</tr>
<tr>
<td>retention-priority-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for retention-priority values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: never-delete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: low</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>priority-value</td>
<td>string</td>
<td>Retention priority for the snapshot, based on the snapshot attributes and the user-defined retention priority for the snapshot type.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x2000: Queued snapshot. The snapshot was taken for remote replication but is queued, waiting for a previous replication to complete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x4000: Replication snapshot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x6000: Standard snapshot.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x8000: Common sync point. The latest snapshot that is copy-complete on all secondary volumes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0xa000: Volume-copy snapshot. Snapshot that is being used to copy data from a source volume to a destination volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0xc000: Replicating snapshot. Snapshot that is being replicated from a primary system to a secondary system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0xe000: Only sync point. The snapshot is the only sync point that is available on any secondary volume.</td>
</tr>
<tr>
<td>user_priority-value</td>
<td>string</td>
<td>User-defined retention priority for the snapshot type.</td>
</tr>
<tr>
<td>snapshot-type</td>
<td>string</td>
<td>Snapshot type.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Standard snapshot: Snapshot of a source volume that consumes a snapshot license.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Replication snapshot: For a primary or secondary volume, a snapshot that was created by a replication operation but is not a sync point.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Replication snapshot (Replicating): For a primary volume, a snapshot that is being replicated to a secondary system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Replication snapshot (Queued): For a primary volume, a snapshot associated with a replication operation that is waiting for a previous replication operation to complete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Replication snapshot (Awaiting replicate): For a primary volume, a snapshot that is waiting to be replicated to a secondary system.</td>
</tr>
</tbody>
</table>
### Table 105  snapshots properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>snapshot-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for snapshot-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00004000: Standard snapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x0000b000: Standard snapshot(DRM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00008000: Replication snapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00010000: Replication snapshot(Replicating)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00020000: Replication snapshot(Current sync point)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00040000: Replication snapshot(Common sync point)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00080000: Replication snapshot(Only sync point)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00100000: Replication snapshot(queued)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00200000: Replication snapshot(Awaiting replicate)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00800000: Replication snapshot(Common sync point)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0x00000000: N/A</td>
</tr>
<tr>
<td>storage-type</td>
<td>string</td>
<td>- Linear: Linear pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Virtual: Virtual pool.</td>
</tr>
<tr>
<td>storage-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: Linear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Virtual</td>
</tr>
<tr>
<td>total-size</td>
<td>uint64</td>
<td>The total size of the snapshot.</td>
</tr>
<tr>
<td>total-size-numeric</td>
<td>uint64</td>
<td>Unformatted total-size value in 512-byte blocks.</td>
</tr>
</tbody>
</table>
This basetype is used by show tasks for a TakeSnapshot task.

Table 106  snapshot-with-retention-tasks properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>master-volume-name</td>
<td>string</td>
<td>Source volume name.</td>
</tr>
<tr>
<td>master-volume-serial</td>
<td>string</td>
<td>Source volume serial number.</td>
</tr>
<tr>
<td>snapshot-prefix</td>
<td>string</td>
<td>A label to identify snapshots created by this task.</td>
</tr>
<tr>
<td>retention-count</td>
<td>uint32</td>
<td>Number of snapshots to retain with this prefix. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.</td>
</tr>
<tr>
<td>last-created</td>
<td>string</td>
<td>• The name of the last snapshot created by the task.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if the task has not created a snapshot.</td>
</tr>
<tr>
<td>snapshot</td>
<td>Embedded; see snap-tasks.</td>
<td></td>
</tr>
</tbody>
</table>
**snap-tasks**

This basetype is used by `show schedules`, and `show tasks` for a task that has created at least one snapshot.

**Table 107  snap-tasks properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>snapshot-name</td>
<td>string</td>
<td>Snapshot name.</td>
</tr>
<tr>
<td>snapshot-serial</td>
<td>string</td>
<td>Snapshot serial number.</td>
</tr>
</tbody>
</table>
This basetype is used by show snmp-parameters.

Table 108  snmp-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>snmp-enabled</td>
<td>string</td>
<td>Shows whether the Simple Network Management Protocol (SNMP) interface is enabled or disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disabled: SNMP is disabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled: SNMP is enabled.</td>
</tr>
<tr>
<td>snmp-enabled-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for snmp-enabled values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled</td>
</tr>
<tr>
<td>snmp-filter</td>
<td>string</td>
<td>Minimum level of events to include for SNMP traps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• crit: Only critical events are sent as traps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• error: Error and critical events are sent as traps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• warn: Warning, error, and critical events are sent as traps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• info: All events are sent as traps.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• none: No events are sent as traps and traps are disabled.</td>
</tr>
<tr>
<td>snmp-filter-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for snmp-filter values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: info</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: warn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: crit</td>
</tr>
<tr>
<td>snmp-trap-host-1</td>
<td>string</td>
<td>Trap host IP address.</td>
</tr>
<tr>
<td>snmp-trap-host-2</td>
<td>string</td>
<td>Trap host IP address.</td>
</tr>
<tr>
<td>snmp-trap-host-3</td>
<td>string</td>
<td>Trap host IP address.</td>
</tr>
<tr>
<td>snmp-read-community</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>snmp-write-community</td>
<td>string</td>
<td>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.</td>
</tr>
</tbody>
</table>
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 109 status properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>response-type</td>
<td>string</td>
<td>• Success: The command succeeded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Error: The command failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Info: The command returned an informational message.</td>
</tr>
<tr>
<td>response-type-numeric</td>
<td>uint32</td>
<td>• 0: Success</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Info</td>
</tr>
<tr>
<td>response</td>
<td>string</td>
<td>A message stating what the command accomplished, why the command failed, or information about the command's progress.</td>
</tr>
<tr>
<td>return-code</td>
<td>sint32</td>
<td>• 0: The command completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• -nnnnn: The command failed.</td>
</tr>
<tr>
<td>component-id</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>time-stamp</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC), when the command was issued.</td>
</tr>
<tr>
<td>time-stamp-numeric</td>
<td>uint32</td>
<td>Unformatted time-stamp value.</td>
</tr>
</tbody>
</table>
syslog-parameters

This basetype is used by `show syslog-parameters`.

### Table 110 syslog-parameters properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>syslog-host-ip</td>
<td>string</td>
<td>The IP address of the remote syslog server to use for the notifications.</td>
</tr>
<tr>
<td>syslog-notification-level</td>
<td>string</td>
<td>Shows the minimum severity for which the system sends notifications:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• crit: Sends notifications for Critical events only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• error: Sends notifications for Error and Critical events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• warn: Sends notifications for Warning, Error, and Critical events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• info: Sends notifications for all events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• none: Disables syslog notification and clears the settings.</td>
</tr>
<tr>
<td>syslog-notification-level-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for syslog-notification-level values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: crit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12: error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 14: warn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 15: info</td>
</tr>
<tr>
<td>syslog-host-port</td>
<td>uint32</td>
<td>The port on which the remote syslog facility is expected to listen for notifications.</td>
</tr>
</tbody>
</table>
This basetype is used by `show configuration` and `show system`.

### Table 111: System properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>system-name</td>
<td>string</td>
<td>The name of the storage system. The default is <code>Uninitialized Name</code>.</td>
</tr>
<tr>
<td>system-contact</td>
<td>string</td>
<td>The name of the person who administers the system. The default is <code>Uninitialized Contact</code>.</td>
</tr>
<tr>
<td>system-location</td>
<td>string</td>
<td>The location of the system. The default is <code>Uninitialized Location</code>.</td>
</tr>
<tr>
<td>system-information</td>
<td>string</td>
<td>A brief description of what the system is used for or how it is configured. The default is <code>Uninitialized Info</code>.</td>
</tr>
<tr>
<td>midplane-serial-number</td>
<td>string</td>
<td>The serial number of the controller enclosure midplane.</td>
</tr>
<tr>
<td>vendor-name</td>
<td>string</td>
<td>The vendor name.</td>
</tr>
<tr>
<td>product-id</td>
<td>string</td>
<td>The product model identifier.</td>
</tr>
<tr>
<td>product-brand</td>
<td>string</td>
<td>The product brand name.</td>
</tr>
<tr>
<td>scsi-vendor-id</td>
<td>string</td>
<td>The vendor name returned by the SCSI INQUIRY command.</td>
</tr>
<tr>
<td>scsi-product-id</td>
<td>string</td>
<td>The product identifier returned by the SCSI INQUIRY command.</td>
</tr>
<tr>
<td>enclosure-count</td>
<td>uint32</td>
<td>The number of enclosures in the system.</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK&lt;br&gt;• Degraded&lt;br&gt;• Fault&lt;br&gt;• N/A&lt;br&gt;• Unknown</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.&lt;br&gt;• 0: OK&lt;br&gt;• 1: Degraded&lt;br&gt;• 2: Fault&lt;br&gt;• 3: Unknown&lt;br&gt;• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>other-MC-status</td>
<td>string</td>
<td>The operational status of the Management Controller in the partner controller. This is not factored into system health.&lt;br&gt;• Operational&lt;br&gt;• Not Operational&lt;br&gt;• Not Communicating&lt;br&gt;• Unknown</td>
</tr>
<tr>
<td>other-MC-status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for other-MC-status values.&lt;br&gt;• 1524: Not Communicating&lt;br&gt;• 3231: Not Operational&lt;br&gt;• 4749: Operational&lt;br&gt;• 1496: Unknown</td>
</tr>
<tr>
<td>pfuStatus</td>
<td>string</td>
<td>Shows whether partner firmware update is running on the system, or is idle.</td>
</tr>
</tbody>
</table>
## Table 111  system properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>supported-locales</td>
<td>string</td>
<td>Supported display languages: Arabic (ar), Portuguese (pt), 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).</td>
</tr>
<tr>
<td>current-node-wwn</td>
<td>string</td>
<td>Storage system node World Wide Name (WWNN).</td>
</tr>
</tbody>
</table>
| fde-security-status   | string     | • Unsecured: The system has not been secured with a passphrase.  
  • Secured: The system has been secured with a passphrase.  
  • Secured, Lock Ready: The system has been secured and lock keys are clear. The system will become locked after the next power cycle.  
  • Secured, Locked: The system is secured and the disks are locked to data access, preventing their use. |
| fde-security-status-numeric | uint32 | Numeric equivalents for fde-security-status values.  
  • 1: Unsecured  
  • 2: Secured  
  • 3: Secured, Lock Ready  
  • 4: Secured, Locked |
| platform-type         | string     | Platform type.                                                                                                                               |
| platform-type-numeric | uint32     | Numeric equivalent for the platform-type value.                                                                                              |
| platform-brand        | string     | Platform brand.                                                                                                                              |
| platform-brand-numeric | uint32 | Numeric equivalent for the platform-brand value.                                                                                          |
| redundancy-mode       | Embedded    | Embedded; see redundancy.                                                                                                                     |
| unhealthy-component   | Embedded    | Embedded; see unhealthy-component.                                                                                                           |
This basetype is used by `show system-parameters`.

Table 112  system-parameters-table properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ulp-enabled</td>
<td>string</td>
<td>Shows true to indicate that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>profiles-enabled</td>
<td>string</td>
<td>Shows whether host profiles are enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- true: Host profiles are enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- false: Host profiles are disabled.</td>
</tr>
<tr>
<td>max-ports</td>
<td>uint32</td>
<td>Number of host-interface ports in the controller enclosure.</td>
</tr>
<tr>
<td>max-drives</td>
<td>uint32</td>
<td>Number of disks that the system supports.</td>
</tr>
<tr>
<td>max-volumes</td>
<td>uint32</td>
<td>Number of volumes that the system supports.</td>
</tr>
<tr>
<td>max-vdisks</td>
<td>uint32</td>
<td>Number of linear disk groups that the system supports.</td>
</tr>
<tr>
<td>max-luns</td>
<td>uint32</td>
<td>Number of LUNs that the system supports.</td>
</tr>
<tr>
<td>max-owned-arrays-per-controller</td>
<td>uint32</td>
<td>Number of linear disk groups that each controller supports.</td>
</tr>
<tr>
<td>max-storage-pools-per-controller</td>
<td>uint32</td>
<td>The number of virtual pools that each controller supports.</td>
</tr>
<tr>
<td>max-components-per-storage-pool</td>
<td>uint32</td>
<td>The number of virtual pools that each pool can contain.</td>
</tr>
<tr>
<td>max-capi-arrays</td>
<td>uint32</td>
<td>Same as max-vdisks.</td>
</tr>
<tr>
<td>max-chunk-size</td>
<td>uint32</td>
<td>Maximum chunk size for disk groups.</td>
</tr>
<tr>
<td>min-chunk-size</td>
<td>uint32</td>
<td>Minimum chunk size for disk groups.</td>
</tr>
<tr>
<td>physical-position-offset</td>
<td>uint32</td>
<td>Starting index for physical components (enclosures, disks, etc.) in the storage system.</td>
</tr>
<tr>
<td>backoff-percentage</td>
<td>uint32</td>
<td>Percentage of disk capacity that is reserved to compensate for minor capacity differences between disk drives so they can be used interchangeably.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This is not settable by users. The default is 1 percent.</td>
</tr>
<tr>
<td>vdisk-metadata-size-perdisk-blocks</td>
<td>uint32</td>
<td>Amount of space reserved on a disk for metadata, in 512-byte blocks.</td>
</tr>
<tr>
<td>vdisk-metadata-size-blocks</td>
<td>uint32</td>
<td>Amount of metadata, in blocks, stored on each disk.</td>
</tr>
<tr>
<td>max-host-groups</td>
<td>uint32</td>
<td>The number of host groups that the system supports.</td>
</tr>
<tr>
<td>max-hosts-per-host-group</td>
<td>uint32</td>
<td>The maximum number of hosts that a host group can contain.</td>
</tr>
<tr>
<td>max-initiator</td>
<td>uint32</td>
<td>The maximum number of initiators that a host can contain.</td>
</tr>
</tbody>
</table>
### Table 112  system-parameters-table properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>max-volume-groups-per-controller</td>
<td>uint32</td>
<td>The maximum number of volume groups that each controller supports.</td>
</tr>
<tr>
<td>max-volumes-per-volume-group</td>
<td>uint32</td>
<td>The maximum number of volumes that a volume group can contain.</td>
</tr>
<tr>
<td>max-replication-sets</td>
<td>uint32</td>
<td>Number of replication sets that the system supports.</td>
</tr>
<tr>
<td>max-enclosures</td>
<td>uint32</td>
<td>Number of enclosures that the system supports.</td>
</tr>
<tr>
<td>local-controller</td>
<td>string</td>
<td>The ID of the controller you are accessing.</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>A: Controller A.</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>B: Controller B.</td>
</tr>
<tr>
<td>local-controller-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for local-controller values.</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>0: B</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>1: A</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Last six digits of the midplane serial number.</td>
</tr>
<tr>
<td>external-targetid-control</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>external-targetid-control-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>lan-heartbeat</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>lan-heartbeat-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>ip-address-mode</td>
<td>string</td>
<td>• CAPI_TWO_IP_ADDRESSES_MODE: Dual controller system has a unique IP address for each controller.</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>CAPI_ONE_IP_ADDRESS_MODE: Dual controller system has the same IP address for both controllers, only one active at a time.</td>
</tr>
<tr>
<td>ip-address-mode-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for lan-heartbeat values.</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>0: CAPI_TWO_IP_ADDRESSES_MODE</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>1: CAPI_ONE_IP_ADDRESS_MODE</td>
</tr>
<tr>
<td>debug-flags</td>
<td>uint32</td>
<td>For use by service personnel.</td>
</tr>
<tr>
<td>enclosure-flags</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>num-global-spares</td>
<td>uint32</td>
<td>Number of global-spare disks defined in the storage system.</td>
</tr>
<tr>
<td>dynamic-spare-rescan-rate</td>
<td>uint32</td>
<td>Interval at which the system is scanned for disks automatically designated as spares, if the dynamic spares feature is enabled.</td>
</tr>
<tr>
<td>performance-tuning-flags</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>performance-tuning-flags-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for performance-tuning values.</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>0: Disabled</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>1: Enabled</td>
</tr>
<tr>
<td>min-backing-store-size</td>
<td>uint32</td>
<td>Minimum snap-pool size in blocks.</td>
</tr>
<tr>
<td>max-fc-speed</td>
<td>string</td>
<td>Maximum FC host-port speed.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>max-fc-speed-numeric</td>
<td>uint32</td>
<td>Numeric equivalent for the max-fc-speed value.</td>
</tr>
<tr>
<td>max-iscsi-speed</td>
<td>string</td>
<td>Maximum iSCSI host-port speed.</td>
</tr>
<tr>
<td>max-iscsi-speed-numeric</td>
<td>uint32</td>
<td>Numeric equivalent for the max-iscsi-speed value.</td>
</tr>
<tr>
<td>max-peers-allowed</td>
<td>uint32</td>
<td>The maximum number of peer connections that the system supports.</td>
</tr>
<tr>
<td>peers-in-use-count</td>
<td>uint32</td>
<td>The number of peer connections present in the system.</td>
</tr>
<tr>
<td>max-ar-vols-allowed</td>
<td>uint32</td>
<td>The maximum number of virtual replication volumes that the system supports.</td>
</tr>
<tr>
<td>ar-sets-in-use-count</td>
<td>uint32</td>
<td>The number of virtual replication volumes present in the system.</td>
</tr>
<tr>
<td>linear-replication-configured</td>
<td>string</td>
<td>• False: No linear replication sets exist on the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• True: At least one linear replication set exists on the system.</td>
</tr>
<tr>
<td>linear-replication-configured-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for linear-replication-configured values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: False</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: True</td>
</tr>
<tr>
<td>virtual-replication-configured</td>
<td>string</td>
<td>• False: No virtual replication sets exist on the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• True: At least one virtual replication set exists on the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: False</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: True</td>
</tr>
</tbody>
</table>
This basetype is used by `show tasks`.

### Table 113  tasks properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Task name.</td>
</tr>
<tr>
<td>type</td>
<td>string</td>
<td>Type of operation this task performs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- TakeSnapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ResetSnapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VolumeCopy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ReplicateVolume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Replicate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- EnableDSD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DisableDSD</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Task status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Uninitialized: Task is not yet ready to run.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ready: Task is ready to run.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Active: Task is running.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Error: Task has an error.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Invalid: Task is invalid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Complete: The task is complete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Deleted: The task has been deleted.</td>
</tr>
<tr>
<td>state</td>
<td>string</td>
<td>Current step of the task.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- For an EnableDSD or DisableDSD task:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Start</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- For a TakeSnapshot task:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Start</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VerifyVolume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ValidateLicensingLimit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- CreateName</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- CreateSnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VerifySnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- InspectRetention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FindOldestSnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- UnmapSnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ResetSnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RenameSnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- For a ResetSnapshot task:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Start</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VerifySnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- UnmapSnap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ResetSnap</td>
</tr>
</tbody>
</table>
Table 113  tasks properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>error-message</td>
<td>string</td>
<td>If an error occurred while processing the task, the error message.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blank if no error has occurred.</td>
</tr>
<tr>
<td>associated-vdisk-serial</td>
<td>string</td>
<td>For a VolumeCopy task, the serial number of the destination vdisk.</td>
</tr>
</tbody>
</table>
This basetype is used by `show pool-statistics` when the `historical` parameter is specified.

### Table 114  tier-hist-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>number-of-ios</td>
<td>uint64</td>
<td>Total number of read and write operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>Number of read operations since the last sampling time.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>Number of write operations since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred</td>
<td>uint64</td>
<td>Total amount of data read and written since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred-numeric</td>
<td>uint64</td>
<td>Unformatted total-data-transferred value.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since the last sampling time.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>total-iops</td>
<td>uint64</td>
<td>Total number of read and write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>read-iops</td>
<td>uint64</td>
<td>Number of read operations per second since the last sampling time.</td>
</tr>
<tr>
<td>write-iops</td>
<td>uint64</td>
<td>Number of write operations per second since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec</td>
<td>uint64</td>
<td>Total data transfer rate, in bytes per second, since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted total-bytes-per-second value.</td>
</tr>
<tr>
<td>read-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>read-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted read-bytes-per-second value.</td>
</tr>
<tr>
<td>write-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for write operations last sampling time.</td>
</tr>
<tr>
<td>write-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted write-bytes-per-second value.</td>
</tr>
<tr>
<td>number-of-allocated-pages</td>
<td>uint64</td>
<td>The number of 4-MB pages allocated to volumes in the pool.</td>
</tr>
<tr>
<td>number-of-page-moves-in</td>
<td>uint64</td>
<td>The number of pages moved into this tier from a different tier.</td>
</tr>
<tr>
<td>number-of-page-moves-out</td>
<td>uint64</td>
<td>The number of pages moved out of this tier to other tiers.</td>
</tr>
<tr>
<td>number-of-page-rebalances</td>
<td>uint64</td>
<td>The number of pages moved between disks in this tier to automatically load balance.</td>
</tr>
<tr>
<td>number-of-initial-allocations</td>
<td>uint64</td>
<td>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.)</td>
</tr>
</tbody>
</table>
Table 114  tier-hist-statistics properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>number-of-unmaps</td>
<td>uint64</td>
<td>The number of 4-MB pages that are automatically reclaimed and deallocated because they are empty (they contain only zeroes for data).</td>
</tr>
<tr>
<td>number-of-rfc-copies</td>
<td>uint64</td>
<td>The number of 4-MB pages copied from spinning disks to SSD read cache (read flash cache).</td>
</tr>
<tr>
<td>number-of-zero-pages-reclaimed</td>
<td>uint64</td>
<td>The number of empty (zero-filled) pages that were reclaimed during this sample period.</td>
</tr>
<tr>
<td>sample-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds</code>, when the data sample was taken.</td>
</tr>
</tbody>
</table>
This basetype is used by `show tier-statistics` and `show pool-statistics`.

### Table 115  tier-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the tier or pool.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>The name of the pool.</td>
</tr>
</tbody>
</table>
| tier               | string   | - Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).  
                     |          | - Performance: The highest storage tier, which uses SSDs (high speed).     |
|                    |          | - Read Cache: The tier that provides read cache for a storage pool.        |
|                    |          | - Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity). |
| tier-numeric       | uint32   | Numeric equivalents for tier values.                                        |
|                    |          | - 0: N/A                                                                   |
|                    |          | - 1: Performance                                                          |
|                    |          | - 2: Standard                                                             |
|                    |          | - 4: Archive                                                              |
|                    |          | - 8: Read Cache                                                           |
| pages-alloc-per-minute | uint32   | The rate, in pages per minute, at which pages are allocated to volumes in the pool because they need more space to store data. |
| pages-dealloc-per-minute | uint32 | The rate, in pages per minute, at which pages are deallocated from volumes in the pool because they no longer need the space to store data. |
| pages-reclaimed    | uint32   | The number of 4-MB pages that have been automatically reclaimed and deallocated because they are empty (they contain only zeroes for data). |
| num-pages-unmap-per-minute | uint32 | The number of 4-MB pages that host systems have unmapped per minute, through use of the SCSI UNMAP command, to free storage space as a result of deleting files or formatting volumes on the host. |
| resettable-statistics | Embedded; see resettable-statistics.                                      |
**tier-summary**

This basetype is used by `show pool-statistics` when the `historical` parameter is specified.

**Table 116  tier-summary properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the pool.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>The name of the pool.</td>
</tr>
<tr>
<td>tier</td>
<td>string</td>
<td>• Archive: The lowest storage tier, which uses midline spinning SAS disks (&lt;10k RPM, high capacity).&lt;br&gt;• Performance: The highest storage tier, which uses SSDs (high speed).&lt;br&gt;• Read Cache: The tier that provides read cache for a storage pool.&lt;br&gt;• Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity).</td>
</tr>
<tr>
<td>tier-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for tier values.&lt;br&gt;• 0: N/A&lt;br&gt;• 1: Performance&lt;br&gt;• 2: Standard&lt;br&gt;• 4: Archive&lt;br&gt;• 8: Read Cache</td>
</tr>
<tr>
<td>tier-hist-statistics</td>
<td>Embedded; see tier-hist-statistics.</td>
<td></td>
</tr>
<tr>
<td>readcache-hist-statistics</td>
<td>Embedded; see readcache-hist-statistics. (MSA 2040 only)</td>
<td></td>
</tr>
</tbody>
</table>
**tiers**

This basetype is used by `show pools` and `show tiers`.

### Table 117 tiers properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the tier.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>The name of the pool.</td>
</tr>
</tbody>
</table>
| tier                | string   | - Archive: The lowest storage tier, which uses midline spinning SAS disks (<10k RPM, high capacity).  
                     |          | - Performance: The highest storage tier, which uses SSDs (high speed).     |
|                     |          | - Read Cache: The tier that provides read cache for a storage pool.       |
|                     |          | - Standard: The tier that uses enterprise-class spinning SAS disks (10k/15k RPM, higher capacity). |
| tier-numeric        | uint32   | Numeric equivalents for tier values.                                       |
|                     |          | - 0: N/A                                                                   |
|                     |          | - 1: Performance                                                           |
|                     |          | - 2: Standard                                                              |
|                     |          | - 4: Archive                                                               |
|                     |          | - 8: Read Cache                                                            |
| pool-percentage     | uint8    | The percentage of pool capacity that the tier occupies.                    |
| diskcount           | uint8    | The number of disks in the tier.                                           |
| raw-size            | string   | The raw capacity of the disks in the tier, irrespective of space reserved for RAID overhead and so forth, formatted to use the current base, precision, and units. |
| raw-size-numeric    | uint64   | Unformatted 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.       |
This basetype is used by `show controller-date`.

Table 118  time-settings-table properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>date-time</td>
<td>string</td>
<td>Date and time, in the format <code>year-month-day hour:minutes:seconds (UTC)</code>, reported by the controller being accessed.</td>
</tr>
<tr>
<td>date-time-numeric</td>
<td>uint32</td>
<td>Unformatted date-time value.</td>
</tr>
<tr>
<td>time-zone-offset</td>
<td>string</td>
<td>The system's time zone as an offset in hours and minutes from UTC. This is shown only if NTP is enabled.</td>
</tr>
<tr>
<td>ntp-state</td>
<td>string</td>
<td>Shows whether Network Time Protocol (NTP) is in use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• activated: NTP is enabled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• deactivated: NTP is disabled. This is the default.</td>
</tr>
<tr>
<td>ntp-address</td>
<td>string</td>
<td>NTP server IP address, or <code>0.0.0.0</code> if not set.</td>
</tr>
</tbody>
</table>
unhealthy-component

This basetype is used by all commands that show component health.

Table 119 unhealthy-component properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>component-type</td>
<td>string</td>
<td>Component type.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• super-cap: Supercapacitor pack</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MC: Management Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• port: Host port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• controller: Controller module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• expansion module: Expansion module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PSU: Power supply unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• disk: Disk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• enclosure: Enclosure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vdisk: Vdisk (v2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• disk group: Disk group (v3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CompactFlash</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• disk slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• network port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• virtual pool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• virtual disk group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• snap pool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• volume: Source volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• replication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• replication volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• replication set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• volume map</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• system</td>
</tr>
</tbody>
</table>
Table 119  unhealthy-component properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>component-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for component-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: super-cap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: MC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: expansion module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: PSU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: disk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: enclosure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: vdisk (v2) or disk group (v3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: fan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: CompactFlash</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: disk slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 12: SAS port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 13: sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 14: network port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 15: virtual pool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 16: virtual disk group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 17: volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 18: snap pool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 19: volume (source volume)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20: snapshot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 21: host</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 22: replication image</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 23: replication volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 24: replication set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 25: volume map</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 26: system</td>
</tr>
<tr>
<td>component-id</td>
<td>string</td>
<td>Component identifier, such as A for controller A.</td>
</tr>
<tr>
<td>basetype</td>
<td>string</td>
<td>Component basetype.</td>
</tr>
<tr>
<td>primary-key</td>
<td>string</td>
<td>Durable ID of the component.</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>Component health.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
</tbody>
</table>
### Table 119  unhealthy-component properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
</tbody>
</table>
unwritable-cache

This basetype is used by `show unwritable-cache`.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>unwritable-a-percentage</td>
<td>uint8</td>
<td>The percentage of cache space occupied by unwritable data in controller A.</td>
</tr>
<tr>
<td>unwritable-b-percentage</td>
<td>uint8</td>
<td>The percentage of cache space occupied by unwritable data in controller B.</td>
</tr>
</tbody>
</table>
This basetype is used by `show users`.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>username</td>
<td>string</td>
<td>User name.</td>
</tr>
</tbody>
</table>
| roles             | string | • monitor: User can view but not change system settings.  
|                   |        | • manage: User can view and change system settings.  
|                   |        | • admin: User can view and change system settings.  
|                   |        | • diagnostic: User can view and change system settings.                  |
| user-type         | string | The user's level of technical expertise: Novice, Standard, Advanced, or Diagnostic. This parameter does not affect access to commands. The default is Standard. |
| user-type-numeric | string | Numeric equivalents for user-type values.                                |
|                   |        | • 1: Novice  
|                   |        | • 2: Standard  
|                   |        | • 3: Advanced  
|                   |        | • 4: Diagnostic                                                  |
| user-locale       | string | Display language for this user. The default is English.                  |
| user-locale-numeric | string | Numeric equivalents for user-locale values.                             |
|                   |        | • 0: English  
|                   |        | • 1: Spanish  
|                   |        | • 2: French  
|                   |        | • 3: German  
|                   |        | • 4: Italian  
|                   |        | • 5: Japanese  
|                   |        | • 6: Netherlands  
|                   |        | • 7: Simplified Chinese  
|                   |        | • 8: Traditional Chinese  
|                   |        | • 9: Korean  
|                   |        | • 10: Arabic  
|                   |        | • 11: Portuguese  
|                   |        | • 12: Russian  
| interface-access-WBI | string | • x: User can use the web-browser interface (the SMU). This is the default.  
|                   |        | • (blank): User cannot access this interface.                          |
| interface-access-CLI | string | • x: User can use the command-line interface.  
|                   |        | • (blank): User cannot access this interface. This is the default.     |
| interface-access-FTP | string | • x: User can use the FTP interface.  
|                   |        | • (blank): User cannot access this interface. This is the default.     |
| interface-access-SMIS | string | • x: User can use the Storage Management Initiative Specification (SMI-S) interface.  
|                   |        | • (blank): User cannot access this interface. This is the default.     |
## Table 121  

**Name** | **Type** | **Description**
--- | --- | ---
**interface-access-SNMP** | string | • **U:** The user can access the SNMPv3 interface and view the MIB.
• **T:** The user can access the SNMPv3 interface and receive trap notifications.
• (blank): User cannot access this interface. This is the default.
**storage-size-base** | uint8 | 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.
**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 | The unit for display of storage-space sizes.
• **auto:** Lets the system determine the proper unit for a size. This is the default.
• **MB:** Megabytes.
• **GB:** Gigabytes.
• **TB:** Terabytes.
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.
**temperature-scale** | string | • **Celsius:** Use the Celsius scale to display temperature values. This is the default.
• **Fahrenheit:** Use the Fahrenheit scale to display temperature values.
**timeout** | uint32 | Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes). The default is 1800 seconds (30 minutes).
**authentication-type** | string | For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.
• **none:** No authentication.
• **MD5:** MD5 authentication. This is the default.
• **SHA:** SHA (Secure Hash Algorithm) authentication.
**privacy-type** | string | For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the privacy-password property and the authentication-type property.
• **none:** No encryption. This is the default.
• **DES:** Data Encryption Standard.
• **AES:** Advanced Encryption Standard.
**password** | string | User password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password.
**privacy-password** | string | Encryption password for an SNMPv3 user whose privacy type is set to **DES** or **AES**.
**trap-destination** | string | For an SNMPv3 user whose **interface-access-SNMP** property is set to **snmptarget**, 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 122 vdisk-hist-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>total-data-transferred</td>
<td>uint64</td>
<td>Total amount of data read and written since the last sampling time.</td>
</tr>
<tr>
<td>total-data-transferred-numeric</td>
<td>uint64</td>
<td>Unformatted total-data-transferred value.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since the last sampling time.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since the last sampling time.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>total-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, since the last sampling time.</td>
</tr>
<tr>
<td>total-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted total-bytes-per-second value.</td>
</tr>
<tr>
<td>read-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for read operations since the last sampling time.</td>
</tr>
<tr>
<td>read-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted read-bytes-per-second value.</td>
</tr>
<tr>
<td>write-bytes-per-sec</td>
<td>uint64</td>
<td>Data transfer rate, in bytes per second, for write operations since the last sampling time.</td>
</tr>
<tr>
<td>write-bytes-per-sec-numeric</td>
<td>uint64</td>
<td>Unformatted write-bytes-per-second value.</td>
</tr>
<tr>
<td>sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when the data sample was taken.</td>
</tr>
<tr>
<td>sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted sample-time value.</td>
</tr>
</tbody>
</table>
vdisk-statistics

This basetype is used by show vdisk-statistics when the historical parameter is omitted.

Table 123  vdisk-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Vdisk name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Vdisk serial number.</td>
</tr>
<tr>
<td>bytes-per-second</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second-numeric</td>
<td>uint64</td>
<td>Unformatted bytes-per-second value.</td>
</tr>
<tr>
<td>iops</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>Number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>Number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>Amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>Amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>avg-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>avg-read-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>avg-write-rsp-time</td>
<td>uint32</td>
<td>Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.</td>
</tr>
<tr>
<td>reset-time</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>reset-time-numeric</td>
<td>uint32</td>
<td>Unformatted reset-time value.</td>
</tr>
<tr>
<td>start-sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when sampling started for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>start-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted start-sample-time value.</td>
</tr>
<tr>
<td>stop-sample-time</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds, when sampling stopped for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>stop-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted stop-sample-time value.</td>
</tr>
</tbody>
</table>
This basetype is used by show configuration, show versions, and versions (Deprecated).

### Table 124 versions properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sc-cpu-type</td>
<td>string</td>
<td>Storage Controller processor type.</td>
</tr>
<tr>
<td>bundle-version</td>
<td>string</td>
<td>Firmware bundle version.</td>
</tr>
<tr>
<td>build-date</td>
<td>string</td>
<td>Firmware bundle build date.</td>
</tr>
<tr>
<td>sc-fw</td>
<td>string</td>
<td>Storage Controller firmware version.</td>
</tr>
<tr>
<td>sc-baselevel</td>
<td>string</td>
<td>Storage Controller firmware base level.</td>
</tr>
<tr>
<td>sc-memory</td>
<td>string</td>
<td>Storage Controller memory-controller FPGA firmware version.</td>
</tr>
<tr>
<td>sc-loader</td>
<td>string</td>
<td>Storage Controller loader firmware version.</td>
</tr>
<tr>
<td>capi-version</td>
<td>string</td>
<td>Configuration API (CAPI) version.</td>
</tr>
<tr>
<td>mc-fw</td>
<td>string</td>
<td>Management Controller firmware version.</td>
</tr>
<tr>
<td>mc-loader</td>
<td>string</td>
<td>Management Controller loader firmware version.</td>
</tr>
<tr>
<td>fw-default-platform-brand</td>
<td>string</td>
<td>Default platform brand of the MC firmware.</td>
</tr>
<tr>
<td>ec-fw</td>
<td>string</td>
<td>Expander Controller firmware version.</td>
</tr>
<tr>
<td>pld-rev</td>
<td>string</td>
<td>Complex Programmable Logic Device (CPLD) firmware version.</td>
</tr>
<tr>
<td>prm-version</td>
<td>string</td>
<td>CPLD Power Reset Manager (PRM) version.</td>
</tr>
<tr>
<td>hw-rev</td>
<td>string</td>
<td>Controller hardware version.</td>
</tr>
<tr>
<td>him-rev</td>
<td>string</td>
<td>Host interface module revision.</td>
</tr>
<tr>
<td>him-model</td>
<td>string</td>
<td>Host interface module model.</td>
</tr>
<tr>
<td>backplane-type</td>
<td>uint8</td>
<td>Backplane type.</td>
</tr>
<tr>
<td>host-channel_revision</td>
<td>uint8</td>
<td>Host interface hardware (chip) version.</td>
</tr>
<tr>
<td>disk-channel_revision</td>
<td>uint8</td>
<td>Disk interface hardware (chip) version.</td>
</tr>
<tr>
<td>mrc-version</td>
<td>string</td>
<td>Memory Reference Code (MRC) version for Storage Controller boot Flash.</td>
</tr>
<tr>
<td>ctk-version</td>
<td>string</td>
<td>• version: Customization Toolkit (CTK) version applied to the system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not present: No CTK version has been applied to this system.</td>
</tr>
</tbody>
</table>
virtual-disk-summary

This basetype is used by show vdisk-statistics when the historical parameter is specified.

Table 125  virtual-disk-summary properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Vdisk name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Vdisk serial number.</td>
</tr>
<tr>
<td>vdisk-hist-statistics</td>
<td>Embedded</td>
<td>see vdisk-hist-statistics.</td>
</tr>
</tbody>
</table>
### virtual-disks

This basetype is used by `show configuration` and `show vdisks`.

#### Table 126 virtual-disks properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Vdisk name.</td>
</tr>
<tr>
<td>size</td>
<td>string</td>
<td>Vdisk capacity, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint32</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>freespace</td>
<td>string</td>
<td>Amount of free (available) space in the vdisk, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>freespace-numeric</td>
<td>uint32</td>
<td>Unformatted freespace value in 512-byte blocks.</td>
</tr>
<tr>
<td>owner</td>
<td>string</td>
<td>Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>preferred-owner</td>
<td>string</td>
<td>Controller that owns the vdisk and its volumes during normal operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>preferred-owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for preferred-owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>raidtype</td>
<td>string</td>
<td>Vdisk RAID level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NRAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID50</td>
</tr>
<tr>
<td>raidtype-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for raidtype values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: RAID0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: RAID1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: RAID3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: RAID5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: NRAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: RAID50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: RAID10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: RAID6</td>
</tr>
</tbody>
</table>
Table 126  virtual-disks properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>storage-type</td>
<td>string</td>
<td>• Linear: The disk group acts as a linear pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Virtual: The disk group is in a virtual pool.</td>
</tr>
<tr>
<td>storage-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Linear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Virtual</td>
</tr>
<tr>
<td>diskcount</td>
<td>uint16</td>
<td>Number of disks in the vdisk.</td>
</tr>
<tr>
<td>sparecount</td>
<td>uint16</td>
<td>Number of spare disks assigned to the vdisk.</td>
</tr>
<tr>
<td>chunksize</td>
<td>string</td>
<td>• For RAID levels except NRAID, RAID 1, and RAID 50, the configured chunk size for the vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For NRAID and RAID 1, chunk size has no meaning and is therefore shown as not applicable (N/A).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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).</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>Vdisk status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CRIT: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DMGD: Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FTDN: Fault tolerant with a down disk. The vdisk is online and fault tolerant, but some of its disks are down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• FTOL: Fault tolerant and online.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MSNG: Missing. The disk group is online and fault tolerant, but some of its disks are missing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OFFL: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• QTPO: Quarantined offline. The vdisk is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID-0 vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• STOP: The vdisk is stopped.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UP: Up. The vdisk is online and does not have fault-tolerant attributes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• UNKN: Unknown.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: FTOL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: FTDN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: CRIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: OFFL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: QTCR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: QTOF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: QTDN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: STOP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: MSNG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 9: DMGD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 250: UP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• other: UNKN</td>
</tr>
<tr>
<td>lun</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>min-drive-size</td>
<td>string</td>
<td>Minimum disk size that can this vdisk can use, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>min-drive-size-numeric</td>
<td>uint32</td>
<td>Unformatted min-drive-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>create-date</td>
<td>string</td>
<td>Date and time, in the format year-month-day hour:minutes:seconds (UTC), when the vdisk was created.</td>
</tr>
<tr>
<td>create-date-numeric</td>
<td>uint32</td>
<td>Unformatted create-date value.</td>
</tr>
<tr>
<td>cache-read-ahead</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>cache-read-ahead-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>cache-flush-period</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>read-ahead-enabled</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>read-ahead-enabled-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>write-back-enabled</td>
<td>string</td>
<td>Not used.</td>
</tr>
<tr>
<td>write-back-enabled-numeric</td>
<td>uint32</td>
<td>Not used.</td>
</tr>
<tr>
<td>job-running</td>
<td>string</td>
<td>Same as current-job.</td>
</tr>
</tbody>
</table>
### Table 126  virtual-disks properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>current-job</td>
<td>string</td>
<td>Job running on the vdisk, if any.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- (blank): No job is running.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DRSC: A disk is being scrubbed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- EXPD: The vdisk is being expanded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- INIT: The vdisk is initializing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RCON: The vdisk is being reconstructed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VDRAIN: The virtual disk group is being removed and its data is being</td>
</tr>
<tr>
<td></td>
<td></td>
<td>drained to another disk group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRECV: The virtual disk group is being recovered to restore its membership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the virtual pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VREMV: The disk group and its data are being removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRFY: The vdisk is being verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- VRSC: The vdisk is being scrubbed.</td>
</tr>
<tr>
<td>current-job-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for current-job values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 0: (blank)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2: INIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 3: RCON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4: VRFY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 5: EXPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 6: VRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 7: DRSC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 9: VREMV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 12: VPREP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 13: VDRAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 14: VRECV</td>
</tr>
<tr>
<td>current-job-completion</td>
<td>string</td>
<td>0%–99%: Percent complete of running job.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(blank): No job is running (job has completed).</td>
</tr>
<tr>
<td>num-array-partitions</td>
<td>uint32</td>
<td>Number of volumes in the vdisk.</td>
</tr>
<tr>
<td>largest-free-partition-space</td>
<td>string</td>
<td>The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>largest-free-partition-space-numeric</td>
<td>uint32</td>
<td>Unformatted largest-free-partition-space value in 512-byte blocks.</td>
</tr>
<tr>
<td>num-drives-low-level-array</td>
<td>uint8</td>
<td>For a RAID-10 or RAID-50 vdisk, the number of disks in each sub-vdisk.</td>
</tr>
<tr>
<td>num-expansion-partitions</td>
<td>uint8</td>
<td>Not used.</td>
</tr>
<tr>
<td>num-partition-segments</td>
<td>uint8</td>
<td>Number of free segments available for expansion of volumes.</td>
</tr>
</tbody>
</table>
Table 126  virtual-disks properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>new-partition-lba</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>array-drive-type</td>
<td>string</td>
<td>Type of disks used in the vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS: Enterprise SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SAS MDL: Midline SAS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sSAS: SAS SSD.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MIX: Mixture of enterprise SAS and midline SAS disks.</td>
</tr>
<tr>
<td>array-drive-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for array-drive-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: MIX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: SAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: sSAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: SAS MDL</td>
</tr>
<tr>
<td>is-job-auto-abortable</td>
<td>string</td>
<td>• false: The current job must be manually aborted before you can delete the vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• true: The current job will automatically abort if you delete the vdisk.</td>
</tr>
<tr>
<td>is-job-auto-abortable-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for is-job-auto-abortable values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: false</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: true</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Vdisk serial number.</td>
</tr>
<tr>
<td>blocks</td>
<td>uint64</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>disk-dsd-enable-vdisk</td>
<td>string</td>
<td>• Disabled: DSD is disabled for the vdisk. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enabled - all spinning: DSD is enabled for the vdisk.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Partial spin-down: DSD is enabled for the vdisk and its disks are partially spun down to conserve power.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Full spin-down: DSD is enabled for the vdisk and its disks are fully spun down to conserve power.</td>
</tr>
<tr>
<td>disk-dsd-enable-vdisk-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for disk-dsd-enable-vdisk values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Enabled - all spinning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Partial spin-down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Full spin-down</td>
</tr>
<tr>
<td>disk-dsd-delay-vdisk</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>scrub-duration-goal</td>
<td>uint16</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| pool-sector-format | string | 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). |
| pool-sector-format-numeric | uint32 | Numeric equivalents for pool-sector-numeric values.  
- 0: 512n  
- 1: 512e  
- 3: Mixed |
| health | string | • OK  
• Degraded  
• Fault  
• Unknown  
• N/A |
| health-numeric | uint32 | Numeric equivalents for health values.  
- 0: OK  
- 1: Degraded  
- 2: Fault  
- 3: Unknown  
- 4: N/A |
| health-reason | string | If Health is not OK, the reason for the health state. |
| health-recommendation | string | If Health is not OK, the recommended actions to take to resolve the health issue. |
| unhealthy-component | Embedded; see unhealthy-component. |
This basetype is used by `show volumecopy-status`.

## Table 127 volume-copy-status properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vc_volume_name</td>
<td>string</td>
<td>Destination volume name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Destination volume serial number.</td>
</tr>
<tr>
<td>pool</td>
<td>string</td>
<td>Pool name.</td>
</tr>
<tr>
<td>virtual-disk-name</td>
<td>string</td>
<td>Destination vdisk name.</td>
</tr>
<tr>
<td>source-volume</td>
<td>string</td>
<td>Source volume name.</td>
</tr>
<tr>
<td>progress</td>
<td>string</td>
<td>Percent complete of the volume copy (0%–99%).</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
<td>• VC Online: A volume copy is in progress to the destination volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• VC Offline: The source volume went offline while a volume copy was in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>progress. When the source volume comes back online, the copy process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>resumes from the point where it stopped.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown: Status is unknown.</td>
</tr>
<tr>
<td>status-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for status values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: VC Online</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: VC Offline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Unknown</td>
</tr>
<tr>
<td>status-reason</td>
<td>string</td>
<td>More information about the status value.</td>
</tr>
</tbody>
</table>
volume-copy-tasks

This basetype is used by `show tasks` for a VolumeCopy task.

Table 128  volume-copy-tasks properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source-volume-name</td>
<td>string</td>
<td>Source volume name.</td>
</tr>
<tr>
<td>source-volume-serial</td>
<td>string</td>
<td>Source volume serial number.</td>
</tr>
<tr>
<td>destination-vdisk-name</td>
<td>string</td>
<td>Destination vdisk name.</td>
</tr>
<tr>
<td>destination-pool-name</td>
<td>string</td>
<td>The name of the vdisk or pool in which the new volume will be created.</td>
</tr>
<tr>
<td>destination-vdisk-serial</td>
<td>string</td>
<td>Destination vdisk serial number.</td>
</tr>
<tr>
<td>destination-pool-serial</td>
<td>string</td>
<td>The serial number of the destination vdisk or pool.</td>
</tr>
<tr>
<td>destination-volume-prefix</td>
<td>string</td>
<td>Label that identifies copies created by this task.</td>
</tr>
<tr>
<td>include-modified-data</td>
<td>string</td>
<td>• <strong>modified</strong>: The copy includes modified snapshot data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>preserved</strong>: The copy excludes modified snapshot data.</td>
</tr>
<tr>
<td>last-created</td>
<td>string</td>
<td>• The name of the last snapshot created by the task.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if the task has not created a snapshot.</td>
</tr>
</tbody>
</table>
volume-groups

This basetype is used by show volume-groups.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Volume group ID.</td>
</tr>
<tr>
<td>group-name</td>
<td>string</td>
<td>The name of the volume group in the format volume-group.* , where * represents all volumes in the group.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the volume group.</td>
</tr>
<tr>
<td>type</td>
<td>string</td>
<td>The group type, which is Volume.</td>
</tr>
<tr>
<td>member-count</td>
<td>uint32</td>
<td>The number of volumes in the volume group.</td>
</tr>
<tr>
<td>replication-set-serial</td>
<td>string</td>
<td>The serial number of the replication set.</td>
</tr>
<tr>
<td>volumes</td>
<td>Embedded; see volumes.</td>
<td></td>
</tr>
</tbody>
</table>
volume-group-view

This basetype is used by show maps if volume groups exist.

Table 130 volume-group-view properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Volume group ID.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the volume group.</td>
</tr>
<tr>
<td>group-name</td>
<td>string</td>
<td>The name of the volume group in the format volume-group.*, where the * represents all volumes in the group.</td>
</tr>
<tr>
<td>volume-view-mappings</td>
<td>Embedded; see volume-view-mappings.</td>
<td></td>
</tr>
</tbody>
</table>
### volume-group-view-mappings

This basetype is used by show maps.

#### Table 131  volume-group-view-mappings properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Mapping ID.</td>
</tr>
<tr>
<td>parent-id</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>mapped-id</td>
<td>string</td>
<td>The ID of the mapping target, such as an initiator.</td>
</tr>
<tr>
<td>ports</td>
<td>string</td>
<td>• The controller host ports to which the mapping applies.</td>
</tr>
<tr>
<td>access</td>
<td>string</td>
<td>• read-write: Read and write.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• read-only: Read only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no-access: No access (masked).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• not-mapped: Not mapped.</td>
</tr>
<tr>
<td>initiator-id</td>
<td>string</td>
<td>• For an FC initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a SAS initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For an iSCSI initiator, its node name (typically the IQN).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• all other initiators: The volume's default mapping.</td>
</tr>
<tr>
<td>nickname</td>
<td>string</td>
<td>• For a host, its name in the format host-name.*. where the * represents all initiators in the host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a host group, its name in the format host-group.<em>.</em>. where the first * represents all hosts in the host group and the second * represents all initiators in those hosts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if not set or for all other initiators.</td>
</tr>
<tr>
<td>host-profile</td>
<td>string</td>
<td>• Standard: Default profile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HP-UX: The host uses Flat Space Addressing.</td>
</tr>
<tr>
<td>host-profile-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of host-profile values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HP-UX</td>
</tr>
<tr>
<td>lun-view</td>
<td>Embedded</td>
<td>see volume-view-mappings.</td>
</tr>
</tbody>
</table>
volume-names

This basetype is used by show volume-names.

Table 132  volume-names properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume-name</td>
<td>string</td>
<td>Volume name.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Volume serial number.</td>
</tr>
</tbody>
</table>
This basetype is used by `show volume-reservations`.

**Table 133 volume-reservations properties**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume-name</td>
<td>string</td>
<td>The name of the volume.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the volume.</td>
</tr>
<tr>
<td>reservation-active</td>
<td>string</td>
<td>• Free: The volume is not reserved.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reserved: The volume has been reserved by a host.</td>
</tr>
<tr>
<td>reservation-active-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for reservation-active values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Free</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Reserved</td>
</tr>
<tr>
<td>pgr-generation</td>
<td>uint32</td>
<td>The generation of the volume reservation, shown as a hexadecimal value.</td>
</tr>
<tr>
<td>host-id</td>
<td>string</td>
<td>Host WWPN or iSCSI node name.</td>
</tr>
<tr>
<td>port</td>
<td>string</td>
<td>The controller host-port identifiers.</td>
</tr>
<tr>
<td>reserve-key</td>
<td>string</td>
<td>The reservation key, shown as a hexadecimal value.</td>
</tr>
<tr>
<td>reserve-scope</td>
<td>string</td>
<td>The reservation scope, Logical Unit.</td>
</tr>
<tr>
<td>reserve-scope-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for reserve-scope values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Logical Unit</td>
</tr>
<tr>
<td>reserve-type</td>
<td>string</td>
<td>The reservation type.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Undefined: The volume has no persistent reservations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Write Exclusive: Write commands are only allowed for a single reservation holder.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exclusive Access: Certain access (read, write) commands are only allowed for a single reservation holder.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Write Exclusive - Registrants Only: Write commands are only allowed for registered hosts. There is a single reservation holder.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exclusive Access - Registrants Only: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Write Exclusive - All Registrants: Write commands are only allowed for registered hosts. There is a single reservation holder.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exclusive Access - All Registrants: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.</td>
</tr>
<tr>
<td>reserve-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for reserve-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Undefined</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Write Exclusive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Exclusive Access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: Write Exclusive - Registrants Only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: Exclusive Access - Registrants Only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 7: Write Exclusive - All Registrants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: Exclusive Access - All Registrants</td>
</tr>
</tbody>
</table>
This basetype is used by `show volumes` and `show volume-groups`.

### Table 134 volumes properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>virtual-disk-name</td>
<td>string</td>
<td>The name of the vdisk or pool that contains the volume.</td>
</tr>
<tr>
<td>storage-pool-name</td>
<td>string</td>
<td>The name of the vdisk or pool that contains the volume.</td>
</tr>
<tr>
<td>volume-name</td>
<td>string</td>
<td>Volume name.</td>
</tr>
<tr>
<td>size</td>
<td>uint64</td>
<td>Volume capacity, formatted to use the current base, precision, and units.</td>
</tr>
<tr>
<td>size-numeric</td>
<td>uint64</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>total-size</td>
<td>uint64</td>
<td>The total size of the volume.</td>
</tr>
<tr>
<td>total-size-numeric</td>
<td>uint64</td>
<td>Unformatted total-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>allocated-size</td>
<td>uint64</td>
<td>The amount of space currently allocated to a virtual volume, or the total size of a linear volume.</td>
</tr>
<tr>
<td>allocated-size-numeric</td>
<td>uint64</td>
<td>Unformatted allocated-size value in 512-byte blocks.</td>
</tr>
<tr>
<td>storage-type</td>
<td>string</td>
<td>• Linear: The volume is in a linear pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Virtual: The volume is in a virtual pool.</td>
</tr>
<tr>
<td>storage-type-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for storage-type values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Linear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Virtual</td>
</tr>
<tr>
<td>preferred-owner</td>
<td>string</td>
<td>Controller that owns the volume during normal operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>preferred-owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for preferred-owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>owner</td>
<td>string</td>
<td>Either the preferred owner during normal operation or the partner controller when the preferred owner is offline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A: Controller A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• B: Controller B.</td>
</tr>
<tr>
<td>owner-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for owner values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: A</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>Volume serial number.</td>
</tr>
</tbody>
</table>
### Table 134  volumes properties (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| write-policy          | string       | • 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. |
| write-policy-numeric  | uint32       | Numeric equivalents for write-policy values.                                                                       |
|                       |              | • 0: write-through  
• 1: write-back                                                                                         |
| cache-optimization     | string       | • standard: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. This is the default.  
• no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost. |
| cache-optimization-numeric | uint32 | Numeric equivalents for cache-optimization values. |
|                       |              | • 0: standard  
• 2: no-mirror                                                                                         |
| read-ahead-size       | string       | The volume's 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. |
| read-ahead-size-numeric | uint32 | Numeric equivalents for read-ahead-size values. |
|                       |              | • -2: Stripe  
• -1: Adaptive  
• 0: Disabled  
• 524288: 512 KB  
• 1048576: 1 MB  
• 2097152: 2 MB  
• 4194304: 4 MB  
• 8388608: 8 MB  
• 16777216: 16 MB  
• 33554432: 32 MB  
• -2147483648: Maximum |
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| volume-type         | string | • base: Base volume  
|                     |       | • standard: Standard volume.  
|                     |       | • standard*: Destination of an in-progress volume copy and cannot be mounted until the copy is complete.  
|                     |       | • snap-pool: Snap-pool volume.  
|                     |       | • master volume: Master volume.  
|                     |       | • snapshot: Snapshot volume.  
|                     |       | • replication source: Source for an in-progress replication to a secondary volume.  |
| volume-type-numeric | uint32 | Numeric equivalents for volume-type values.  
|                     |       | • 0: standard  
|                     |       | • 1: snap-pool  
|                     |       | • 2: master volume  
|                     |       | • 3: snapshot  
|                     |       | • 4: standard*  
|                     |       | • 8: replication source  
|                     |       | • 15: base  |
| volume-class        | string | • standard: Standard volume, not enabled for snapshots.  
|                     |       | • PTSNAP: Snapshot-related volume such as a master volume, snap pool, or snapshot.  
|                     |       | • Proxy: Destination of an in-progress replication from a remote volume, which when complete will change to type snapshot.  |
| volume-class-numeric| uint32 | Numeric equivalents for volume-class values.  
|                     |       | • 0: standard  
|                     |       | • 1: PTSNAP  
|                     |       | • 3: Proxy  |
| tier-affinity       | string | • No Affinity: This setting uses the highest available performing tiers first and only uses the Archive tier when space is exhausted in the other tiers. Volume data will swap into higher performing tiers based on frequency of access and tier space availability. This is the default.  
|                     |       | • Archive: This setting prioritizes the volume data to the least performing tier available. Volume data can move to higher performing tiers based on frequency of access and available space in the tiers.  
|                     |       | • Performance: This setting prioritizes volume data to the higher performing tiers. If no space is available, lower performing tier space is used. Performance affinity volume data will swap into higher tiers based upon frequency of access or when space is made available.  |
| tier-affinity-numeric | uint32 | Numeric equivalents for tier-affinity values.  
|                     |       | • 0: No Affinity  
|                     |       | • 1: Archive  
<p>|                     |       | • 2: Performance  |
| snapshot             | string | Shows whether the volume is a snapshot.  |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>snapshot-retention-priority</td>
<td>string</td>
<td>The retention priority for snapshots of the volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• never-delete: Snapshots will never be deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• high: Snapshots may be deleted after all eligible medium-priority snapshots</td>
</tr>
<tr>
<td></td>
<td></td>
<td>have been deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• medium: Snapshots may be deleted after all eligible low-priority snapshots</td>
</tr>
<tr>
<td></td>
<td></td>
<td>have been deleted. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• low: Snapshots may be deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Snapshots that are mapped or are not leaves of a volume's snapshot tree are not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>eligible for automatic deletion.</td>
</tr>
<tr>
<td>snapshot-retention-priority-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for retention-priority values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: never-delete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: low</td>
</tr>
<tr>
<td>volume-qualifier</td>
<td>string</td>
<td>• N/A: Non-replication-specific volume such as a standard volume, master</td>
</tr>
<tr>
<td></td>
<td></td>
<td>volume, snapshot, or snap pool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RSR: Replication-specific volume, such as a primary volume, secondary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>volume, replication snapshot, or replication image.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RSR (DRM Promoted Secondary): During an actual site failover (not a test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>failover), the replication set's primary and secondary volumes are shown as</td>
</tr>
<tr>
<td></td>
<td></td>
<td>primary volumes with a primary-volume conflict. This qualifier enables host-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>based Storage Replication Adapter (SRA) software to determine which volume</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is the failed-over secondary volume for disaster recovery management (DRM).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If both systems are online and the communication link between them is up,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>both systems will show similar information. When the SRA completes a restore-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replication or reverse-replication operation, this volume will be shown with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the RSR qualifier.</td>
</tr>
<tr>
<td>volume-qualifier-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for volume-qualifier values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: RSR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: RSR (DRM Promoted Secondary)</td>
</tr>
<tr>
<td>blocks</td>
<td>uint64</td>
<td>Unformatted size value in 512-byte blocks.</td>
</tr>
<tr>
<td>capabilities</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>volume-parent</td>
<td>string</td>
<td>Parent volume serial number. For example, the serial number of a snapshot's</td>
</tr>
<tr>
<td></td>
<td></td>
<td>master volume.</td>
</tr>
<tr>
<td>snap-pool</td>
<td>string</td>
<td>Snap pool serial number.</td>
</tr>
<tr>
<td>replication-set</td>
<td>string</td>
<td>Replication set serial number.</td>
</tr>
<tr>
<td>attributes</td>
<td>string</td>
<td>Shows whether the volume's disks are single pathed.</td>
</tr>
<tr>
<td>virtual-disk-serial</td>
<td>string</td>
<td>Disk group serial number.</td>
</tr>
<tr>
<td>volume-description</td>
<td>string</td>
<td>• For HP-UX, a text value (set in-band by a host application) that identifies the volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank by default.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>wwn</td>
<td>string</td>
<td>World Wide Name of the volume, used by host-based Storage Replication Adapter (SRA) software to identify the volume.</td>
</tr>
<tr>
<td>progress</td>
<td>string</td>
<td>For a volume-copy operation, the percent complete (0%–99%). The default value is 0%.</td>
</tr>
<tr>
<td>progress-numeric</td>
<td>uint32</td>
<td>Unformatted progress value.</td>
</tr>
<tr>
<td>container-name</td>
<td>string</td>
<td>Name of the vdisk or pool that contains the volume.</td>
</tr>
<tr>
<td>container-serial</td>
<td>string</td>
<td>Serial number of the vdisk or pool that contains the volume.</td>
</tr>
<tr>
<td>allowed-storage-tiers</td>
<td>string</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>allowed-storage-tiers-numeric</td>
<td>uint32</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>threshold-percent-of-pool</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>reserved-size-in-pages</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>allocate-reserved-pages-first</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>allocate-reserved-pages-first-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>zero-init-page-on-allocation</td>
<td>string</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>zero-init-page-on-allocation-numeric</td>
<td>uint32</td>
<td>For internal use only.</td>
</tr>
<tr>
<td>raidtype</td>
<td>string</td>
<td>Disk group RAID level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NRAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RAID50</td>
</tr>
<tr>
<td>raidtype-numeric</td>
<td>string</td>
<td>Numeric equivalents for raidtype values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: RAID0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: RAID1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: RAID3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 5: RAID5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 6: NRAID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 8: RAID50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 10: RAID10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 11: RAID6</td>
</tr>
</tbody>
</table>

Table 134  volumes properties (continued)
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pi-format</td>
<td>string</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>pi-format-numeric</td>
<td>string</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>cs-replication-role</td>
<td>string</td>
<td>• Copy Source: The volume is the source for a volume copy operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Copy Destination: The volume is the destination for a volume copy operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Primary: The volume is the primary volume in a replication set.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Secondary: The volume is the secondary volume in a replication set.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• (blank): Not applicable.</td>
</tr>
<tr>
<td>cs-copy-dest</td>
<td>string</td>
<td>• Off: Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: The volume is the destination for a volume copy operation.</td>
</tr>
<tr>
<td>cs-copy-dest-numeric</td>
<td>string</td>
<td>Numeric equivalents for cs-copy-dest values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>cs-copy-src</td>
<td>string</td>
<td>• Off: Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: The volume is the source for a volume copy operation.</td>
</tr>
<tr>
<td>cs-copy-src-numeric</td>
<td>string</td>
<td>Numeric equivalents for cs-copy-src values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>cs-primary</td>
<td>string</td>
<td>• Off: Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: The volume is the primary volume in a replication set.</td>
</tr>
<tr>
<td>cs-primary-numeric</td>
<td>string</td>
<td>Numeric equivalents for cs-primary values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>cs-secondary</td>
<td>string</td>
<td>• Off: Not applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On: The volume is the secondary volume in a replication set.</td>
</tr>
<tr>
<td>cs-secondary-numeric</td>
<td>string</td>
<td>Numeric equivalents for cs-secondary values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: On</td>
</tr>
<tr>
<td>health</td>
<td>string</td>
<td>• OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• N/A</td>
</tr>
<tr>
<td>health-numeric</td>
<td>uint32</td>
<td>Numeric equivalents for health values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: Degraded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4: N/A</td>
</tr>
<tr>
<td>health-reason</td>
<td>string</td>
<td>If Health is not OK, the reason for the health state.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>health-recommendation</td>
<td>string</td>
<td>If Health is not OK, the recommended actions to take to resolve the health issue.</td>
</tr>
<tr>
<td>volume-group</td>
<td>string</td>
<td>If the volume is in a volume group, the name of the group. Otherwise, UNGROUPEDVOLUMES.</td>
</tr>
<tr>
<td>group-key</td>
<td>string</td>
<td>If the volume is in a volume group, the durable ID of the volume group. Otherwise, VGU.</td>
</tr>
</tbody>
</table>
This basetype is used by `show volume-statistics`.

Table 135 volume-statistics properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume-name</td>
<td>string</td>
<td>The name of the volume.</td>
</tr>
<tr>
<td>serial-number</td>
<td>string</td>
<td>The serial number of the volume.</td>
</tr>
<tr>
<td>bytes-per-second</td>
<td>uint64</td>
<td>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.</td>
</tr>
<tr>
<td>bytes-per-second-numeric</td>
<td>uint64</td>
<td>Unformatted bytes-per-second value.</td>
</tr>
<tr>
<td>iops</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>number-of-reads</td>
<td>uint64</td>
<td>The number of read operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>number-of-writes</td>
<td>uint64</td>
<td>The number of write operations since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read</td>
<td>uint64</td>
<td>The amount of data read since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-read-numeric</td>
<td>uint64</td>
<td>Unformatted data-read value.</td>
</tr>
<tr>
<td>data-written</td>
<td>uint64</td>
<td>The amount of data written since these statistics were last reset or since the controller was restarted.</td>
</tr>
<tr>
<td>data-written-numeric</td>
<td>uint64</td>
<td>Unformatted data-written value.</td>
</tr>
<tr>
<td>allocated-pages</td>
<td>uint32</td>
<td>The number of pages allocated to the volume.</td>
</tr>
<tr>
<td>percent-tier-ssd</td>
<td>uint16</td>
<td>The percentage of volume capacity occupied by data in the Performance tier.</td>
</tr>
<tr>
<td>percent-tier-sas</td>
<td>uint16</td>
<td>The percentage of volume capacity occupied by data in the Standard tier.</td>
</tr>
<tr>
<td>percent-tier-sata</td>
<td>uint16</td>
<td>The percentage of volume capacity occupied by data in the Archive tier.</td>
</tr>
<tr>
<td>percent-allocated-rfc</td>
<td>uint16</td>
<td>The percentage of volume capacity occupied by data in read cache.</td>
</tr>
<tr>
<td>pages-alloc-per-minute</td>
<td>uint32</td>
<td>The average number of pages being allocated to the volume each minute.</td>
</tr>
<tr>
<td>pages-dealloc-per-minute</td>
<td>uint32</td>
<td>The average number of pages being deallocated from the volume each minute.</td>
</tr>
<tr>
<td>shared-pages</td>
<td>uint32</td>
<td>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.</td>
</tr>
<tr>
<td>write-cache-hits</td>
<td>uint64</td>
<td>For the controller that owns the volume, the number of times the block written to is found in cache.</td>
</tr>
<tr>
<td>write-cache-misses</td>
<td>uint64</td>
<td>For the controller that owns the volume, the number of times the block written to is not found in cache.</td>
</tr>
<tr>
<td>read-cache-hits</td>
<td>uint64</td>
<td>For the controller that owns the volume, the number of times the block to be read is found in cache.</td>
</tr>
<tr>
<td>read-cache-misses</td>
<td>uint64</td>
<td>For the controller that owns the volume, the number of times the block to be read is not found in cache.</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>small-destages</td>
<td>uint64</td>
<td>The number of times flush from cache to disk is not a full stripe.</td>
</tr>
<tr>
<td>full-stripe-write-destages</td>
<td>uint64</td>
<td>The number of times flush from cache to disk is a full stripe.</td>
</tr>
<tr>
<td>read-ahead-operations</td>
<td>uint64</td>
<td>The number of read pre-fetch or anticipatory-read operations.</td>
</tr>
<tr>
<td>write-cache-space</td>
<td>uint16</td>
<td>The cache size used on behalf of this volume.</td>
</tr>
<tr>
<td>write-cache-percent</td>
<td>uint32</td>
<td>The percentage of cache used on behalf of this volume.</td>
</tr>
<tr>
<td>reset-time</td>
<td>string</td>
<td>The date and time, in the format year-month-day hour:minutes:seconds, when</td>
</tr>
<tr>
<td></td>
<td></td>
<td>these statistics were last reset, either by a user or by a controller restart.</td>
</tr>
<tr>
<td>reset-time-numeric</td>
<td>uint32</td>
<td>Unformatted reset-time value.</td>
</tr>
<tr>
<td>start-sample-time</td>
<td>string</td>
<td>The date and time, in the format year-month-day hour:minutes:seconds, when</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sampling started for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>start-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted start-sample-time value.</td>
</tr>
<tr>
<td>stop-sample-time</td>
<td>string</td>
<td>The date and time, in the format year-month-day hour:minutes:seconds, when</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sampling stopped for the iops and bytes-per-second values.</td>
</tr>
<tr>
<td>stop-sample-time-numeric</td>
<td>uint32</td>
<td>Unformatted stop-sample-time value.</td>
</tr>
</tbody>
</table>
This basetype is used by `show maps`.

### Table 136  volume-view properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>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.</td>
</tr>
<tr>
<td>volume-serial</td>
<td>string</td>
<td>The serial number of the volume.</td>
</tr>
<tr>
<td>volume-name</td>
<td>string</td>
<td>Volume name.</td>
</tr>
<tr>
<td>volume-view-mappings</td>
<td>Embedded; see volume-view-mappings.</td>
<td></td>
</tr>
</tbody>
</table>
volume-view-mappings

This basetype is used by `show maps`.

Table 137  volume-view-mappings properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>durable-id</td>
<td>string</td>
<td>Mapping ID.</td>
</tr>
<tr>
<td>parent-id</td>
<td>string</td>
<td>For a mapping between a volume and an initiator, the volume ID—or if the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>volume is a member of a volume group, the volume-group ID.</td>
</tr>
<tr>
<td>mapped-id</td>
<td>string</td>
<td>The ID of the mapping target, such as an initiator.</td>
</tr>
<tr>
<td>ports</td>
<td>string</td>
<td>• The controller host ports to which the mapping applies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if not mapped or mapped as <code>no-access</code>.</td>
</tr>
<tr>
<td>lun</td>
<td>string</td>
<td>• The LUN that identifies the volume to a host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a volume group, * means multiple LUNs are represented in the group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if not mapped or mapped as <code>no-access</code>.</td>
</tr>
<tr>
<td>access</td>
<td>string</td>
<td>Type of host access to the volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• read-write: Read and write. This is the default.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• read-only: Read only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no-access: No access (masked).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• not-mapped: Not mapped.</td>
</tr>
<tr>
<td>access-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of <code>access</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: not-mapped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: no-access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2: read-only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3: read-write</td>
</tr>
<tr>
<td>identifier</td>
<td>string</td>
<td>• For an FC initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a SAS initiator, its WWPN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For an iSCSI initiator, its node name (typically the IQN).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• all other initiators: The volume's default mapping.</td>
</tr>
<tr>
<td>nickname</td>
<td>string</td>
<td>• For a host, its name in the format <code>host-name.*</code>, where the * represents all</td>
</tr>
<tr>
<td></td>
<td></td>
<td>initiators in the host.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For a host group, its name in the format <code>host-group.*.*</code>, where the first</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* represents all hosts in the host group and the second * represents all</td>
</tr>
<tr>
<td></td>
<td></td>
<td>initiators in those hosts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blank if not set or for all other initiators.</td>
</tr>
<tr>
<td>host-profile</td>
<td>string</td>
<td>• Standard: Default profile.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HP-UX: The host uses Flat Space Addressing.</td>
</tr>
<tr>
<td>host-profile-numeric</td>
<td>uint32</td>
<td>Numeric equivalents of <code>host-profile</code> values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0: Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1: HP-UX</td>
</tr>
</tbody>
</table>
5 Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:
  [www.hpe.com/assistance](http://www.hpe.com/assistance)
- To access documentation and support services, go to the HP Support Center – Hewlett Packard Enterprise website:
  [www.hpe.com/support/hpesc](http://www.hpe.com/support/hpesc)

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
  - HP Support Center – Hewlett Packard Enterprise Get connected with updates from HP page:
    [www.hpe.com/support/e-updates](http://www.hpe.com/support/e-updates)
  - Software Depot website:
    [www.hpe.com/support/softwaredepot](http://www.hpe.com/support/softwaredepot)
- To view and update your entitlements, and to link your contracts, Care Packs, and warranties with your profile, go to the HP Support Center – Hewlett Packard Enterprise More Information on Access to HP Support Materials page:

1 IMPORTANT: Access to some updates might require product entitlement when accessed through the HP Support Center – Hewlett Packard Enterprise. You must have a Hewlett Packard Enterprise Passport set up with relevant entitlements.
Websites

<table>
<thead>
<tr>
<th>Website</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett Packard Enterprise Information Library</td>
<td><a href="http://www.hpe.com/info/enterprise/docs">www.hpe.com/info/enterprise/docs</a></td>
</tr>
<tr>
<td>HP Support Center – Hewlett Packard Enterprise</td>
<td><a href="http://www.hpe.com/support/hpesc">www.hpe.com/support/hpesc</a></td>
</tr>
<tr>
<td>Contact Hewlett Packard Enterprise Worldwide</td>
<td><a href="http://www.hpe.com/assistance">www.hpe.com/assistance</a></td>
</tr>
<tr>
<td>Subscription Service/Support Alerts</td>
<td><a href="http://www.hpe.com/support/e-updates">www.hpe.com/support/e-updates</a></td>
</tr>
<tr>
<td>Software Depot</td>
<td><a href="http://www.hpe.com/support/softwaredepot">www.hpe.com/support/softwaredepot</a></td>
</tr>
<tr>
<td>Customer Self Repair</td>
<td><a href="http://www.hpe.com/support/selfrepair">www.hpe.com/support/selfrepair</a></td>
</tr>
<tr>
<td>Insight Remote Support</td>
<td><a href="http://www.hpe.com/info/insightremotesupport/docs">www.hpe.com/info/insightremotesupport/docs</a></td>
</tr>
<tr>
<td>Serviceguard Solutions for HP-UX</td>
<td><a href="http://www.hpe.com/info/hpux-serviceguard-docs">www.hpe.com/info/hpux-serviceguard-docs</a></td>
</tr>
<tr>
<td>Single Point of Connectivity Knowledge (SPOCK)</td>
<td><a href="http://www.hpe.com/storage/spock">www.hpe.com/storage/spock</a></td>
</tr>
<tr>
<td>Storage compatibility matrix</td>
<td></td>
</tr>
<tr>
<td>Storage white papers and analyst reports</td>
<td><a href="http://www.hpe.com/storage/whitepapers">www.hpe.com/storage/whitepapers</a></td>
</tr>
</tbody>
</table>

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:
www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty, Care Pack Service, or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product’s service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:
www.hpe.com/info/insightremotesupport/docs

Documentation feedback

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## A  Settings changed by restore defaults

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

### Table 138  Settings changed by restore defaults

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System information settings:</td>
<td></td>
</tr>
<tr>
<td>• System name</td>
<td>• Initialized Name</td>
</tr>
<tr>
<td>• System contact</td>
<td>• Initialized Contact</td>
</tr>
<tr>
<td>• System location</td>
<td>• Initialized Location</td>
</tr>
<tr>
<td>• System information</td>
<td>• Initialized Info</td>
</tr>
<tr>
<td>Management protocols settings:</td>
<td></td>
</tr>
<tr>
<td>• CLI/Telnet</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• CLI/SSH</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• FTP</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• SNMP</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• WBI/HTTP</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• WBI/HTTPS</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• SMI-S</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Unsecure SMI-S</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Debug</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• In-band SES</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Activity Progress Reporting</td>
<td>• Enabled</td>
</tr>
<tr>
<td>Management mode</td>
<td>v3</td>
</tr>
<tr>
<td>Users</td>
<td>All configured users are deleted and replaced with default user definitions and default settings:</td>
</tr>
<tr>
<td>• User: manage; password: !manage</td>
<td></td>
</tr>
<tr>
<td>• User: monitor; password: !monitor</td>
<td></td>
</tr>
<tr>
<td>• User: ftp; password: !ftp</td>
<td></td>
</tr>
<tr>
<td>• Temperature scale: Celsius</td>
<td></td>
</tr>
<tr>
<td>• Timeout: 30 minutes</td>
<td></td>
</tr>
<tr>
<td>CLI session timeout</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Tasks and schedules</td>
<td>(preserved)¹</td>
</tr>
<tr>
<td>Remote system definitions</td>
<td>(preserved)²</td>
</tr>
<tr>
<td>MC debug logs</td>
<td>(preserved)³</td>
</tr>
<tr>
<td>SC event logs</td>
<td>(preserved)</td>
</tr>
<tr>
<td>Time/date and NTP settings</td>
<td>(preserved)⁴</td>
</tr>
<tr>
<td>Network IP settings</td>
<td>If addressing mode is Manual, IP values are preserved. If addressing mode is DHCP, IP values are released.⁵</td>
</tr>
</tbody>
</table>

¹, ², ³, ⁴, ⁵: (preserved)
### Table 138  Settings changed by restore defaults (continued)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SNMP settings:</strong></td>
<td></td>
</tr>
<tr>
<td>• SNMP</td>
<td>Disabled</td>
</tr>
<tr>
<td>• SNMP trap notification level</td>
<td>none</td>
</tr>
<tr>
<td>• SNMP trap host IPs</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>• SNMP read community</td>
<td>public</td>
</tr>
<tr>
<td>• SNMP write community</td>
<td>private</td>
</tr>
<tr>
<td><strong>SMTP settings:</strong></td>
<td></td>
</tr>
<tr>
<td>• Email notification</td>
<td>Disabled</td>
</tr>
<tr>
<td>• Email notify filter</td>
<td>(none)</td>
</tr>
<tr>
<td>• Email addresses</td>
<td>(none)</td>
</tr>
<tr>
<td>• Email server</td>
<td>(none)</td>
</tr>
<tr>
<td>• Email domain</td>
<td>(none)</td>
</tr>
<tr>
<td>• Email sender</td>
<td>(none)</td>
</tr>
<tr>
<td>• Log destination</td>
<td>(none)</td>
</tr>
<tr>
<td>• Include logs</td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>SSL/SSH certificates</strong></td>
<td>(preserved)</td>
</tr>
<tr>
<td><strong>Licenses</strong></td>
<td>(preserved)</td>
</tr>
<tr>
<td><strong>Disk group metadata</strong></td>
<td>(preserved)</td>
</tr>
<tr>
<td><strong>Host port settings:</strong></td>
<td></td>
</tr>
<tr>
<td>• FC link speed</td>
<td>Auto</td>
</tr>
<tr>
<td>• FC topology</td>
<td>Point-to-point</td>
</tr>
<tr>
<td>• SAS fan-out cable support</td>
<td>Enabled (1040 only)</td>
</tr>
<tr>
<td><strong>Host names and profiles</strong></td>
<td>(preserved)</td>
</tr>
<tr>
<td><strong>Drive spin down</strong></td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>Advanced settings:</strong></td>
<td></td>
</tr>
<tr>
<td>• Disk group background scrub (v3)</td>
<td>Enabled</td>
</tr>
<tr>
<td>• Disk group background scrub interval (v3)</td>
<td>24 hours</td>
</tr>
<tr>
<td>• Vdisk background scrub (v2)</td>
<td>High</td>
</tr>
<tr>
<td>• Vdisk background scrub interval (v2)</td>
<td>(preserved)</td>
</tr>
</tbody>
</table>
Table 138  Settings changed by restore defaults (continued)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Partner firmware upgrade</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Utility priority</td>
<td>• 24 hours</td>
</tr>
<tr>
<td>• SMART</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Dynamic spare configuration</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Enclosure polling rate</td>
<td>• 5 seconds</td>
</tr>
<tr>
<td>• Host control of caching</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Sync cache mode</td>
<td>• Immediate</td>
</tr>
<tr>
<td>• Missing LUN response</td>
<td>• Not Ready</td>
</tr>
<tr>
<td>• Controller failure</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Supercap failure</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• CompactFlash failure</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Power supply failure</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Fan failure</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Temperature exceeded</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Partner notify</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Auto write back</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Inactive drive spin down</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Inactive drive spin down delay</td>
<td>• 15 minutes</td>
</tr>
<tr>
<td>• Disk background scrub</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Managed logs</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Single controller mode</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Auto stall recovery</td>
<td>• Enabled</td>
</tr>
<tr>
<td>• Restart on CAPI fail</td>
<td>• Disabled</td>
</tr>
<tr>
<td>• Large pools</td>
<td>• Disabled</td>
</tr>
<tr>
<td>FDE settings (MSA 2040 only)</td>
<td>(preserved)</td>
</tr>
</tbody>
</table>

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 addresses are released.
6. Factory default: certificates are initialized.
7. Factory default: host names and profiles are cleared.
8. Factory default: no action for all disks.
B Warranty and regulatory information


Warranty information

HPE ProLiant and x86 Servers and Options
www.hpe.com/support/ProLiantServers-Warranties

HPE Enterprise Servers
www.hpe.com/support/EnterpriseServers-Warranties

HPE Storage Products
www.hpe.com/support/Storage-Warranties

HPE Networking Products
www.hpe.com/support/Networking-Warranties

Regulatory information

Belarus Kazakhstan Russia marking

EAC

Manufacturer and Local Representative Information

Manufacturer information:
- Hewlett Packard Enterprise, 3000 Hanover Street, Palo Alto, CA 94304, U.S.

Local representative information Russian:
- Russia:
  ЗАО “Хьюлетт-Паккард А.О.”, 125171, Россия, г. Москва, Ленинградское шоссе, 16А, стр.3, тел/факс: +7 (495) 797 35 00, +7 (495) 287 89 05
- Belarus:
  ИООО «Хьюлетт-Паккард Бел» , 220030, Беларусь, г. Минск, ул. Интернациональная, 36-1, офис 722-723, тел.: +375 (17) 392 28 18, факс: +375 (17) 392 28 21
- Kazakhstan:
  ТОО «Хьюлетт-Паккард (К)», 050040, Казахстан, г. Астана, Бостандыкский район, ул. Тимирязева, 28В, 1 этаж, тел./факс: +7 (727) 355 35 50, +7 (727) 355 35 51

Local representative information Kazakh:
- Kazakhstan:
  ЖШС «Хьюлетт-Паккард (К)», Казахстан, Астана, Бостандык сөздөр, Тимирязева көш, 28В, тел./факс: +7 (727) 355 35 50, +7 (727) 355 35 51
Manufacturing date:
The manufacturing date is defined by the serial number.
CCSYWWZZZZ (serial number format for this product)
Valid date formats include:

- YWW, where Y indicates the year counting from within each new decade, with 2000 as the starting point; for example, 238: 2 for 2002 and 38 for the week of September 9. In addition, 2010 is indicated by 0, 2011 by 1, 2012 by 2, 2013 by 3, and so forth.
- YYWW, where YY indicates the year, using a base year of 2000; for example, 0238: 02 for 2002 and 38 for the week of September 9.

Turkey RoHS material content declaration
Türkiye Cumhuriyeti: EEE Yönetmeligine Uygundur

Ukraine RoHS material content declaration
Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057
Glossary

2U12 An enclosure that is two rack units in height and can contain 12 disks.

2U24 An enclosure that is two rack units in height and can contain 24 disks.

Additional Sense Code/Additional Sense Code Qualifier See ASC/ASCQ.

Advanced Encryption Standard See AES.

AES Advanced Encryption Standard. A specification for the encryption of data using a symmetric-key algorithm.

Air Management Sled See AMS.

allocated page A page of storage-pool space that has been allocated to a volume to store data.

allocation rate The rate, in pages per minute, at which a pool is allocating pages to its volumes because they need more space to store data.

ALUA Asymmetric Logical Unit Access.

AMS For a 2U12 or 2U24 enclosure, Air Management Sled. A drive blank designed to fill an empty disk slot in an enclosure to maintain optimum airflow through the chassis.

array See storage system.

ASC/ASCQ Additional Sense Code/Additional Sense Code Qualifier. Information on sense data returned by a SCSI device.

ATS Automated tiered storage. A paged-storage feature that automatically uses the appropriate tier of disks to store data based on how frequently the data is accessed. This enables higher-cost, higher-speed disks to be used only for frequently needed data, while infrequently needed data can reside in lower-cost, lower-speed disks.

automated tiered storage See ATS.

auto-write-through See AWT.

available disk A disk that is not a member of a disk group, is not configured as a spare, and is not in the leftover state. It is available to be configured as a part of a disk group or as a spare. See also compatible disk, dedicated spare, dynamic spare, and global spare.

AWT Auto-write-through. A setting that specifies when the RAID controller cache mode automatically changes from write-back to write-through.

dedicated spare, dynamic spare, and global spare.

base volume A virtual volume that is not a snapshot of any other volume, and is the root of a snapshot tree.

CAPI Configuration Application Programming Interface. A proprietary protocol used for communication between the Storage Controller and the Management Controller in a controller module. CAPI is always enabled.


base volume The sheetmetal housing of an enclosure.

child volume The snapshot of a parent volume in a snapshot tree.

chunk size The amount of contiguous data that is written to a disk group member before moving to the next member of the disk group.

CIM Common Information Model. The data model for WBEM. It provides a common definition of management information for systems, networks, applications and services, and allows for vendor extensions.

CIM Query Language See COL.
CIMOM  Common Information Model Object Manager. A component in CIM that handles the interactions between management applications and providers.

comma separated values  See CSV.

Common Information Model  See CIM.

Common Information Model Object Manager  See CIMOM.

compatible disk  A disk that can be used to replace a failed member disk of a disk group because it both has enough capacity and is of the same type (enterprise SAS, for example) as the disk that failed. See also available disk, dedicated spare, dynamic spare, and global spare.

columns separated value  See CSV.

Complex Programmable Logic Device  See CPLD.

Configuration Application Programming Interface  See CAPI.

cpu  A short way of referring to controller module A (or B).

controller enclosure  An enclosure that contains one or two controller modules.

controller module  A FRU that contains the following subsystems and devices: a Storage Controller processor; a Management Controller processor; a SAS expander and Expander Controller processor; management interfaces; cache protected by a supercapacitor pack and nonvolatile memory (CompactFlash); host, expansion, network, and service ports; and midplane connectivity.

controller module: A controller module whose host ports can be set to operate in FC or iSCSI mode. Changing the host-port mode is also known as changing the ports' personality.

Converged Network Controller  A controller module whose host ports can be set to operate in FC or iSCSI mode. Changing the host-port mode is also known as changing the ports' personality.

Coordinated Universal Time  See UTC.

CPLD  Complex programmable logic device. An electronic component used to build reconfigurable digital circuits. It can replace large numbers of logic gates.

CQL  CIM Query Language.

CRC  Cyclic Redundancy Check. A mathematical algorithm that, when implemented in software or hardware, can be used to detect errors in data.

CSV  Comma separated values. A format to store tabular data in plain-text form.

Cyclic Redundancy Check  See CRC.

DES  Data Encryption Standard. An algorithm for the encryption of electronic data.


Direct Attached Storage  See DAS.

disk group  A set of disk drives that is configured to use a specific RAID type and provides storage capacity for a pool. See also linear disk group and virtual disk group.

dedicated spare  A disk that is reserved for use by a specific linear disk group to replace a failed disk. See also available disk, compatible disk, dynamic spare, and global spare.

deallocation rate  The rate, in pages per minute, at which a pool is deallocating pages from its volumes because they no longer need the space to store data.

default mapping  Host-access settings that apply to all initiators that are not explicitly mapped to that volume using different settings. See also explicit mapping and masking.

DECT  Dynamic Encryption and Compression Technique.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distributed Management Task Force</strong></td>
<td>See DMTF.</td>
</tr>
<tr>
<td><strong>DMTF</strong></td>
<td>Distributed Management Task Force. An industry organization that develops and maintains standards for system management.</td>
</tr>
<tr>
<td><strong>drain</strong></td>
<td>Moving active volume data from a virtual disk group to other disk-group members within the same pool.</td>
</tr>
<tr>
<td><strong>drive enclosure</strong></td>
<td>See expansion enclosure. See also JBOD.</td>
</tr>
<tr>
<td><strong>drive spin down</strong></td>
<td>See DSD.</td>
</tr>
<tr>
<td><strong>DRM</strong></td>
<td>Disaster recovery management. Storage-system firmware features that, when the Site Replication Adapter (SRA) feature is enabled, support the use of VMware’s Site Recovery Manager to automate disaster-recovery failover and failback tasks. See also SRA.</td>
</tr>
<tr>
<td><strong>DSD</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>dual-port disk</strong></td>
<td>A disk that is connected to both controllers so it has two data paths, achieving fault tolerance.</td>
</tr>
<tr>
<td><strong>Dynamic Host Configuration Protocol</strong></td>
<td>See DHCP.</td>
</tr>
<tr>
<td><strong>dynamic spare</strong></td>
<td>An available compatible disk that is automatically assigned, if the dynamic spares option is enabled, to replace a failed disk in a disk group with a fault-tolerant RAID level. See also available disk, compatible disk, dedicated spare, and global spare.</td>
</tr>
<tr>
<td><strong>EC</strong></td>
<td>Expander Controller. A processor (located in the SAS expander in each controller module and expansion module) that controls the SAS expander and provides SES functionality. See also EMP, MC, and SC.</td>
</tr>
<tr>
<td><strong>EMP</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>enclosure</strong></td>
<td>A physical storage device that contains I/O modules, disk drives, and other FRUs.</td>
</tr>
<tr>
<td><strong>enclosure management processor</strong></td>
<td>See EMP.</td>
</tr>
<tr>
<td><strong>Expander Controller</strong></td>
<td>See EC.</td>
</tr>
<tr>
<td><strong>expansion enclosure</strong></td>
<td>An enclosure that contains one or two expansion modules. Expansion enclosures can be connected to a controller enclosure to provide additional storage capacity. See also JBOD.</td>
</tr>
<tr>
<td><strong>expansion module</strong></td>
<td>A FRU that contains the following subsystems and devices: a SAS expander and EC processor; host, expansion, and service ports; and midplane connectivity.</td>
</tr>
<tr>
<td><strong>explicit mapping</strong></td>
<td>Access settings for an initiator to a volume that override the volume’s default mapping. See also default mapping and masking.</td>
</tr>
<tr>
<td><strong>failback</strong></td>
<td>See recovery.</td>
</tr>
<tr>
<td><strong>failover</strong></td>
<td>In an active-active configuration, failover is the act of temporarily transferring ownership of controller resources from an offline controller to its partner controller, which remains operational. The resources include pools, volumes, cache data, host ID information, and LUNs and WWNs. See recovery.</td>
</tr>
<tr>
<td><strong>FC</strong></td>
<td>Fibre Channel interface protocol.</td>
</tr>
<tr>
<td><strong>FC-AL</strong></td>
<td>Fibre Channel Arbitrated Loop. The FC topology in which devices are connected in a one-way loop.</td>
</tr>
<tr>
<td><strong>FDE</strong></td>
<td>Full disk encryption. A method by which you can secure the data residing on a system. See also lock key, passphrase, repurpose, and SED.</td>
</tr>
<tr>
<td><strong>Fibre Channel Arbitrated Loop</strong></td>
<td>See FC-AL.</td>
</tr>
<tr>
<td><strong>field-programmable gate array</strong></td>
<td>See FPGA.</td>
</tr>
</tbody>
</table>
field-replaceable unit  See FRU.

FPGA  Field-programmable gate array. An integrated circuit designed to be configured after manufacturing.

FRU  Field-replaceable unit. A part that can be removed and replaced by the user or support technician without having to send the product to a repair facility.

full disk encryption  See FDE.

global spare  A compatible disk that is reserved for use by any disk group with a fault-tolerant RAID level to replace a failed disk. See also available disk, compatible disk, dedicated spare, and dynamic spare.

HBA  Host bus adapter. A device that facilitates I/O processing and physical connectivity between a host and the storage system.

host  (v3) A user-defined group of initiators that represents a server or switch.

   (v2) 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. Product interfaces use the terms host and initiator interchangeably.

host bus adapter  See HBA.

host group  A user-defined group of hosts for ease of management, such as for mapping operations.

host port  A port on a controller module that interfaces to a host computer, either directly or through a network switch.

image ID  A globally unique serial number that identifies the point-in-time image source for a volume. All volumes that have identical image IDs have identical data content, whether they be snapshots or stand-alone volumes.

initiator  (v3) An external port to which the storage system is connected. The external port may be a port in an I/O adapter in a server, or a port in a network switch.

   (v2) See host.

I/O Manager  A MIB-specific term for a controller module.

I/O module  See IOM.

IOM  Input/output module. An IOM can be either a controller module or an expansion module.

IQN  iSCSI Qualified Name.

iSCSI  Internet SCSI interface protocol.

iSNS  Internet Storage Name Service.

JBOD  “Just a bunch of disks.” See drive enclosure.

large form factor  See LFF.

LBA  Logical Block Address. The address used for specifying the location of a block of data.

leftover  The state of a disk that the system has excluded from a disk group because the timestamp in the disk’s metadata is older than the timestamp of other disks in the disk group, or because the disk was not detected during a rescan. A leftover disk cannot be used in another disk group until the disk’s metadata is cleared; for information and cautions about doing so, see documentation topics about clearing disk metadata.

LFF  Large form factor.

linear  The storage-class designation for logical components such as volumes that do not use paged-storage technology to virtualize data storage. The linear method stores user data in sequential, fully allocated physical blocks, using a fixed (static) mapping between the logical data presented to hosts and the physical storage where it is stored.

linear disk group  A set of disk drives that is configured to use a specific RAID type. The number of disks that a linear disk group can contain is determined by its RAID level. Any supported RAID level can be used. When a linear disk group is created, a linear pool with the same name is also created to represent the volume-containment properties of the disk group. See also linear pool.
linear pool
A container for volumes that is composed of one linear disk group.

LIP
Loop Initialization Primitive. An FC primitive used to determine the loop ID for a controller.

lock key
A system-generated value that manages the encryption and decryption of data on FDE-capable disks. See also FDE and passphrase.

logical block address
See LBA.

Logical Unit Number
See LUN.

loop
See FC-AL.

Loop Initialization Primitive
See LIP.

LUN
Logical Unit Number. A number that identifies a mapped volume to a host system.

MAC address
Media Access Control Address. A unique identifier assigned to network interfaces for communication on a network.

Management Controller
See MC.

Management Information Base
See MIB.

map/mapping
Settings that specify whether a volume is presented as a storage device to a host system, and how the host system can access the volume. Mapping settings include an access type (read-write, read-only, or no access), controller host ports through which initiators may access the volume, and a LUN that identifies the volume to the host system. See also default mapping, explicit mapping, and masking.

masking
A volume-mapping setting that specifies no access to that volume by hosts. See also default mapping and explicit mapping.

master volume
A volume that is enabled for snapshots and has an associated snap pool.

MC
Management Controller. A processor (located in a controller module) that is responsible for human-computer interfaces, such as the SMU, and computer-computer interfaces, such as SNMP, and interacts with the Storage Controller. See also EC and SC.

Media Access Control Address
See MAC address.

metadata
Data in the first sectors of a disk drive that stores all disk-, disk-group-, and volume-specific information including disk group membership or spare identification, disk group ownership, volumes and snapshots in the disk group, host mapping of volumes, and results of the last media scrub.

MIB
Management Information Base. A database used for managing the entities in SNMP.

mount
To enable access to a volume from a host OS. Synonyms for this action include present and map. See also host, map/mapping, and volume.

network port
The Ethernet port on a controller module through which its Management Controller is connected to the network.

network time protocol
See NTP.

NTP
Network time protocol.

NV device
Nonvolatile device. The CompactFlash memory card in a controller module.

object identifier
See OID.

OID
Object Identifier. In SNMP, an identifier for an object in a MIB.

orphan data
See unwritable cache data.

overcommit
A setting that controls whether a virtual pool is allowed to have volumes whose total size exceeds the physical capacity of the pool.

overcommitted
The amount of storage capacity that is allocated to volumes exceeds the physical capacity of the storage system.
A range of contiguous LBAs in a virtual disk group.

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.

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.

The automatic update of the partner controller when the user updates firmware on one controller.

Persistent group reservations.

One of two hardware components that form a physical connection between devices in a SAS network that enables transmission of data.

See PHY.

Fibre Channel Point-to-Point topology in which two ports are directly connected.

See linear pool and virtual pool.

Power-on self test. Tests that run immediately after a device is powered on.

See POST.

The power supply FRU.

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.

See controller enclosure.

A special disk group using SSDs that can be added to a virtual pool for the purpose of speeding up read access to data stored on spinning disks elsewhere in the pool. Read cache is also referred to as read flash cache.

See read cache.

In an active-active configuration, recovery is the act of returning ownership of controller resources to a controller (which was offline) from its partner controller. The resources include volumes, cache data, host ID information, and LUNs and WWNs. See also failover.

See syslog.

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.
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.

A volume created for the purpose of being the secondary volume in a replication set. Replication-prepared volumes are automatically created by the SMU Replication Setup Wizard, or they can be created manually in the CLI or the SMU.

Associated primary and secondary volumes that are enabled for replication and that typically reside in two physically or geographically separate storage systems. See primary volume and secondary volume.

A special type of snapshot, created by the remote replication feature, that preserves the state of data of a replication set's primary volume as it existed when the snapshot was created. For a primary volume, the replication process creates a replication snapshot on both the primary system and, when the replication of primary-volume data to the secondary volume is complete, on the secondary system. Replication snapshots are unmappable and are not counted toward a license limit, although they are counted toward the system's maximum number of volumes. A replication snapshot can be exported to a regular, licensed snapshot. See also replication sync point.

The state of a replication snapshot whose corresponding primary or secondary snapshot exists and contains identical data. For a replication set, four types of sync point are identified: the only replication snapshot that is copy-complete on any secondary system is the "only sync point"; the latest replication snapshot that is copy-complete on any secondary system is the "current sync point"; the latest replication snapshot that is copy-complete on all secondary systems is the "common sync point"; a common sync point that has been superseded by a new common sync point is an "old common sync point."

A method by which all data on a system or disk is erased in an FDE-capable system. Repurposing unsecures the system and disks without needing the correct passphrase. See also FDE and passphrase.

Read flash cache. See read cache.

Serial Attached SCSI interface protocol or disk-drive architecture.

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. See also EC and MC.

See SES.

The storage system that contains a replication set's secondary volume. See also replication set, primary system.

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.

For use with CHAP, a password that is shared between an initiator and a target to enable authentication.

See SHA.

See SSH.

See SSL.

Self-encrypting drive. A disk drive that provides hardware-based data encryption and supports use of the storage system's Full Disk Encryption feature. See also FDE.

Serial electrically erasable programmable ROM. A type of nonvolatile (persistent if power removed) computer memory used as FRU ID devices.

See SMART.

See SEEPROM.

See SLP.
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<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>SES</td>
<td>SCSI Enclosure Services. The protocol that allows the initiator to communicate with the enclosure using SCSI commands.</td>
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<td>SFCB</td>
<td>Small Footprint CIM Broker.</td>
</tr>
<tr>
<td>SFF</td>
<td>Small form factor. A type of disk drive.</td>
</tr>
<tr>
<td>SHA</td>
<td>Secure Hash Algorithm. A cryptographic hash function.</td>
</tr>
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<td>SLP</td>
<td>Service Location Protocol. Enables computers and other devices to find services in a local area network without prior configuration.</td>
</tr>
<tr>
<td>SMF</td>
<td>See SFCB.</td>
</tr>
<tr>
<td>SFF</td>
<td>See SFF.</td>
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<tr>
<td>SMART</td>
<td>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.</td>
</tr>
<tr>
<td>SMI-S</td>
<td>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.</td>
</tr>
<tr>
<td>SMU</td>
<td>Storage Management Utility. The web application that is embedded in each controller module and is the primary management interface for the storage system.</td>
</tr>
<tr>
<td>snap pool</td>
<td>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.</td>
</tr>
<tr>
<td>snapshot</td>
<td>A “virtual” volume that preserves the state of a source volume’s data as it existed when the snapshot was created. Data associated with a snapshot is recorded in both the source volume and in its associated snap pool. A snapshot can be mapped and written to. The capability to create snapshots is a licensed feature. A base of 64 snapshots is included without an additional license. Snapshots that can be mapped to hosts are counted against the snapshot-license limit, whereas transient and unmappable snapshots are not.</td>
</tr>
<tr>
<td>snapshot tree</td>
<td>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. See also base volume, child volume, parent volume, and source volume.</td>
</tr>
<tr>
<td>SNIA</td>
<td>Storage Networking Industry Association. An association regarding storage networking technology and applications.</td>
</tr>
<tr>
<td>source volume</td>
<td>A volume that has snapshots. Used as a synonym for parent volume.</td>
</tr>
<tr>
<td>sparse snapshot</td>
<td>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.</td>
</tr>
<tr>
<td>SRA</td>
<td>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. See also DRM.</td>
</tr>
<tr>
<td>SSD</td>
<td>Solid-state drive.</td>
</tr>
<tr>
<td>SSH</td>
<td>Secure Shell. A network protocol for secure data communication.</td>
</tr>
<tr>
<td>SSL</td>
<td>Secure Sockets Layer. A cryptographic protocol that provides security over the internet.</td>
</tr>
<tr>
<td>standard volume</td>
<td>A volume that can be mapped to initiators and presented as a storage device to a host system, but is not enabled for snapshots.</td>
</tr>
<tr>
<td>Storage Controller</td>
<td>See SC.</td>
</tr>
<tr>
<td>Storage Management Initiative - Specification</td>
<td>See SMI-S.</td>
</tr>
</tbody>
</table>
storage system
A controller enclosure with at least one connected drive enclosure. Product documentation and interfaces use the terms storage system and system interchangeably.

syslog
A protocol for sending event messages across an IP network to a logging server.

thin provisioning
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.

tier
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:
- Performance, which uses SAS SSDs (high speed, low capacity)
- Standard, which uses enterprise-class spinning SAS disks (lower speed, higher capacity)
- Archive, which uses midline spinning SAS disks (low speed, high capacity).

tier migration
The automatic movement of blocks of data, associated with a single volume, between tiers based on the access patterns that are detected for the data on that volume.

tray
See enclosure.

UCS Transformation Format - 8-bit
See UTF-8.

ULP
Unified LUN Presentation. A RAID controller feature that enables a host system to access mapped volumes through any controller host port. ULP incorporates Asymmetric Logical Unit Access (ALUA) extensions.

undercommitted
The amount of storage capacity that is allocated to volumes is less than the physical capacity of the storage system.

Unified LUN Presentation
See ULP.

unmount
To remove access to a volume from a host OS. Synonyms for this term include unpresent and unmap.

unwritable cache data
Cache data that has not been written to disk and is associated with a volume that no longer exists or whose disks are not online. If the data is needed, the volume’s disks must be brought online. If the data is not needed it can be cleared, in which case it will be lost and data will differ between the host system and disk. Unwritable cache data is also called orphan data.

UTC
Coordinated Universal Time. The primary time standard by which the world regulates clocks and time. It replaces Greenwich Mean Time.

UTF-8
UCS transformation format - 8-bit. A variable-width encoding that can represent every character in the Unicode character set used for the CLI and SMU interfaces.

v2
The legacy interface for managing linear storage. This is the default for a system that has been upgraded from a previous release.

v3
The new interface for managing virtual and linear storage. This is the default for a new installation.

vdisk
A virtual disk comprising the capacity of one or more disks. The number of disks that a vdisk can contain is determined by its RAID level. See linear disk group.

vdisk spare
See dedicated spare.

virtual
The storage-class designation for logical components such as volumes that use paged-storage technology to virtualize data storage. See paged storage.
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<th>Definition</th>
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<td>virtual disk</td>
<td>See vdisk.</td>
</tr>
<tr>
<td>virtual disk group</td>
<td>A set of disk drives that is configured to use a specific RAID type. The number of disks that a linear disk group can contain is determined by its RAID level. A virtual disk group can use RAID 1, 5, 6, or 10. A virtual disk group can be added to a new or existing virtual pool. See also virtual pool.</td>
</tr>
<tr>
<td>virtual pool</td>
<td>A container for volumes that is composed of one or more virtual disk groups.</td>
</tr>
<tr>
<td>volume</td>
<td>A logical representation of a fixed-size, contiguous span of storage that is presented to host systems for the purpose of storing data.</td>
</tr>
<tr>
<td>volume copy</td>
<td>An independent copy (clone) of the data in a linear volume. The capability to create volume copies makes use of snapshot functionality.</td>
</tr>
<tr>
<td>volume group</td>
<td>A user-defined group of volumes for ease of management, such as for mapping operations.</td>
</tr>
<tr>
<td>WBEM</td>
<td>Web-Based Enterprise Management. A set of management and internet standard technologies developed to unify the management of enterprise computing environments.</td>
</tr>
<tr>
<td>web-based interface/web-browser interface</td>
<td>Web-browser interface, called Storage Management Utility. The primary interface for managing the system. A user can enable the use of HTTP, HTTPS for increased security, or both. See SMU.</td>
</tr>
<tr>
<td>WBI</td>
<td>See WBI.</td>
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<tr>
<td>World Wide Name</td>
<td>See WWN.</td>
</tr>
<tr>
<td>World Wide Node Name</td>
<td>See WWNN.</td>
</tr>
<tr>
<td>World Wide Port Name</td>
<td>See WWPN.</td>
</tr>
<tr>
<td>WWN</td>
<td>World Wide Name. A globally unique 64-bit number that identifies a device used in storage technology.</td>
</tr>
<tr>
<td>WWNN</td>
<td>World Wide Node Name. A globally unique 64-bit number that identifies a device.</td>
</tr>
<tr>
<td>WWPN</td>
<td>World Wide Port Name. A globally unique 64-bit number that identifies a port.</td>
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