



SEAGATE

# Exos<sup>®</sup> CORVAULT<sup>™</sup> CLI Reference Guide

## **Abstract**

This guide provides information about managing a Seagate Exos CORVAULT storage system by using its command-line interface (CLI).

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# 1 Using the CLI

This chapter introduces the command-line interface (CLI).

## Accessing the CLI

The CLI software embedded in the controller modules enables you to manage and monitor storage system operation. Access the CLI in one of two ways:

- Use secure protocols HTTPS or SSH on a management host that is remotely connected through a LAN to a controller module's network port. Using insecure protocols HTTP and Telnet is also supported but not recommended.
- Use a terminal emulator on a management host that is directly connected to a controller module's management serial port.

For information about accessing the CLI and obtaining IP values for storage system management, see the *Seagate Exos CORVAULT Hardware Installation and Maintenance Guide*.

## CLI output modes

The CLI has two output modes:

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

Console mode enables users to interact with the CLI and obtain easily readable information. This mode 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 mode, some commands display confirmation prompts. Regardless of the locale, confirmation prompts only accept English characters, such as `y` for `yes` or `n` for `no`.

API mode enables any external application to interact with the storage system. XML and JSON formats are supported. These formats are constructed to permit new fields to be added without impacting existing clients if they follow standard parsing conventions for the respective format. In API mode, commands do *not* use confirmation prompts.

Scripting is not supported using console mode because labels, field sizes, and order of fields may change in future firmware releases. To properly script CLI commands use API mode, 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 API output will not impact a conventional XML or JSON parsing engine.

You can change the CLI output mode 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** Interactive mode requires confirmation for commands that can 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: 2020-01-23 11:05:12
Time Zone Offset: -07:00

Success: Command completed successfully. (2020-01-23 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 HTTPS (preferred) or HTTP interface to access the API.

Two login methods are supported:

- HTTPS authentication using a SHA-256 hash to return a session key that is sent for each request. The session key and the user login are valid as long as they are used, with the same inactivity timeout as that of the user whose login credentials were used. The default timeout during user creation is 30 minutes.

To log in to the HTTPS API, the username and password must be joined with an underscore as a separator (<username>\_<password>) and then sent through a SHA-256 hash. The SHA-256 hash is represented in hexadecimal format. This string is appended to the login function for the API, `https://<IP-address>/api/login/hash`. For example:  
`https://10.0.0.2/api/login/<SHA256-hash>`

---

**NOTE** The SHA-256 method is not compatible with LDAP user accounts. For LDAP, use HTTPS basic authentication instead.

---

- HTTPS basic authentication using the `Authorization` header. If this login method is used, the username and password must be joined with a ':' (<username>:<password>) and then encoded in Base64. For example:

```
Authorization: Basic base64-string
```

Use the following URL for basic authentication:

```
https://<IP-address>/api/login
```

For both methods, the response returned is in XML and the content contains an `OBJECT` element. Within the `OBJECT` element, a `PROPERTY` element with the name attribute of `response` contains the session key. These API elements are described in [Table 1 on page 17](#).

The following example shows how to construct a Perl script to communicate with the XML API via HTTPS.

---

**NOTE** The API provides default self-signed certificates for an HTTPS connection. For the certificate to be validated, download it through a browser and then set the following environment variable to point to the certificate:

```
# export HTTPS_CA_FILE=<path-to-certificate>
```

---

```
# Include required libraries
use LWP::UserAgent;
use XML::LibXML;
```

```

use HTTP::Request::Common;
use IO::Socket::SSL qw( SSL_VERIFY_NONE );
# For SHA-256 Authentication
use Digest::SHA qw(sha256_hex);

use constant use_basic_auth => 1;

my $user = "manage";
my $password = "Abcd_1234";
my $ip = "YourIPAddress";
my $protocol = "https";

# Create a user agent for sending requests
my $user_agent = LWP::UserAgent->new();

# Skip certificate verification
$user_agent->ssl_opts(
    SSL_verify_mode => SSL_VERIFY_NONE,
    verify_hostname => 0
);

my $request;
if( use_basic_auth ) {
    # Login with HTTP basic authentication
    my $auth_url = "$protocol://$ip/api/login/";
    $request = HTTP::Request->new( GET=>$auth_url );
    $request->authorization_basic( $user, $password );
} else {
    # Login with SHA-256 hash
    my $auth_data = "$user\_password";
    my $sha256_hash = sha256_hex( $auth_data );
    my $auth_url = "$protocol://$ip/api/login/$sha256_hash";
    $request = HTTP::Request->new( GET => $auth_url );
}

# Request return data be XML format
$request->header( 'dataType'=>'ipa' );

# Make the request
$response = $user_agent->request( $request );

# Parse the returned XML and retrieve the returned 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;
    }
}

```

```

    }
}

# Using the session key, request the system configuration
$url = "$protocol://$ip/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 last several lines of the Perl code above show how to get the entire configuration information from the CLI and print the output using the `ipa` option for XML output. The output can easily be redirected to a file for archiving.

Alternatively, the `dataType` in the request header can be set to `json` for JSON output, or to `console` for standard CLI text output. Console output should not be used for parsing, but can be useful for tabular reports obtained directly from the CLI commands.

The following example shows how to construct a Python script to access the XML API via HTTPS.

```

import base64
import sys
import urllib.request
import xml.dom.minidom
import ssl

username = 'manage'
password = 'Abcd_1234'
# For the following, the protocol (HTTP or HTTPS) must be specified; for example,
# https://10.235.221.121
if sys.argv[1]:
    ip = sys.argv[1]
else:
    sys.exit(1)

temp_string = bytes(username + ':' + password, "utf-8")
encodedBytes = base64.b64encode(temp_string)
auth_string = str(encodedBytes, "utf-8")
print("Base64 = " + auth_string + "\n")

url = ip + '/api/login/'
req = urllib.request.Request(url)
req.add_header('Authorization', 'Basic ' + auth_string)

print(req.get_full_url())
print(req.get_header('Authorization'))

# Skip certificate verification
context = ssl._create_unverified_context()
response = urllib.request.urlopen(req, context=context)
xmlDoc = xml.dom.minidom.parseString(response.read())
loginObjs = xmlDoc.getElementsByTagName('OBJECT')
loginProps = xmlDoc.getElementsByTagName('PROPERTY')
sessionKey = ''

```

```

for lProp in loginProps:
    name = lProp.getAttribute('name')
    print("Property = " + name)
    if name == 'response':
        sessionKey = lProp.firstChild.data

print("Session Key = " + sessionKey + "\n" )

url = ip + '/api/show/disks'
req = urllib.request.Request(url)
req.add_header('sessionKey', sessionKey)
req.add_header('dataType', 'console')
response = urllib.request.urlopen(req, context=context)
print(response.read().decode('utf-8'))

```

The following example shows how to construct a Python script to communicate with the JSON API via HTTPS and return the response in JSON format.

```

import sys
import requests
import json
import hashlib
# NOTE: This is to suppress the insecure connection warning for certificate
# verification.
from requests.packages.urllib3.exceptions import InsecureRequestWarning
requests.packages.urllib3.disable_warnings(InsecureRequestWarning)

USE_BASIC_AUTH = 1

url = "https://<YourIPAddress>"
username = "manage"
password = "Abcd_1234"

if USE_BASIC_AUTH:
    # HTTP basic authentication
    headers = {'datatype': 'json'}
    r = requests.get(url + '/api/login', auth=(username, password), headers=headers, verify=False)
else:
    # SHA-256 authentication
    auth_bytes = bytes(username + '_' + password, 'utf-8')
    auth_string = hashlib.sha256(auth_bytes).hexdigest()
    headers = {'datatype': 'json'}
    r = requests.get(url + '/api/login/' + auth_string, headers=headers, verify=False )

# Extract session key from response
response = json.loads(r.content.decode('utf-8'))
sessionKey = response['status'][0]['response']

# Obtain the health of the system
headers = {'sessionKey': sessionKey, 'datatype': 'json'}
r = requests.get(url + '/api/show/system', headers=headers, verify=False)

```



```
print(r.content.decode('utf-8'))
response = json.loads(r.content)
print("Health = " + response['system'][0]['health'])
```

## Using XML API output

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 1 XML API elements**

Elements	Description and attributes
RESPONSE	<p>The RESPONSE element is the top-level element, which contains all data output for the CLI command that was issued. The response includes:</p> <ul style="list-style-type: none"> <li>A number of OBJECT elements, which varies by command.</li> <li>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.</li> </ul> <p>There is only one RESPONSE element per issued command.</p>
OBJECT	<p>In general, an OBJECT element describes a storage system component such as a disk or a volume. An object has these attributes:</p> <ul style="list-style-type: none"> <li><code>basetype</code>. This attribute allows output in brief mode to be correlated with metadata to reduce the overhead of each command, as described in XML API optimization. This is also a good field to use to detect the type of the object (e.g., a disk, a volume, etc.).</li> <li><code>name</code>. The name of the object.</li> <li><code>oid</code>. The unique identifier for the object in the scope of the response.</li> </ul> <p>The OBJECT element can contain PROPERTY elements.</p>
PROPERTY	<p>A PROPERTY element provides detail about the attributes of an OBJECT. A property has these attributes:</p> <ul style="list-style-type: none"> <li><code>name</code>. The unique name for the property within the object.</li> <li><code>type</code>. The type of data represented by the element data.</li> <li><code>key</code>. Indicates whether this property is a key value to identify this object.</li> <li><code>size</code>. Typically the maximum size of the output. Usually only important if the console output is displayed in rows.</li> <li><code>draw</code>. Whether to show or hide this data in console mode.</li> <li><code>sort</code>. The type of sorting that can be applied to this property.</li> <li><code>display-name</code>. The label for this data to show in user interfaces.</li> </ul>
COMP	<p>A COMP (composition) element associates nested objects, such as a task object within a schedule object. A composition element has these attributes:</p> <ul style="list-style-type: none"> <li><code>G</code>. The OID of the group component.</li> <li><code>P</code>. The OID of the part component.</li> </ul> <p>An alternative to using COMP elements is described in "XML API optimization" on page 20.</p>
ASC	<p>The association element provides a simple association description between two objects in the response.</p> <ul style="list-style-type: none"> <li><code>A</code>. First object.</li> <li><code>B</code>. Second object.</li> </ul>

## Using JSON API output

The simplest mechanism to handle JSON output is by using either a JavaScript or a Python parser to interpret the data.

The JSON output is organized according to the basetypes defined for the system. All basetype objects are returned in an array. The JSON object uses the same name for the key as the XML API uses in the `name` attribute. Objects can also be embedded inside of other objects and are always presented as an array as well. This is different from the XML API where the

default output uses associations. The JSON output always uses a hierarchical presentation of objects to identify relationships between objects.

Each object also has an `object-name` property that may be used in some cases to identify the object uniquely. For example, the `show versions` command uses the `object-name` property to identify the version for controller A and controller B:

```
{
  "versions": [
    {
      "object-name": "controller-a-versions",
      "meta": "/meta/versions",
      "sc-cpu-type": "Broadwell 2200MHz",
      "bundle-version": "<bundle-version>",
      ...
    },
    {
      "object-name": "controller-b-versions",
      ...
    }
  ],
  "status": [
    {
      "object-name": "status",
      "meta": "/meta/status",
      "response-type": "Success",
      "response-type-numeric": 0,
      "response": "Command completed successfully. (2020-01-29 10:34:38)",
      "return-code": 0,
      "component-id": "",
      "time-stamp": "2020-01-29 10:34:38",
      "time-stamp-numeric": 1580294078
    }
  ]
}
```

---

**NOTE** If the system has warnings or other messages to report, there can be more than one status object returned in this list, so the command status might not appear in the first element of the list.

---


Other basetypes may use the durable ID to uniquely identify the objects.

## 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 HTTPS or 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 mode 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 API status object, using the `ipa` output option:

```
<OBJECT basetype="status" name="status" oid="1">
  <PROPERTY name="response-type" type="string">Success</PROPERTY>
  <PROPERTY name="response-type-numeric" type="uint32">0</PROPERTY>
  <PROPERTY name="response" type="string">Command completed successfully. (2020-01-29
10:58:27)</PROPERTY>
  <PROPERTY name="return-code" type="sint32">0</PROPERTY>
  <PROPERTY name="component-id" type="string"></PROPERTY>
  <PROPERTY name="time-stamp" type="string">2020-01-29 10:58:27</PROPERTY>
  <PROPERTY name="time-stamp-numeric" type="uint32">1580295507</PROPERTY>
</OBJECT>
```

The following example shows the API status object, using the `json` output option:

```
"status": [
  {
    "object-name": "status",
    "meta": "/meta/status",
    "response-type": "Success",
    "response-type-numeric": 0,
    "response": "Command completed successfully. (2020-01-29 11:01:10)",
    "return-code": 0,
    "component-id": "",
    "time-stamp": "2020-01-29 11:01:10",
    "time-stamp-numeric": 1580295670
  }
]
```

A script should check the previous command's status before proceeding with the next command. The value of the `status` object's `return-code` property may be:

- 0: The command completed successfully.
- -1000 to -1999: The command completed with a warning.
- Any other value: The command failed.

If you script an operation to repeatedly add and remove disk groups, set a delay of at least two minutes between deleting a disk group and creating the next one.

#### Example command input and API output

The following table shows a command formatted for use with the command-line interface, the same command formatted for use with the HTTPS interface, and command output in the XML and JSON APIs.

**Table 2 Command input and API output format examples**

Context	Example
Command-line interface format	<code>create user JSmith interfaces wbi password Abc#1379</code>
HTTPS interface format	<code>create/user/JSmith/interfaces/wbi/password/Abc#1379</code>

**Table 2 Command input and API output format examples (continued)**

Context	Example
XML API output	<pre>&lt;?xml version="1.0" encoding="UTF-8" standalone="yes"?&gt; &lt;RESPONSE VERSION="L100" REQUEST="create user JSmith interfaces wbi password Abc#1379"&gt;   &lt;OBJECT basetype="status" name="status" oid="1"&gt;     &lt;PROPERTY name="response-type" type="string"&gt;Success&lt;/PROPERTY&gt;     &lt;PROPERTY name="response-type-numeric" type="uint32"&gt;0&lt;/PROPERTY&gt;     &lt;PROPERTY name="response" type="string"&gt;Command completed successfully. (JSmith) - The new user was created. (2020-01-29 11:08:59)&lt;/PROPERTY&gt;     &lt;PROPERTY name="return-code" type="sint32"&gt;0&lt;/PROPERTY&gt;     &lt;PROPERTY name="component-id" type="string"&gt;JSmith&lt;/PROPERTY&gt;     &lt;PROPERTY name="time-stamp" type="string"&gt;2020-01-29 11:08:59&lt;/PROPERTY&gt;     &lt;PROPERTY name="time-stamp-numeric" type="uint32"&gt;1580296139&lt;/PROPERTY&gt;   &lt;/OBJECT&gt; &lt;/RESPONSE&gt;</pre>
JSON API output	<pre>{   "status": [     {       "object-name": "status",       "meta": "/meta/status",       "response-type": "Success",       "response-type-numeric": 0,       "response": "Command completed successfully. (JSmith) - The new user was created. (2020-01-29 11:05:40)",       "return-code": 0,       "component-id": "JSmith",       "time-stamp": "2020-01-29 11:05:40",       "time-stamp-numeric": 1580295940     }   ] }</pre>

### XML API optimization

For the XML API only, the following are two ways to optimize 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. 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="uint32">1</PROPERTY>
    <PROPERTY name="port" key="true" type="string">A1</PROPERTY>
    ...
  <OBJECT basetype="fc-port" name="port-details" oid="2" format="rows">
```

```
<PROPERTY name="configured-topology" type="string">PTP</PROPERTY>
<PROPERTY name="configured-topology-numeric" type="uint32">1</PROPERTY>
...
</OBJECT>
</OBJECT>
...
<OBJECT basetype="status" name="status" oid="17">
  <PROPERTY name="response-type" type="string">Success</PROPERTY>
  ...
</OBJECT>
</RESPONSE>
```

For the JSON API, embedding objects is the only way to show relationships and brief mode is not applicable.

## Command syntax

### General rules for specifying commands

- Command names and parameter keywords are not case sensitive.
- Parameters enclosed in square brackets ( [ ] ) are optional. Do not type the bracket characters.
- Parameter values separated by '|' characters are options. Enter only one of the values. Unless specified otherwise, enumerated values are not case sensitive.
- Parameter values in angle brackets (<>) represent variable text, such as user-defined input. Substitute text that is appropriate for the task you want to perform, and do not type the bracket characters. Unless specified otherwise, variable values such as names of users and volumes are case sensitive and have a maximum length in bytes. The system uses UTF-8 which supports 1 byte per character for English.
- 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. If a parameter includes a list of values and any value includes a space, the entire list must be enclosed in double quotes. Unless specified otherwise, if you include leading or trailing spaces with a value in double quotes, those spaces are treated as part of the value.
- Parameters can be entered in any order. However, for a parameter with no keyword, if you want to specify a value whose entirety matches the initial part of an optional parameter's keyword, you must specify the optional parameter before the keyword-less parameter.

For example, the `create user` command has an optional parameter with the keyword `base` and a `name` parameter with no keyword. To create a user named "base" or "bas" the `base` parameter must precede the `name` parameter. To create a user named "base1" or "ase" the parameters can be in any order.

### Specifying disks

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

- A disk. Example: 1.4
- A hyphenated range of disks. Example: 1.4-7
- A comma-separated list of individual disks, ranges, or both (with no spaces). Example: 1.4, 1.6-9
- A RAID 10 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 disk groups

You can specify:

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

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: `dg1_v1, "Vol #1"`

## 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).

Controller IDs are not case sensitive.

Port IDs increment from 0 in each controller module.

You can specify:

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

## Specifying initiators and hosts

You can specify:

- A SAS initiator by its nickname or 16-hex-digit WWPN.
- A host by name in the format `<hostname>.*`, where `*` represents all initiators in the host. Example: `Mail_Server.*`

## Specifying host groups

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 from 8 to 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, one numeric character, and one non-alphanumeric character. This rule does not apply if the password contains UTF-8 characters that are outside the range of printable ASCII characters.

## Viewing help

See the topic for the `help` command.

## Command completion, editing, and history

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

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

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

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

**Table 3** Keyboard shortcuts for command completion, editing, and history

Task	Shortcut
Complete a partially entered keyword	TAB or CTRL+I
Show command history	F6
Get previous command from history	↑
Get next command from history	↓
Move cursor left	←
Move cursor right	→
Delete previous character	BACKSPACE
Delete previous, current, or next character (varies by terminal emulator)	DELETE
Move the cursor to the start of the line	HOME
Move the cursor to the end of the line	END

---

**NOTE** Keyboard shortcut support varies by terminal emulator.

---

## 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`. For entry of storage-space sizes, unless a base-2 or base-10 unit is specified, the unit is 512-byte blocks. If your base is set to 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.

**Table 4 Size representations in base-2 and base-10**

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

## 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 of severity:

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

For information about viewing events, see the `show events` command.

## Alerts

The alerts mechanism is a robust storage enclosure health and notification system designed to identify actionable conditions and promote best practices. Alerts enable you to monitor system health and performance issues and to track and acknowledge the resolution of these issues.

Each alert has one of the following levels of severity:

- **Informational:** The system configuration does not match recommendations. No change is required, but for optimal system performance and security, you should resolve the issue.
- **Warning:** A problem occurred that may affect system stability or performance but not data integrity. Evaluate the problem and correct it if necessary.
- **Critical:** A failure occurred that may cause a controller to shut down or could affect data integrity or system stability. Correct the problem *immediately*.
- **Unknown:** The system is unable to determine the state of a component. In some configurations, this situation is normal. In other situations, resolving other system issues should resolve this issue as well.

For information about viewing alerts, see the `show alerts` command.



## 2 Categorical list of commands

### Current commands by category

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

**Table 5** Commands by category

Category	Commands
CLI and users	create user delete user exit help meta set cli-parameters set password set prompt set user show cli-parameters show sessions show users whoami
LDAP and user groups	create user-group delete user-group set ldap-parameters set user-group show ldap-parameters show user-groups whoami
Disks, disk groups, and spares	abort scrub abort disk-firmware-update activate disk-firmware add disk-group add spares clear disk-metadata clear fenced-data delete disk-firmware delete pools dequarantine erase disk expand disk-group remove disk-groups remove spares rescan scrub disk-groups set disk-group show disk-groups show disks show disk-affinity show fenced-data show pools trust

**Table 5 Commands by category (continued)**

<b>Category</b>	<b>Commands</b>
Full disk encryption	clear fde-keys set disk set fde-import-key set fde-lock-key set fde-state show fde-state
Volumes, initiators, hosts, and mapping	create volume create volume-set delete initiator-nickname delete volumes expand volume map volume release volume scrub volume set initiator set volume show initiators show maps show ports show unwritable-cache show volume-names show volume-reservations show volumes unmap volume
Host groups	add host-group-members add host-members create host create host-group delete host-groups delete hosts remove host-group-members remove host-members set host set host-group show host-groups
Scheduled tasks	create schedule create task delete schedule delete task set schedule show schedules show tasks

**Table 5 Commands by category (continued)**

<b>Category</b>	<b>Commands</b>
Notifications (alerts and events)	<code>clear alerts</code> <code>set alert</code> <code>set email-parameters</code> <code>set snmp-parameters</code> <code>set syslog-parameters</code> <code>show alert-condition-history</code> <code>show alerts</code> <code>show email-parameters</code> <code>show events</code> <code>show snmp-parameters</code> <code>show syslog-parameters</code> <code>test</code>

**Table 5 Commands by category (continued)**

Category	Commands
System configuration and utilities	activate certificate activate disk-firmware activate firmware add certificate (API command) add ipv6-address add storage check firmware-upgrade-health clear cache clear dns-parameters create certificate-signing-request delete disk-firmware ping remove certificate remove ipv6-address reset dns-management-hostname reset host-link restart mc restart sc set advanced-settings set controller-date set disk-parameters set dns-management-hostname set dns-parameters set enclosure set host-parameters set ipv6-network-parameters set network-parameters set ntp-parameters set protocols set system set system-cache-parameters set volume-cache-parameters show advanced-settings show audit-log show cache-parameters show certificates show configuration show controller-date show controllers show disk-parameters show dns-management-hostname show dns-parameters show enclosures show expander-status show fan-modules show fans show firmware-bundles show firmware-update-status show frus show inquiry show ipv6-addresses show ipv6-network-parameters show license

**Table 5 Commands by category (continued)**

Category	Commands
	show network-parameters show ntp-status show power-supplies show protocols show provisioning show redundancy-mode show sas-link-health show sensor-status show shutdown-status show storage-configurations show system show system-parameters show timezones show versions shutdown
Service utilities	clear events clear expander-status fail restore defaults set debug-log-parameters set led show debug-log-parameters unfail controller
Degraded disk utilities	clear degraded-disk set degraded-disk-policy set degraded-disk-threshold show degraded-disk-policy show degraded-disk-thresholds
API specific	meta
Remote systems	create remote-system delete remote-system remote set remote-system show remote-systems
Statistics	reset all-statistics reset controller-statistics reset disk-error-statistics reset disk-group-statistics reset disk-statistics reset host-port-statistics reset volume-statistics show controller-statistics show disk-group-statistics show disk-statistics show host-phy-statistics show host-port-statistics show volume-statistics
Proxy server	set proxy-server show proxy-server

**Table 5** Commands by category (continued)

Category	Commands
Security	reset ciphers set ciphers show ciphers
Redfish support	add event-subscriber set event-subscriber show event-subscriber

## Unsupported commands

The following table lists commands that are no longer supported and specifies commands to use instead, if any. If you have scripts that use unsupported commands, update the scripts to use the replacement commands instead.

**Table 6** Deprecated commands

Deprecated command	Replacement command
abort verify	abort scrub
create certificate	add certificate (API command)
show certificate	show certificates
verify disk-groups	scrub disk-groups

# 3 Alphabetical list of commands

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

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

# abort disk-firmware-update

## Description

Aborts an in-progress disk firmware update operation.

The batch of disks currently being updated will complete, but no further updates will start. To determine which disks were updated, run `show disks firmware`.

## Minimum role

standard

## Syntax

```
abort disk-firmware-update
```

## Output

Success or failure message.

## Examples

Abort disk firmware update.

```
# abort disk-firmware-update
```

## See also

`activate disk-firmware`

`delete disk-firmware`



# abort scrub

## Description

Aborts a media scrub operation.

## Minimum role

standard

## Syntax

```
abort scrub  
  [disk-group <disk-groups>]  
  [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.

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 volume vol1.

```
# abort scrub volume vol1
```

## See also

scrub disk-groups

scrub volume

show disk-groups

show volumes

# activate certificate

## Description

Makes a previously added certificate active for a specific service.

Certificates are specified by name. Run the `show certificates` command to list all certificates and view certificate names.

---

**NOTE** For a user-supplied certificate, a trusted root certificate must be present, linking any intermediate certificates, in order to establish a valid trust chain of certificates. For a system-generated certificate, a root certificate is provided.

To determine if a root certificate is present, run `show certificates` with the `truststore` parameter.

---

**NOTE** Certificates must be uploaded to the storage system before you can activate them. Certificates can be uploaded by using the API or SFTP.

---

## Minimum role

manage

## Syntax

```
activate certificate
  service web
  <name>
```

## Parameters

service web

The service that the certificate is applied to.

<name>

The name of the certificate to activate. Run the `show certificates` command to list all certificates, where you can view certificate names.

## Examples

Activate a certificate named `CERT_A_12345` for the web service.

```
# activate certificate CERT_A_12345 service web
```

## See also

```
add certificate (API command)
create certificate-signing-request
remove certificate
show certificates
```

# activate disk-firmware

## Description

Initiates the intelligent drive firmware update process.

---

**NOTE** To run this command, the drive firmware update ability must be enabled by running

```
set advanced-settings disk-firmware-update enabled
```

To check whether this feature is enabled, use `show advanced-settings`.

---

When you run this command, the drive firmware update engine determines which drives are eligible for the firmware update. The engine splits the drive list into batches selected to avoid taking any disk group offline, then updates are run on each batch, one at a time.

If a drive in a batch fails to successfully update the firmware, the update engine marks the drive as failed, then proceeds to update the next batch. The system validates all failed drives from all batches and reports the overall update status.

If you want to stop the update process while it is running, you must disable the update process using `set advanced-settings`. When you disable drive firmware update, the background process stops, but if a batch is being processed, processing continues until the whole batch is updated.

---

**NOTE** This command updates drives from firmware that has previously been uploaded to the controller. To upload a drive firmware image, you must use either FTP or the SMC. To view uploaded drive firmware, run `show firmware-bundles` with the `disk` parameter.

---

## Minimum role

manage

## Syntax

```
activate disk-firmware
  model-list <model-name>
  name <firmware-name>
```

## Parameters

```
model-list <model-name>
```

Identifies a drive model or list of models compatible with the uploaded drive firmware. For a model list, items are separated by a comma with no space.

```
name <firmware-name>
```

Specifies which stored firmware file to activate. To find the file name, use the `show firmware-bundles` command with the `disk` parameter.

## Examples

Start the disk firmware update process using the uploaded firmware bundle for drive models STXmodel123 and STXmodel456.

```
# activate disk-firmware model-list STXmodel123,STXmodel456 name MobulaBPEXosX14SAS-STD-5xxE-E004.LOD
```

## See also

```
abort disk-firmware-update
activate firmware
```

```
delete disk-firmware  
set advanced-settings  
show advanced-settings  
show firmware-bundles
```

# activate firmware

## Description

Updates the firmware bundle or firmware bundle measurement stored in the controller.

## Minimum role

manage

## Syntax

```
activate firmware  
bundle active|available|measurement
```

## Parameters

```
bundle active|available|measurement
```

Specifies either which stored firmware to activate, or to measure all stored firmware bundles.

- `active`: Re-activates the currently active firmware to retry a firmware update.
- `available`: Activates firmware that has been uploaded to the system.
- `measurement`: For internal use only.

## Examples

Activate a firmware bundle that has been uploaded to the system.

```
# activate firmware bundle available
```

Measure all firmware bundles stored in the controller.

```
# activate firmware bundle measurement
```

## See also

```
show firmware-bundles  
show firmware-update-status  
check firmware-upgrade-health  
show versions
```

# add disk-group

## Description

Creates a disk group using specified disks.


---

**NOTE** If the storage system consists of SATA drives, the `add disk-group` command is not available. You must use `add storage` for provisioning instead.


---

All disks in a disk group must be the same type (SATA, SSD, enterprise SAS, or midline SAS). In addition, all disks must be 512-byte formatted disks or 4K native (4Kn) formatted disks. Disks must match the cache block size shown by `show cache-parameters`.


---

 **IMPORTANT** Storage enclosures support Seagate-branded drives only.

---

 **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).

---

 **IMPORTANT** Performance of the system will be reduced until initialization of all disk groups is complete.

---

## Minimum role

standard

## Syntax

```
add disk-group
  [assigned-to a|b|auto]
  [chunk-size 64k|128k|256k|512k]
  disks <disks>
  [interleaved-basename <name>]
  [interleaved-volume-count <value>]
  [level nraid|raid0|r0|raid1|r1|raid5|r5|raid6|r6|raid10|r10|ADAPT]
  [mode online|offline]
  [spare <disks>]
  [spare-capacity <size>[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] |default]
  [spare disabled|off|basic|strict]
  [stripe-width 8+2|16+2|8+3|16+3]
  [type linear]
  <name>
```

## Parameters

`assigned-to a|b|auto`

Optional. For a system operating in Active-Active ULP mode, this specifies the controller module to own the disk 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 disk groups in anticipation of the insertion of a second controller in the future.

`chunk-size 64k|128k|256k|512k`

Optional. Prohibited for ADAPT.

This parameter specifies the amount of contiguous data, in KB, that is written to a disk-group member before moving to the next member of the disk group. For NRAID and RAID 1, `chunk-size` has no meaning and is therefore not applicable. The default is 512k.

For an ADAPT disk group, the system automatically determines the proper chunk size.

`disks <disks>`

Specifies the IDs of the disks to include in the group. For disk syntax, see ["Command syntax" on page 21](#).

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

- NRAID: 1 (not fault tolerant)
- RAID 0: 2 to 16 (not fault tolerant)
- RAID 1: 2
- RAID 5: 3 to 16
- RAID 6: 4 to 16
- RAID 10: 4 to 16
- ADAPT: 12 to 106

RAID 10 requires a minimum of two RAID 1 subgroups each having two disks.

---

**ⓘ IMPORTANT** RAID 5 and RAID 6 disk groups, which have parity disks, should be created using the power of 2 best practice to align properly. Failure to follow this method can result in significant degradation of sequential write performance. The power of 2 best practice pertains to HDD disk groups.

RAID 5 disk groups should be created using 3, 5, or 9 disks. RAID 6 disk groups should be created using 4, 6, or 10 disks.

---

`interleaved-basename <name>`

Optional. When specifying `interleaved-volume-count`, a name can be chosen for the volumes that will be created. 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 `interleaved-basename pDG_v`, if `pDG_v0000` and `pDG_v0002` exist, the next volumes created will be `pDG_v0001` and `pDG_v0003`.

If a `basename` is not provided when specifying `interleaved-volume-count`, the name defaults to `vol`.

`interleaved-volume-count <value>`

Optional. The number of volumes to create, from 1 to 128. An ADAPT disk group can be optimized by predetermining the number of interleaved volumes in a disk group. The volumes are created as part of adding the disk group. Available space is distributed evenly among the volumes.

Volumes created by using this parameter are not mapped. If volume creation fails for any of the volumes, the disk group creation fails. In this case, the disk group and all volumes are deleted.

---

**NOTE** Interleaved volumes cannot be expanded, and you cannot remove an interleaved volume. To remove interleaved volumes, you must remove the entire disk group.

---

`level nraid|raid0|r0|raid1|r1|raid5|r5|raid6|r6|raid10|r10|ADAPT`

Specifies the RAID level to apply to the member disks.

`mode online|offline`

Optional. 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.
- `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.

`spare <disks>`

Optional. Prohibited for ADAPT. Specifies the IDs of from 1 to 4 dedicated spares to assign to a RAID 1, 5, 6, or 10 disk group. For disk syntax, see ["Command syntax" on page 21](#).

`spare-capacity <size> [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] |default`

Optional. For an ADAPT disk group, this specifies the target spare capacity.

- `<size> [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`: Sets the target spare capacity to a specific size. The unit is optional (B represents bytes). If no unit is specified, GiB will be used, regardless of the current base. Whichever unit is set, internally the value will be rounded down to the nearest GiB. If the value is set to 0, the absolute minimum spare space will be used. If this parameter is omitted, the default setting will be used.
- `default`: Sets the target spare capacity to the sum of the two largest disks in the disk group, which is sufficient to fully recover fault tolerance after loss of any two disks in the group.

`spear disabled|off|basic|strict`

Optional. Specifies whether the new disk group is enabled for SPEAR, which improves data integrity by checking stripe consistency with each read access.

---

**NOTE** This parameter requires the following: RAID 6 or ADAPT disk groups with 4KB drive sectors, and Protection Information (PI) type 0 and 1 on controller host ports.

---

- `disabled` or `off`: SPEAR is disabled. This is the default.
- `basic`: SPEAR is enabled in `basic` mode. User data is not returned for SPEAR errors.
- `strict`: SPEAR is enabled in `strict` mode. User data is not returned for SPEAR errors or when SPEAR is unavailable.

`stripe-width 8+2|16+2|8+3|16+3`

Optional. For an ADAPT disk group, this specifies the stripe width to use.



- 8+2: Each stripe contains 8 data chunks and 2 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 12 disks. This option is the default.
- 16+2: Each stripe contains 16 data chunks and 2 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 20 disks. This option has less overhead, but also less redundancy, than the 8+2 option.
- 8+3: Each stripe contains 8 data chunks and 3 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 12 disks. This option provides the best reliability.
- 16+3: Each stripe contains 16 data chunks and 3 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 20 disks. This option provides better reliability than both 8+2 and 16+2 and has less overhead than both 8+2 and 8+3.

type linear

Optional. Specifies the type of disk group to create.

- `linear`: A disk group for linear storage.

<name>

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

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

If this parameter is omitted, the system will generate a name in the format `dg<controller-ID><#>`, where <#> starts at 01.

### 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 ADAPT linear disk group `ALDG`.

```
# add disk-group type linear disks 1.1-12 level ADAPT ALDG
```

Add ADAPT linear disk group `ALDG` with 7 optimally sized volumes (interleaved) and 1 drive spare capacity. The volume `basename` is `myVol`.

```
# add disk-group type linear disks 0.0-48 level ADAPT spare-capacity 16TB interleaved-
volume-count 7 interleaved-basename myVol ALDG
```

### See also

```
expand disk-group
remove disk-groups
set disk-group
show disk-groups
show disks
```

# add host-group-members

## Description

Adds hosts to a host group.

A host group can contain a maximum of 128 initiators. A host group can contain from 1 to 256 hosts as long as the sum of all initiators in all hosts in the host group does not exceed 128.

To add a host to a host group, the host must be mapped with the same access, port, and LUN settings to the same volumes as every other host in the host group.

## Minimum role

standard

## 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 be mapped with the same access, port, and LUN settings to the same volumes as every other initiator in the host.

## Minimum role

standard

## Syntax

```
add host-members
    initiators <initiators>
    <hostname>
```

## 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.

```
<hostname>
```

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-members
show host-groups
show initiators
```

# add ipv6-address

## Description

Adds a static IPv6 address for a controller network port.

A maximum of 8 static IPv6 addresses can be configured, 4 per controller. These addresses can be configured at any time, but can only become active when the `set ipv6-network-parameters` command's `autoconfig` parameter is disabled.

All addresses added to the IPv6 address list should be reachable if `autoconfig` is disabled. They are ignored if `autoconfig` is enabled.

Static addresses are stored on the controller enclosure midplane. Therefore the addresses will persist even if both controller modules are replaced.

## Minimum role

standard

## Syntax

```
add ipv6-address
  [address-label <name>]
  [controller a|b]
  ip-address <IP-address>
  [prefix-length <value>]
```

## Parameters

`address-label <name>`

Optional. Lets you specify a name for how the address is used. Input rules:

- The value is case sensitive.
- The value can have a maximum of 32 bytes.
- The value can include spaces and printable UTF-8 characters except: " , < \
- A value that includes a space must be enclosed in double quotes.
- If this parameter is specified, each interface needs a unique name within the scope of each controller. For example, controller A can have only one address labeled `vlan1`, and controller B can also have only one address labeled `vlan1`.

`controller a|b`

Optional. Specifies to change controller A or B, only. If this parameter is omitted, changes affect the controller being accessed.

`ip-address <IP-address>`

Specifies the IPv6 address to add. The value may include the standard IPv6 `/prefixLength 1-128` notation; or the `prefixLength` may be omitted if the `prefix-length` parameter is used instead. The address cannot be used elsewhere in the network port configuration.

`prefix-length <value>`

Optional. Specifies the length of the prefix in the IP address. This parameter is valid only if the `ip-address` parameter value does not include `/prefixLength` notation.

## Examples

Add an IPv6 address named `vlan1` to the network port in controller A only.

```
# add ipv6-address controller a address-label vlan1 ip-address
2620:0:350:fc02:2c0:ffff:fe28:8787/64
```

**See also**

```
remove ipv6-address  
set ipv6-network-parameters  
show ipv6-addresses  
show ipv6-network-parameters
```

# add spares

## Description

Designates specified available disks to be spares.

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


A global spare can replace a failed disk of the same type (SATA, SSD, enterprise SAS, or midline SAS) and the same or lower capacity in any disk group with a fault-tolerant RAID level other than ADAPT. The system supports a maximum of 64 global spares. However, the system prevents adding global spares if only ADAPT disk groups exist.

A dedicated spare can replace a failed disk of the same type (SATA, SSD, enterprise SAS, or midline SAS) and the same or lower capacity in a specific disk group with a fault-tolerant RAID level other than ADAPT. A linear disk group can have 4 dedicated spares.

If the disks in the system are FDE-capable, spares must also be FDE-capable.

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

---

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

---

## Minimum role

standard

## Syntax

```
add spares
  [disk-group <disk-group>]
  <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.

<disks>

The IDs of the disks to designate as spares. For disk syntax, see ["Command syntax" on page 21](#).

## Examples

Designate disk 1.2 as a global spare.

```
# add spares 1.2
```

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
```

# add storage

## Description

Provisions disks into disk groups, according to rules defined by the storage-system manufacturer.

In a new system, this command quickly provisions disks in enclosures so that you can proceed with creating and mapping volumes.

---

**NOTE** If the storage system consists of SAS drives, the `add storage` command is not available. You must use `add disk-group` for provisioning instead.

---

**!** **IMPORTANT** If a disk group already exists, this command will fail. All 96 disks must be available on the system and nothing can be provisioned on the system or the command returns an error.

---

For increased reliability, all SATA drive configurations use ADAPT disk groups. Spare capacity is determined by the configuration, and you cannot alter it to increase storage space.

To verify the results of the command, use `show disk-groups` with the `detail` parameter to display the size and spare capacity of disk groups.

## Minimum role

standard

## Syntax

```
add storage
    [configuration <config-ID>]
    [interleaved-volume-count <value>]
```

## Parameters

`configuration <config-ID>`

Optional. Indicates the storage configuration to use, specified by ID. Run `show storage-configurations` to see the available configurations. If this parameter is omitted, the system defaults to using the first configuration in the list.

If you specify a configuration with interleaved volumes, you must also specify the `interleaved-volume-count` parameter.

`interleaved-volume-count <value>`

Optional. The number of volumes to create, from 1 to 128. An ADAPT disk group can be optimized by predetermining the number of interleaved volumes in a disk group. The volumes are created as part of adding the disk group. Available space is distributed evenly among the volumes.

Volumes created by using this parameter are not mapped. If volume creation fails for any of the volumes, the disk group creation fails. In this case, the disk group and all volumes are deleted.

---

**NOTE** Interleaved volumes cannot be expanded, and you cannot remove an interleaved volume. To remove interleaved volumes, you must remove the entire disk group.

---

## Examples

Add storage for a SATA drive system based on a configuration without interleaved volumes.

```
add storage configuration 2
```

Add storage for a SATA drive system based on a configuration with interleaved volumes.

```
add storage configuration 1 interleaved-volume-count 3
```

**See also**

show disks

show disk-groups

show pools

show storage-configurations



# 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 multipathing to disks—upgrade failure or loss of availability can occur.

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

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

## Minimum role

standard

## 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
```

```
At least one controller contains unwritten cache data.
```

```
Data corruption, data loss
```

One or more fans are not functioning.

One or more disk groups are in a quarantined state.

Code load failure

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 firmware-update-status

show power-supplies

show sensor-status

show system

# clear alerts

## Description

Clears all the alerts from the active list, and forces a fresh analysis of the system for any active alert conditions. For alert conditions that have not yet been resolved, new alerts are reported in an unacknowledged state. Any previously acknowledged alerts that are unresolved must be re-acknowledged.

## Minimum role

standard

## Syntax

```
clear alerts
```

## Examples

Clear all alerts for the system.

```
# clear alerts
```

## See also

```
set alert  
show alert-condition-history  
show alerts
```

# clear cache

## Description

Clears unwritable cache data from both controllers.

---

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

---

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 and accessible from the host. Clearing cache for a volume that is offline or quarantined could result in unrecoverable data loss.

---

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

## Minimum role

standard

## 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 degraded-disk

## Description

Sets a degraded disk's health to OK and clears the disk's error count.

For a disk that has been failed by the degraded-disk policy, this command also clears the disk's metadata.

After this command is run, error counts used to measure disk medium errors are restarted.

## Minimum role

standard

## Syntax

```
clear degraded-disk  
  <disks>
```

## Parameters

<disks>

The IDs of the disks to operate on. For disk syntax, see ["Command syntax" on page 21](#).

## Examples

Clear metadata from a disk that has been failed by the degraded-disk policy.

```
# clear degraded-disk 1.2
```

## See also

```
set degraded-disk-policy  
set degraded-disk-threshold  
show degraded-disk-policy  
show degraded-disk-thresholds  
show disks
```


# 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.

---

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

---

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

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

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

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

If spares are available, and the health of the disk group is `Degraded`, the disk group will use spares 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

standard

## Syntax

```
clear disk-metadata  
  <disks>
```

---

 **CAUTION** Contact technical support before clearing metadata from a disk that is a member of an offline or quarantined disk group, which could result in unrecoverable data loss. Recovery of an offline disk group must be done with help from technical support before metadata is cleared.

---

## Parameters

<disks>

The IDs of the leftover disks from which to clear metadata. For disk syntax, see ["Command syntax" on page 21](#).

**Examples**

Clear metadata from leftover disk 1.1.

```
# clear disk-metadata 1.1
```

**See also**

show disks

# clear dns-parameters

## Description

Clears configured DNS settings for each controller module.

## Minimum role

standard

## Syntax

```
clear dns-parameters  
    [controller a|b|both]
```

## Parameters

controller a|b|both

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

## Examples

Clear DNS settings for controller A.

```
# clear dns-parameters controller a
```

## See also

```
set dns-parameters  
set email-parameters  
show dns-parameters  
show email-parameters
```



# clear events

## Description

Clears the event log in controller A, B, or both.

---

**NOTE** This command is for use by or with direction from technical support.

---

## Minimum role

standard

## Syntax

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

## Parameters

a|b|both

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

noprompt

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

## 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.

---

**NOTE** This command is 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

standard

## Syntax

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

## Parameters

<enclosure-ID>

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

## Examples

Clear the expander status for the enclosure with ID 1.

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

## See also

`show expander-status`

# clear fde-keys

## Description

Clears the lock key ID and import lock ID used with full disk encryption.

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. No further FDE configuration will be allowed until the system has been power cycled. Disks will remain in the `Secured, Unlocked` state until they are power cycled.

After the system has been transported and powered back up, the system and disks will enter the `Secured, Locked` state, and volumes will become inaccessible. To restore access to data, re-enter the original passphrase by using the `set fde-lock-key` command.

## Minimum role

standard

## 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
```

## See also

```
set fde-import-key  
set fde-lock-key  
set fde-state  
show fde-state
```


# clear fenced-data

## Description

Clears fenced data blocks from a specified disk group.

If the specified disk group has no fenced data, the command returns an error and the disk group is not affected.

---

 **CAUTION** This command is for use by or with direction from technical support. Using this command without proper review from technical support will cause data corruption or data loss.

---

## Minimum role

monitor

## Syntax

```
clear fenced-data  
    [disk-group <disk-group>]
```

## Parameters

disk-group <disk-group>

Optional. The name or serial number of a disk group. A value that includes a space must be enclosed in double quotes.

## Examples

Clear fenced data for disk group ar5.

```
# clear fenced-data disk-group ar5
```

## See also

show fenced-data

# create certificate-signing-request

## Description

Creates a certificate signing request (CSR) to generate a new certificate.

The storage system supports use of unique certificates for secure data communications and to authenticate the identity of the storage system. Use of authentication certificates applies to the HTTPS protocol, which is used by the web server in each controller module.

The CSR contains the information that a certificate authority (CA) would use to create a signed device certificate. This certificate can be uploaded using the `add certificate` API command. The generated CSR is a PEM-encoded string. Along with CSR this command will also produce a private key, which will be stored on the controller and later used for verification of the uploaded signed certificate. The CSR is deleted automatically after the corresponding signed certificate is uploaded. When you run this command again (either with the same parameters or different ones) a new CSR will replace the existing CSR. At any time, only one CSR can exist on the system.

## Minimum role

standard

## Syntax

```
create certificate-signing-request
  [a|b|both]
  subject <subject-string>
  [extensions <extension-string>]
```

## Parameters

a|b|both

Optional. Specifies whether to generate the CSR for controller A, B, or both. If this parameter is omitted, the CSR is generated for the controller being accessed.

subject <subject-string>

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 C for country, ST for state or province, L for location, CN for common name, and O for organization. Input rules:

- Cannot exceed 1024 characters.
- Can include printable UTF-8 characters except semicolon.
- Spaces cannot be included in type names but can be included in type values. If a value contains a space, the entire subject string must be enclosed in double quotes.

Example: `"/C=US/ST=CO/O=My Organization/CN=www.mysite.com"`

extensions <extension-string>

Optional. Adds extension parameters to the CSR if requested by a user. Input rules:

- Cannot exceed 1024 characters.
- Can include printable UTF-8 characters except semicolon.
- If the string contains a space, the entire subject string must be enclosed in double quotes.

Example: `/basicConstraints=CA:FALSE/extendedKeyUsage=clientAuth,serverAuth`

## Examples

Create a CSR for the controller being accessed, only.

```
# create certificate-signing-request subject  
/C=US/ST=CO/L=NewYork/O=MyCompany/CN=www.mycompany.com
```

Create a CSR for both controllers.

```
# create certificate-signing-request both subject "/C=US/ST=New York/L=New York/O=My  
Company/CN=mycompany.com" extension  
/basicConstraints=CA:FALSE/extendedKeyUsage=clientAuth,serverAuth
```

## See also

```
activate certificate  
add certificate (API command)  
restart mc full  
remove certificate  
show certificates
```

# 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

standard

## Syntax

```
create host
    [host-group <host-group>]
    initiators <initiators>
    [profile standard|hp-ux|openvms]
    <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 names, IDs, or both, with no spaces.

For SAS, the ID is a WWPN. A WWPN can include a colon between each byte but the colons will be discarded.

profile standard|hp-ux|openvms

Optional.

- standard: Default profile.
- hp-ux: The host uses Flat Space Addressing.
- openvms: The host does not allow LUN 0 to be assigned to a mapping.

<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 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

standard

## Syntax

```
create host-group
  hosts <hosts>
  <host-group>
```

## Parameters

hosts <hosts>

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

<host-group>

A name for the host group. Input rules:

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

## Examples

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

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

## See also

```
add host-group-members
delete host-groups
remove host-group-members
set host-group
show host-groups
```

# create remote-system

## Description

Creates a persistent association with a remote storage system.

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

standard

## Syntax

```
create remote-system
  password <password>
  username <username>
  <IP-address>
```

## 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 having the `standard` or `manage` role to remotely configure or provision that system.

<IP-address>

The network-port IP address of the remote system. The value can be an IPv4 address, IPv6 address, or FQDN.

## Examples

Create a remote system with username `JDoe`, password `Abcd_1234`, and IP address `10.122.1.21`.

```
# create remote-system username JDoe password Abcd_1234 10.122.1.21
```

## See also

```
delete remote-system
remote
set remote-system
show remote-systems
```

# create schedule

## Description

Schedules a task to run automatically.

## Minimum role

standard

## 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.
- `[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  
day|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, 2019, runs daily between midnight and 1:00 AM, and runs for the last time in the morning of January 1, 2020.

```
# create schedule schedule-specification "start 2019-03-01 00:01, every 1 days, between
12:00 AM and 1:00 AM, expires 2020-01-01 1:00 AM" task-name Task1 Sched1
```

Create schedule `Sched2` that runs `Task2` for the first time on March 1, 2019, and on the first weekday of each month, with no expiration.

```
# create schedule schedule-specification "start 2019-03-01 00:01 only first weekday of
month" task-name Task2 Sched2
```

Create schedule `schedStartScrub` that runs task `taskStartScrub` for the first time on February 11, 2023, runs every Saturday, and never expires.

```
# create schedule schedule-specification "Start 2023-02-11 00:00:00, Only Any Saturday Of
Year" task-name taskStartScrub schedStartScrub
```

Create schedule `schedStopScrub` that runs task `taskStopScrub` for the first time on February 12, 2023, runs every Sunday, and never expires.

```
# create schedule schedule-specification "Start 2023-02-12 23:59:00, Only Any Sunday Of
Year" task-name taskStopScrub schedStopScrub
```

## See also

```
delete schedule
set schedule
show schedules
show tasks
```

# create task

## Description

Creates a task that can be scheduled.

You can create a task to start or stop background scrub on disk groups.

Use the `StartScrub` option to start or resume scrub during hours of infrequent activity. When `StartScrub` is executed, the background disk-group scrub utility starts scrubbing the disk group.

Use the `StopScrub` option to stop or pause scrub during hours of frequent activity. When `StopScrub` is executed, the background disk-group scrub utility stops scrubbing the disk group.

For the start or stop background scrub task to run successfully, enable the `background-scrub` and `scrub-schedule` parameters of the `set advanced-settings` command.

## Minimum role

standard

## Syntax

To create a task to start or stop background disk-group scrub:

```
create task
  type StartScrub|StopScrub
  <name>
```

## Parameters

```
type StartScrub|StopScrub
```

The task type:

- `StartScrub`: Starts the background disk-group scrub.
- `StopScrub`: Stops the background disk-group scrub.

```
<name>
```

A name for the new task. Input rules:

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

## Examples

Create task `taskStartScrub` to start background disk-group scrub.

```
# create task type StartScrub taskStartScrub
```

Create task `taskStopScrub` to stop background disk-group scrub.

```
# create task type StopScrub taskStopScrub
```

## See also

```
create schedule
delete task
show tasks
show volumes
```

# create user

## Description

Creates a user account.

The system supports 12 local user accounts. You can create a user who can access the SMC, CLI, SFTP, or FTP interface, or an SNMPv3 user who can access the MIB and receive trap notifications. SNMPv3 user accounts support SNMPv3 security features such as authentication and encryption.

In addition to the above local users, members of LDAP groups can also access the CLI. Local users and LDAP users can use the same set of CLI commands. Only LDAP users with the `manage` role can create, modify, and delete both local users and LDAP user groups. For information about enabling access by LDAP users, see `create user-group`.

## Minimum role

`manage`

## Syntax

```
create user
  [authentication-type MD5|SHA|none]
  [base 2|10]
  [interfaces <interfaces>]
  [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>]
  [trap-port <port-number>]
  [type novice|standard|advanced|diagnostic]
  [units auto|MB|GB|TB]
  <username>
```

## 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-1 authentication.
- `none`: No authentication.

base 2|10

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

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

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

interfaces <interfaces>

Optional. Specifies the interfaces that the user can access. Multiple values must be separated by commas and no spaces.

- cli: Command-line interface. This is enabled by default.
- wbi: Web-browser interface. This is enabled by default.
- ftp: SFTP/FTP interface.
- snmpuser: Allows an SNMPv3 user to view the SNMP MIB and receive SNMP trap notifications. This option requires the trap-host parameter. To use a trap destination port other than the default port, also specify the trap-port parameter.
- none: No interfaces.

A command that specifies snmpuser cannot also specify a non-SNMP interface. To enable or disable interface protocols, use the set protocols command.

password <password>

Optional in console mode; required for API mode. Sets a new password for the user. Input rules:

- The value is case sensitive.
- The value can have 8 to 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, one numeric character, and one non-alphanumeric 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 to 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. Input rules:

- The value is case sensitive.
- The value can have 8 to 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, one numeric character, and one non-alphanumeric character.

`privacy-type DES|AES|none`

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

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

`roles <roles>`

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

- `monitor`: User can view but not change system settings. This is the default.
- `standard`: User can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP/FTP; performing file uploads from the SMC; using the `restore defaults` command.
- `manage`: User can view and change system settings.
- `diagnostic`: For use by or with direction from technical support.

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 to 43200 seconds (2 to 720 minutes). The default is 1800 seconds (30 minutes).

`trap-host <IP-address>`

Optional. For an SNMPv3 user whose `interfaces` parameter is set to `snmpuser`, this specifies the IP address of the host that will receive SNMP traps. The value can be an IPv4 address or IPv6 address or FQDN.

`trap-port <port-number>`

Optional. For an SNMPv3 user, this parameter specifies the target port of the host that will receive SNMP traps. The default port is 162.

`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 0.11709TB is instead shown as 117.1GB.

<username>

A name for the new user. The name 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: " , < \ :
- The first character of the value cannot be: -

### Examples

Create user John who will view system information using base 2 in the SMC.

```
# create user base 2 interfaces wbi roles monitor John
Enter new password: *****
Re-enter new password: *****
```

Create user `testsnmp` that can view the SNMP MIB and receive SNMP trap notifications, using authentication and encryption.

```
# create user interfaces snmpuser password Abcd_1234 authentication-type SHA privacy-type
AES privacy-password Abcd_5678 trap-host 172.22.4.171 testsnmp
```

### See also

```
delete user
set snmp-parameters
set user
show users
```

# create user-group

## Description

Creates a user group in the storage system to match an LDAP group.

There are two sources of user credentials for the storage system:

- The primary source is local users created by using the `create user` command.
- The secondary source is an LDAP server.

Users logging in using their LDAP credentials must authenticate using these credentials and be members of a group that is authorized to access the storage system. The group will exist on the LDAP server and will be listed under the `Member Of` property for the user account. The same group name must also exist in the storage system, and be created by using the `create user-group` command.

Individual user preferences are not saved in the storage system. Any settings made to the login session are not retained after the session terminates. If the user wants to retain any preferences for the session, these must be saved as part of the user group. Any changes made to a user group will affect all members of that group.

The system supports a maximum of 5 user groups to allow different permissions and user preferences. User group permissions are defined by assigning roles, the same as for local users. User group preference parameters include the storage size base, precision, and units; temperature scale; and timeout.

User groups can be created whether the LDAP feature is enabled or disabled.

Local users and LDAP users can use the same set of CLI commands. Only LDAP users with the `manage` role can create, modify, and delete both local users and LDAP user groups.

---

**!** **IMPORTANT** Running the `restore defaults` command will clear LDAP user groups.

---

For more information about the LDAP feature, see the Storage Management Guide.

## Minimum role

`manage`

## Syntax

```
create user-group
  [base 2|10]
  [interfaces <interfaces>]
  [precision <#>]
  [roles <roles>]
  [storage-size-base 2|10]
  [storage-size-precision <#>]
  [storage-size-units auto|MB|GB|TB]
  [temperature-scale celsius|c|fahrenheit|f]
  [timeout <#>]
  [type LDAP]
  [units auto|MB|GB|TB]
  <user-group-name>
```

## 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. 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 group can access. Multiple values must be separated by commas and no spaces.

- `cli`: Command-line interface. This is enabled by default.
- `wbi`: Web-browser interface (the SMC). This is enabled by default.
- `ftp`: SFTP interface.
- `none`: No interfaces.

Only secure protocols are supported for the above interfaces. To enable or disable interface protocols, use the `set protocols` command.

`precision <#>`

Optional. Sets the number of decimal places from 1 to 10 for display of storage-space sizes.

`roles <roles>`

Optional. Specifies the user group role as one or more of the following values:

- `monitor`: User group can view but not change system settings. This is the default.
- `standard`: User group can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP; performing file uploads from the SMC; using the `restore defaults` command.
- `manage`: User group can view and change system settings.
- `diagnostic`: For use by or with direction from technical support.

Multiple values must be separated with a comma (with no spaces). If multiple values are specified, the user group'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).

type LDAP

Optional. Identifies the user group type.

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 0.11709TB is instead shown as 117.1GB.

<user-group-name>

A name for the new user group, which must match the name used in the LDAP database including capitalization. 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 group `StorageAdmins` with the `manage` role for the CLI and SFTP interfaces.

```
# create user-group type ldap interfaces cli,ftp roles manage StorageAdmins
```

### See also

```
delete user-group
set ldap-parameters
set user-group
show audit-log
show user-groups
```

# create volume

## Description

Creates a volume in a pool.

Each linear disk-group has a dedicated pool of the same name.

You must specify a pool, size, and name for the volume.

You can optionally map the volume to hosts in the same operation. By default, this command will not map the new volume.

---

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

---

Volume sizes are aligned to 4.2MB (4MiB) boundaries. When a volume is created or expanded, if the resulting size would be less than 4.2MB it will be increased to 4.2MB; if the resulting size would be greater than 4.2MB it will be decreased to the nearest 4.2MB boundary.

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

To create multiple volumes at once, use the `create volume-set` command.

## Minimum role

standard

## Syntax

```
create volume
  [access read-write|rw|read-only|ro|no-access]
  [host-pi-type T0|T1]
  [initiator <initiators>|<hosts>|<host-groups>]
  [lun <LUN>]
  [ovms-uid <ID>]
  pool <pool>
  [ports <ports>]
  size <size> [B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
  <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`. The default is `read-write`.

`host-pi-type T0|T1`

Optional. Defines the host protection information (PI) type for this volume set at creation, enabling or disabling host PI for it. This setting cannot be changed for the life of the volume. `T0` disables host PI for the volume. `T1` enables host PI for the volume. When creating a volume, `T0` is the default PI type and host PI is disabled.

`initiator <initiators>|<hosts>|<host-groups>`

Optional. Specifies a comma-separated list of initiators or hosts or host-groups that can access the volume. If this parameter is specified, the `lun` parameter must also be specified.

`lun <LUN>`

Optional if the `access` parameter is set to `no-access`. Specifies the LUN to assign to the mapping on all ports. If this parameter is specified, the `initiator` parameter must also be specified.

`ovms-uid <ID>`

Optional. For a volume to be accessed by an OpenVMS host, assign a volume ID 1-32767 to identify that volume to that host.

`pool <pool>`

The name or serial number of the pool in which to create the volume. For linear storage use the disk group name as the pool value.

`ports <ports>`

Optional. The controller ports through which the host can access the volume. For port syntax, see ["Command syntax" on page 21](#). If this parameter is omitted, all ports are selected.

`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 the cache block size shown by `show cache-parameters`.

A value less than 4.2MB (4MiB) will be increased to 4.2MB. A value greater than 4.2MB will be decreased to the nearest 4.2MB boundary. The maximum volume size is 1.5PiB. The recommended maximum volume size is half the total capacity of the storage system. For example, if the system contains 106 18TB disks, the maximum volume size is 954TB (106 x 18 x 0.5).

For an ADAPT disk group, minimum volume size for 8+2 and 8+3 stripe widths is 8GiB. Minimum volume size for 16+2 and 16+3 stripe widths is 16GiB.

`<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 20GB volume `V1` in pool `A`, and map it with LUN 5 through ports `A1` and `B1` to an initiator.

```
# create volume pool a size 20GB ports a1,b1 lun 5 initiator initiator001 V1
```

Create the unmapped, 20GB volume `V2` in pool `B` using host `PI-type T1`:

```
# create volume V2 pool B size 20GB host-pi-type T1
```

Create a 100GB volume named `MyVolume` in pool `A`, map it to use LUN 5 with read-write access through port 1 in each controller, and.

```
# create volume MyVolume pool A size 100GB access rw lun 5 initiator Host2 ports 1
```

## See also

```
set advanced-settings
create volume-set
delete volumes
set volume
```

```
show advanced-settings  
show pools  
show ports  
show volumes
```

# create volume-set

## Description

Creates a specified number of volumes in a pool.

You must specify a pool, count, size, and base name for the volumes.

You can optionally map the volumes to hosts in the same operation. By default, this command will not map the new volumes.

---

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

---

Volume sizes are aligned to 4.2MB (4MiB) boundaries. When a volume is created or expanded, if the resulting size would be less than 4.2MB it will be increased to 4.2MB; if the resulting size would be greater than 4.2MB it will be decreased to the nearest 4.2MB boundary.

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

---

**NOTE** `create volume-set` cannot create volumes within ADAPT disk groups that have an `interleaved-volume-count` greater than 1.

---

## Minimum role

standard

## Syntax

```
create volume-set
  [access read-write|rw|read-only|ro|no-access]
  [baselun <base-LUN>]
  basename <basename>
  count <#>
  [host-pi-type T0|T1]
  [initiator <initiators>|<hosts>|<host-groups>]
  pool <pool>
  [ports <ports>]
  size <size>[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
```

## 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. If this parameter is specified, the `initiator` parameter must also be specified.



basename <basename>

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 `pA_v`, if `pA_v0000` and `pA_v0002` exist, the next volumes created will be `pA_v0001` and `pA_v0003`.

count <#>

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

host-pi-type T0|T1

Optional. Defines the host protection information (PI) type for this volume set at creation, enabling or disabling host PI for it. This setting cannot be changed for the life of the volumes in the volume set. T0 disables host PI for the volumes. T1 enables host PI for the volumes. When creating a volume set, T0 is the default PI type and host PI is disabled.

initiator <initiators>|<hosts>|<host-groups>

Optional. Specifies a comma-separated list of initiators or hosts or host-groups that can access the volume. If this parameter is specified, the `baselun` parameter must also be specified.

pool <pool>

The name or serial number of the pool in which to create the volumes.

ports <ports>

Optional. The controller ports through which the host can access the volume. For port syntax, see ["Command syntax" on page 21](#). If this parameter is omitted, all ports are selected.

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 the cache block size shown by `show cache-parameters`.

A value less than 4.2MB (4MiB) will be increased to 4.2MB. A value greater than 4.2MB will be decreased to the nearest 4.2MB boundary. The maximum volume size is 1.5PiB. The recommended maximum volume size is half the total capacity of the storage system. For example, if the system contains 106 18TB disks, the maximum volume size is 954TB (106 x 18 x 0.5). If the combined size of the volumes exceeds the capacity of the pool, an error message is displayed and no volumes are created.

For an ADAPT disk group, minimum volume size for 8+2 and 8+3 stripe widths is 8GiB. Minimum volume size for 16+2 and 16+3 stripe widths is 16GiB.

## Examples

Create two unmapped, 100GB volumes with base name `MyVol-` in pool B.

```
# create volume-set count 2 size 100GB pool b basename MyVol-
```

Create three 20GB volumes with the base name `pA_v` in pool A, and map them starting with LUN 5 with read-only access through port A1 to three initiators.

```
# create volume-set count 3 size 20GB pool a basename pA_v baselun 5 initiator  
initiator001,initiator002,initiator003 access ro ports a1
```

Create three unmapped, 20GB volumes with the base name V in pool B with the host PI-type T1:

```
# create volume-set pool b basename V count 3 size 20GB host-pi-type T1
```

**See also**

- create volume
- delete volumes
- map volume
- set volume
- show maps
- show pools
- show volumes
- unmap volume

# delete disk-firmware

## Description

Deletes the uploaded disk firmware image file from the file system in the controller.

You must disable the disk firmware update process before using this command. The command returns an error if disk firmware update is enabled. Use `set advanced-settings` to enable or disable this feature.

In a dual controller system, the command first deletes the disk firmware file from the local controller, then deletes the disk firmware file from the partner controller.

## Minimum role

manage

## Syntax

```
delete disk-firmware  
  <filename>
```

## Parameters

<filename>

The disk firmware file name. To find the file name, use the `show firmware-bundles` command with the `disk` parameter.

## Examples

Delete uploaded disk firmware.

```
# delete disk-firmware MobulaBPEXosX14SAS-STD-5xxE-E003.LOD
```

## See also

```
abort disk-firmware-update  
activate disk-firmware  
set advanced-settings  
show advanced-settings  
show firmware-bundles
```

# delete host-groups

## Description

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

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

This command has a confirmation prompt in interactive console mode.

## Minimum role

standard

## Syntax

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

## Parameters

delete-hosts

Optional. Specifies to delete all hosts in the host 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 host groups.

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

Delete all host groups and the hosts in those host 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

standard

## 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

standard

## Syntax

```
delete initiator-nickname  
    <initiator>|all
```

## Parameters

<initiator>|all

Specifies either:

- The nickname or ID of the initiator to delete. A value that includes a space must be enclosed in double quotes.
- `all`: Deletes all manually created initiators and nicknames of discovered initiators.

## Examples

Delete the manually created initiator named `Init1`.

```
# delete initiator-nickname Init1
```

Delete the nickname of discovered initiator `Init2`.

```
# delete initiator-nickname Init2
```

Delete all manually created initiators and nicknames of discovered initiators.

```
# delete initiator-nickname all
```

## See also


```
create host  
set initiator  
show initiators
```

# delete pools

## Description

Deletes specified pools and provides options for also performing data erasure.

---

 **CAUTION** Deleting a pool deletes 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 prompts for confirmation to delete the volumes. If the reply is `yes`, the command unmaps and deletes all volumes in the pool, deletes the pool and corresponding disk group, and makes all the disks available. If the reply is `no`, the command is canceled.

You cannot remove the only pool from a system that is used in a peer connection.

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

standard

## Syntax

```
delete pools
  [assurance-level secure|sanitize]
  [erase]
  [prompt yes|no]
  <pools>
```

## Parameters

`assurance-level secure|sanitize`

Optional. This parameter specifies the method for the data erasure operation if the `erase` parameter is specified:

- `secure`: Performs data erasure using cryptographic erase based on the Subsystem Security Class method that applies to the system's SED (FDE-capable) drives.
- `sanitize`: Performs data erasure with the `SANITIZE` SCSI command, using the system's SAS interface.

---

**NOTE** The `sanitize` option is not available on storage systems that consist of SATA drives.

---

If this parameter is omitted, the system determines the appropriate `assurance-level` based on drive capability and system security status. If the parameter is provided and a failure occurs, the command returns the failed result.

---

 **TIP** Considerations for using the optional data erasure command parameters:

- The `assurance-level sanitize` option works only on an unsecured system.
  - The `assurance-level secure` option works only on drives that support cryptographic erase. For SEDs, the appropriate cryptographic erase command is sent to the drive based on the secured or unsecured state.
- 

`erase`

Optional. This parameter specifies data erasure. If this parameter is omitted, the command does not perform data erasure when deleting the specified pool.

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. For a linear pool, a name that includes a space must be enclosed in double quotes.

### Examples

Delete pool A

```
# delete pools A
```

Delete linear pool dg1.

```
# delete pools dg1
```

Delete pool B and perform erasure on a system secured with FDE-capable drives.

```
# delete pools B erase assurance-level secure
```

### See also

remove disk-groups

show pools



# delete remote-system

## Description

Deletes the persistent association with a remote system.

## Minimum role

standard

## 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.

The value can be an IPv4 address, IPv6 address, or FQDN.

## Examples

Delete remote-system System2.

```
# delete remote-system System2
```

## See also

show remote-systems

# 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 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

standard

## 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 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

standard

## Syntax

```
delete task  
    [prompt yes|no]  
    <task>
```

## Parameters

prompt yes|no

Optional. For scripting, this specifies an automatic reply to confirmation prompts:

- `yes`: Allow the command to proceed.
- `no`: Cancel the command.

If this parameter is omitted, you must manually reply to prompts.

<task>

The name of the task to delete.

## Examples

Delete task Task1.

```
# delete task Task1
```

## See also

```
create task  
delete schedule  
show schedules  
show tasks
```

# delete user

## Description

Deletes a user account.

Except for the user you are logged in as, you can delete any user. 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 username are terminated.

This command has a confirmation prompt in interactive console mode.

## 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 user-group

## Description

Deletes an LDAP user group.

The system requires at least one local user with the `manage` role to exist. Deleting a user group does not affect the active user session.

This command has a confirmation prompt in interactive console mode.

## Minimum role

`manage`

## Syntax

```
delete user-group  
    [noprompt]  
    <user-group-name>
```

## Parameters

`noprompt`

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

`<user-group-name>`

The user group to delete. Names are case sensitive.

## Examples

Delete user group `StorageAdmins`.

```
# delete user-group StorageAdmins
```

## See also

`create user-group`

`show user-groups`

# delete volumes

## Description

Deletes specified volumes.

---

 **CAUTION** Deleting a volume will delete all data it contains, and its schedules.

---

**NOTE** You cannot delete interleaved volumes in an ADAPT disk group.

---

This command has a confirmation prompt in interactive console mode.

## Minimum role

standard

## Syntax

```
delete volumes  
  <volumes>
```

## Parameters

<volumes>

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

## Examples

Delete volumes `vol1` and `vol2`.

```
# delete volumes vol1,vol2
```

## See also


`create volume`  
`show volumes`

# dequarantine

## Description

Removes a disk group from quarantine.

---

 **CAUTION** This command should only be used by or with direction from technical support.

---

The system will automatically quarantine a disk group having a fault-tolerant RAID level if one or more of its disks becomes inaccessible. If quarantine occurs because of an inaccessible disk, event 172 is logged. The `dequarantine` command is not permitted in this case. Contact technical support, or see the `trust` command in this situation.

The system will automatically quarantine a disk group to prevent invalid data that may exist in the controller from being written to the disk group. If quarantine occurs to prevent writing invalid data, event 485 is logged. Use the `dequarantine` command to manually dequarantine the disk group only as specified by the event's recommended-action text to avoid data corruption or loss.

Recommended actions are described in the *Event Descriptions Reference Guide*.

---

**NOTE** The only commands allowed for a quarantined disk group are `dequarantine` and `trust`. 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).

---

This command has a confirmation prompt in interactive console mode.

## Minimum role

standard

## Syntax

```
dequarantine
  disk-group <disk-group>
  [recovery]
```

## 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.

```
recovery
```

Optional. Puts the disk group into recovery mode and disables regular dequarantine function until recovery completes. This operation is available only for ADAPT disk groups. This parameter also returns an error if attempted on a disk group that is not quarantined.

---

 **CAUTION** This parameter, as for the main command, should be used only by or with direction from technical support.

---

## Examples

```
Dequarantine disk group dgB01.
# dequarantine disk-group dgB01
```

## See also

```
show disk-groups
```

trust



# erase disk

## Description

Erases data from a single disk drive.

---

 **CAUTION** Erasing a disk drive removes all the data it contains.

---

This command supports certain hard disk drives (HDD), self-encrypting drives (SED), Instant Secure Erase (ISE) drives, and solid-state drives (SSD).

## Minimum role

standard

## Syntax

```
erase disk  
  [assurance-level secure|sanitize]  
  <disk>
```

## Parameters

assurance-level secure|sanitize

Optional. This parameter specifies the method used for the data erasure operation:

- `secure`: Performs data erasure using cryptographic erase based on the Subsystem Security Class method that applies to the system's SED (FDE-capable) drives.
- `sanitize`: Performs data erasure with the `SANITIZE` SCSI command, using the system's SAS interface.


---

**NOTE** The `sanitize` option is not available on storage systems that consist of SATA drives.

---

If this parameter is omitted, the system determines the appropriate `assurance-level` based on drive capability and system security status. If the parameter is provided and a failure occurs, the command returns the failed result.

---

 **TIP** Considerations for using the optional data erasure command parameters:

- The `assurance-level sanitize` option works only on an unsecured system.
- The `assurance-level secure` option works only on drives that support cryptographic erase. For SEDs, the appropriate cryptographic erase command is sent to the drive based on the secured or unsecured state.

---

<disk>

The ID of the disk targeted for data erasure. For disk syntax, see "[Command syntax](#)" on page 21. If this parameter is omitted, a message states that the disk specifier is missing, and the command exits.

## Examples

Perform erasure on the drive residing in slot 5 of enclosure 1, which is secured with FDE-capable drives.

```
# erase disk 1.5 assurance-level secure
```

Perform erasure on the drive residing in slot 11 of enclosure 2, which is not secured with FDE-capable drives.

```
# erase disk 2.11 assurance-level sanitize
```

**See also**

show disks

remove disk-groups

show disk-groups

delete pools

show pools

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 disk groups using any RAID level except NRAID and RAID 1.


ADAPT disk groups with an `interleaved-volume-count` greater than 0 cannot be expanded.

The new disks must be the same type as disks already in the disk group, and must be in the same tier as the disk group.

The new disks need not have consistent capacity. ADAPT algorithms will attempt to use the maximum possible space on each disk in the group. However, some capacity will be unusable. How much depends on the number of disks in the group and the size difference between the disks:

- Disk groups with few disks (such as 12 disks) won't effectively use the capacity of all the disks if they are different sizes. For example, a group composed of eleven 2TB disks and one 1TB disk will have a usable capacity closer to 12TB than 24TB.
- Disk groups with a large number of disks can handle different size disks with much more effective use of capacity.

---

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

---

The expansion capability for each supported RAID level is:

RAID level	Expansion capability	Maximum disks
NRAID	Cannot expand.	1
0	Can add 1 to 4 disks at a time.	16
1	Cannot expand.	2
5	Can add 1 to 4 disks at a time.	16
6	Can add 1 to 4 disks at a time.	16
10	Can add 2 or 4 disks at a time.	16
ADAPT	Can add up to 68 disks at a time.	106

When disks are added to an ADAPT disk group, the system will first replenish any spare capacity needed to be fully fault-tolerant, then use the remainder or expansion of user data capacity.

- When set to the default spare capacity, the system will try to replenish spare capacity to be the sum of the two largest disks in the group.
- When default spare capacity has been overridden (via the `set disk-group` command's `spare-capacity` parameter), the system will try to replenish spare capacity to meet the configured target GiB.
- If the actual spare capacity meets the target spare capacity, the new disk capacity will be allocated to user data.

---

**NOTE** If you want to make spare capacity changes, do so by using the `set disk-group` command before starting disk-group expansion.

---

---

**!** **IMPORTANT** Expansion of a non-ADAPT disk group can take hours or days to complete, depending on the disk group's RAID level and size, disk speed, utility priority, and other processes running on the storage system. You can stop expansion only by deleting the disk group.

For ADAPT disk groups, expansion is very fast and extra capacity is immediately available when rebalancing is not needed. If rebalancing is needed, extra capacity may not be available until rebalancing is complete.

---

Before starting the expansion, ensure no other utilities are running on the disk group. If another operation is in progress, the expansion cannot start.

### Minimum role

standard

### Syntax

```
expand disk-group
  disks <disks>
  [prompt yes|no]
  <disk-group>
```

### Parameters

disks <disks>

The IDs of the disks to add. For disk syntax, see ["Command syntax" on page 21](#).

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 DG1 to include disk 1.11.

```
# expand disk-group disks 1.11 DG1
```

Expand a RAID 10 disk group named R10 to include an additional mirror pair.

```
# expand disk-group disks 2.9-10 R10
```

Add 10 disks to ADAPT disk group Data3.

```
# expand disk-group disks 1.1-10 Data3
```

### See also

`set disk-group` (to set spare capacity before expansion)

`show disk-groups`

`show disks`

# expand volume

## Description

Expands a standard volume.

Volume sizes are aligned to 4.2MB (4MiB) boundaries. When a volume is created or expanded, if the resulting size would be less than 4.2MB it will be increased to 4MB; if the resulting size would be greater than 4.2MB it will be decreased to the nearest 4.2MB boundary.

For linear storage, if insufficient space is available for expansion in the disk group, first expand the disk group by using `expand disk-group`.

You cannot expand an ADAPT disk group with interleaved volumes.

## Minimum role

standard

## 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
```

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 the cache block size shown by `show cache-parameters`.

The maximum volume size is 1.5PiB. The recommended maximum volume size is half the total capacity of the storage system. For example, if the system contains 106 18TB disks, the maximum volume size is 954TB (106 x 18 x 0.5). For linear storage, if `max` is specified, the volume will expand 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 volume `v1` by 100GB.

```
# expand volume size 100GB v1
```

## See also

```
expand disk-group
show volumes
```

# 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.

---

**NOTE** Failing a controller module will reduce system redundancy and performance, and increase risk of data unavailability due to the reduced redundancy. If you are uncertain whether to use this command, contact technical support for assistance.

---

## Minimum role

standard

## Syntax

```
fail  
    controller a|b
```

## Parameters

controller a|b

Specifies whether to kill controller A or B. You cannot kill the controller on which the command is issued.

## Examples

From controller A, fail controller B.

```
# fail controller b
```

## See also

```
show redundancy-mode  
unfail controller
```

# help

## Description

Shows brief help for all available commands or full help for a specific command.

This help topic also provides tips for using command shortcuts.

## Minimum role

monitor

## Syntax

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

```
help
```

To view help for a command name, enter:

```
help <command-name>
```

To view information about the syntax for specifying parameters, disks, and so forth, enter:

```
help syntax
```

To view the information shown in this topic, enter:

```
help help
```

## Examples

Show brief help for all available commands:

```
# help
```

Show full help for the `show cli-parameters` command:

```
# help show cli-parameters
```



# map volume

## Description

Maps volumes to initiators.

This command can be used to modify existing mappings or create new mappings.

---

**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 attach the volume and will report an error such as "unknown partition table."

---

## Minimum role

standard

## Syntax

```
map volume
  [access read-write|rw|read-only|ro|no-access]
  initiator <initiators>|<hosts>|<host-groups>
  lun <LUN>
  [ports <ports>]
  <volumes>
```

## 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. no-access causes the volume to be masked from specified initiators. If the access parameter is omitted, access is set to read-write.

initiator <initiators>|<hosts>|<host-groups>

A comma-separated list of initiators, hosts, or host groups to which to map the volumes. For initiator, host, and host-group syntax, see ["Command syntax" on page 21](#).

---

**NOTE** If an initiator is specified, at least one LUN must also be specified.

---

lun <LUN>

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.

ports <ports>

Optional. The controller host ports to use for the mapping. Any unspecified ports become unmapped. For port syntax, see ["Command syntax" on page 21](#). The ports parameter is ignored if access is set to no-access. If the ports parameter is omitted, all ports are mapped.

<volumes>

A comma-separated list of the names or serial numbers of the volumes to map. For volume syntax, see ["Command syntax" on page 21](#).

## Examples

Map volume vol2 with read-only access to initiator Init1, using port A1 and LUN 100.

```
# map volume access ro ports a1 lun 100 initiator Init1 vol2
```

Map volumes vol2 and vol3 with read-write access for Host1. \*, using ports A1 and B1 and LUN 101.

```
# map volume access rw ports a1,b1 lun 101 initiator Host1.* vol2,vol3
```

Mask volume vol4 from Init1 and Init3.

```
# map volume vol4 access no-access lun 101 initiator Init1,Init3
```

Map volumes vol1 and vol2 to initiators Init1 and Init2, using ports A1 and B1 starting with LUN 6.

```
# map volume ports a1,b1 lun 6 initiator Init1,Init2 vol1,vol2
```

## See also

show host-groups

show initiators

show maps

show ports

show volumes

unmap volume

# meta

## Description

In API mode 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 ["API basetype properties" on page 374](#).

## 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 or FQDN. Ping sends ICMP echo response packets and waits for replies.

## Minimum role

monitor

## Syntax

```
ping  
  [count <count>]  
  <host-address>  
  [packet-size <size>]
```

## Parameters

count <count>

Optional. The number of packets to send. Use a small count because the command cannot be interrupted. The default is 4 packets. This parameter accepts a maximum value of 2,147,483,647.

<host-address>

The network address of the remote host. The value can be an IPv4 address, IPv6 address, or FQDN.

packet-size <size>

Optional. The packet size in bytes. The default value is 56 bytes.

## Examples

Send two packets to the remote computer at 10.134.50.6.

```
# ping 10.134.50.6 count 2
```


# 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 host initiators that have visibility to the volumes whose reservations will be released.

---

## Minimum role

standard

## Syntax

```
release volume  
    all|<volumes>
```

## Parameters

```
all|<volumes>
```

Specifies all volumes, or a comma-separated list of the names or serial numbers of specific volumes. A name that includes a space must be enclosed in double quotes.

## Examples

Release reservations for a specific volume.

```
# release volume dg04_v0002
```

## See also

```
show volume-reservations  
show volumes
```

# remote

## Description

Runs a command on a remote system that is associated with the local system.

If the command cannot connect to remote controller module A, it tries to connect to remote controller module B. If it is unsuccessful, the remote command is not run. Output is displayed in console or API mode 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

standard

## 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. An address can be an IPv4 address, IPv6 address, or FQDN.

<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 certificate

## Description

Deletes a user-supplied certificate from the system.

This command removes a user-supplied certificate whether it is active or inactive. You can remove device certificates and trust certificates.

When the certificate being removed is the active certificate for a service:

- If there is a default system-supplied certificate available for the service, the system uses the default certificate.
- If no default system-supplied certificate is available for the service, the console prompts you to activate a certificate for the service. The service might not function as expected until a new certificate is applied.
- In either case, you must restart the Management Controller for the changes to take effect.

When the certificate being removed is *not* the active certificate for a service, the listed items do not apply.

---

**NOTE** You cannot remove a system-generated certificate.

---

## Minimum role

manage

## Syntax

```
remove certificate  
  <name>
```

## Parameters

<name>

The name of the certificate to remove. Use the `show certificates` command to list all certificates, where you can view certificate names. You can only remove certificates labeled as `Customer-supplied`.

## Examples

```
Remove a certificate named CERT_A_12345.  
# remove certificate CERT_A_12345
```

## See also

```
activate certificate  
add certificate (API command)  
create certificate-signing-request  
show certificates
```

# remove disk-groups

## Description

Removes specified disk groups and provides options for also performing data erasure.

---

 **CAUTION** Deleting a linear disk group deletes all data it contains.

---

If a specified disk group has a job running, such as media scrub, the command prompts for confirmation to stop the job. For a linear disk group, if the group contains volumes, the command prompts for confirmation to delete the volumes. If the reply is `yes`, the command unmaps and deletes all volumes in the group, deletes the group and corresponding pool, and makes all the disks available. If the reply is `no`, the command is canceled.

---

**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

standard

## Syntax

```
remove disk-groups
  [assurance-level secure|sanitize]
  [erase]
  [prompt yes|no]
  <disk-groups>
```

## Parameters

`assurance-level secure|sanitize`

Optional. This parameter specifies the method for the data erasure operation if the `erase` parameter is specified:

- `secure`: Performs data erasure using cryptographic erase based on the Subsystem Security Class method that applies to the system's SED (FDE-capable) drives.
  - `sanitize`: Performs data erasure with the `SANITIZE` SCSI command, using the system's SAS interface.
- 

**NOTE** The `sanitize` option is not available on storage systems that consist of SATA drives.

---

If this parameter is omitted, then the system determines the appropriate `assurance-level` based on drive capability and system security status. If the parameter is provided and a failure occurs, the command returns the failed result.

---

 **TIP** Considerations for using the optional data erasure command parameters:

- The `assurance-level sanitize` option works only on an unsecured system.
  - The `assurance-level secure` option works only on drives that support cryptographic erase. For SEDs, the appropriate cryptographic erase command is sent to the drive based on the secured or unsecured state.
-



erase

Optional. This parameter specifies data erasure. If this parameter is omitted, the command does not perform data erasure when deleting the specified disk group.

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
```

Remove disk group dg1 and perform erasure on a system secured with FDE-capable drives.

```
# remove disk-groups dg1 erase assurance-level secure
```

### See also

delete pools

show disk-groups

# remove host-group-members

## Description

Removes specified hosts from a host group.

You cannot remove all hosts from a host group. At least one host must remain. The hosts are ungrouped but not deleted.

This command has a confirmation prompt in interactive console mode.

## Minimum role

standard

## 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 host 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

standard

## Syntax

```
remove host-members
    initiators <initiators>
    <hostname>
```

## 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.

```
<hostname>
```

The name of the host. A name that includes a space must be enclosed in double quotes.

## Examples

From group FC-host11, which contains three initiators, remove initiators FC-init2 and FC-init3.

```
# remove host-members initiators FC-init2,FC-init3 FC-host11
```

## See also

```
delete hosts
show initiators
```

# remove ipv6-address

## Description

Removes a static IPv6 address from a controller network port.

---

**NOTE** When the set `ipv6-network-parameters` command's `autoconfig` parameter is disabled, you cannot remove the last IPv6 address.

---

## Minimum role

standard

## Syntax

```
remove ipv6-address
  [address-label <name>]
  [controller a|b]
  [index <index>]
  [ip-address <IP-address>]
```

## Parameters

The parameters must be used in one of these ways:

- controller and index
- controller and address-label
- index only
- ip-address only

address-label <name>

Optional. Specifies the name assigned to the address.

controller a|b

Optional. Specifies whether to change controller A or B, only. If this parameter is omitted, changes affect the controller being accessed.

index <index>

Optional. A value from 1 to 4 that specifies the controller's index value for the address.

ip-address <IP-address>

Optional. Specifies the address to remove.

## Examples

Remove the IPv6 address named `vlan1` from controller A.

```
# remove ipv6-address controller a address-label vlan1
```

## See also

```
add ipv6-address
set ipv6-network-parameters
show ipv6-addresses
show ipv6-network-parameters
```

# remove spares

## Description

Removes specified spares.

For linear storage, you can remove global spares and dedicated spares in the same command.

## Minimum role

standard

## Syntax

```
remove spares  
  <disks>
```

## Parameters

<disks>

The IDs of the spares to remove. For disk syntax, see ["Command syntax" on page 21](#).

## Examples

Remove dedicated spare 1.21 and global spare 1.22.

```
# remove spares 1.21-22
```

## See also


add spares  
show disks

# 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 non-FDE 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.

A manual rescan may be required to discover newly inserted SED (self-encrypting drive) disks in an FDE secured system.

## Minimum role

standard

## 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

standard

## 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 appears 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 volume-statistics
show controller-statistics
```

# reset ciphers

## Description

Clears user-supplied ciphers and sets the cipher list to the system default.

The command will prompt you to restart both Management Controllers to activate the ciphers. The change will take effect when the restart is complete.

If you change any cipher settings between running the reset ciphers command and restarting the Management Controllers, those changes will be ignored.

## Minimum role

manage

## Syntax

```
reset ciphers
```

## Examples

Reset the cipher list to the system default.

```
# reset ciphers
```

## See also

```
set ciphers  
show ciphers
```



# reset controller-statistics

## Description

Resets performance statistics for controllers.

This command resets all controller statistics except Power On Time and Total Power On Hours.

## Minimum role

standard

## 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 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

standard

## Syntax

```
reset disk-error-statistics  
    [<disks>]
```

## Parameters

<disks>

Optional. The IDs of the disks for which to reset statistics. For disk syntax, see ["Command syntax" on page 21](#). 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 volume-statistics  
show disk-statistics  
show disks
```

# reset disk-group-statistics

## Description

Clears resettable performance statistics for specified disk groups, and resets timestamps for those statistics.

## Minimum role

standard

## 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 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 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

standard

## 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 volume-statistics  
show disk-statistics
```

# reset dns-management-hostname

## Description

Resets each controller module's management hostname to the factory default.

The factory default is: <SCSI-vendor-ID><midplane-serial-number><controller-ID>.

## Minimum role

standard

## Syntax

```
reset dns-management-hostname  
    [controller a|b|both]
```

## Parameters

controller a|b|both

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

## Examples

Reset the domain hostname for controller A.

```
# reset dns-management-hostname controller a
```

## See also


```
clear dns-parameters  
set dns-management-hostname  
set dns-parameters  
show dns-management-hostname  
show dns-parameters
```

# reset host-link

## Description

Resets specified controller host ports (channels).

---

 **CAUTION** Resetting host links may cause lost connection to hosts.

---

For SAS, you cannot reset individual ports; this command resets all ports on the specified controller.

This command has a confirmation prompt in interactive console mode.

## Minimum role

standard

## 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.

For SAS, all ports on the specified controller are reset, regardless of which port number you enter.

## 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

standard

## Syntax

```
reset host-port-statistics  
[ports <ports>]
```

## Parameters

ports <ports>

Optional. The controller ID and port number of ports for which to reset statistics. For port syntax, see ["Command syntax" on page 21](#). 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 volume-statistics  
show host-port-statistics  
show ports
```

# reset volume-statistics

## Description

Resets performance statistics for all or specified volumes.

## Minimum role

standard

## 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 dg1_v0001.  
# reset volume-statistics dg1_v0001
```

## See also

```
reset all-statistics  
reset controller-statistics  
reset disk-error-statistics  
reset disk-group-statistics  
reset disk-statistics  
reset host-port-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

standard

## Syntax

```
restart mc  
    [a|b|both]  
    [full]  
    [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. These options complete quickly, performing a "soft" reset that ends application processes and clears some memory.

full

Optional. Performs a full reboot of the specified Management Controller(s), which takes a longer time to complete. Use this option only when specified by a message, documentation, or technical support.

noprompt

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

## Output

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

## Examples

Restart the Management Controller in controller A.

```
# 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

standard

## 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 is shut down, when failover is initiated, and when the controller has restarted.

## Examples

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.

---

**NOTE** This command is for use by or with direction from a service technician.

---

Settings restored by this command are listed in ["Settings changed by restoring defaults" on page 472](#).

---

**CAUTION** This command restores the default settings to the controllers and then restarts the controllers. Changes to host interface settings may cause loss of data availability and require some reconfiguration to restore host access to volumes. Changes to network-port IP addresses may cause loss of access to management interfaces.

---

## 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

`restart mc`

`restart sc`

# scrub disk-groups

## Description

Analyzes specified disk groups to find and fix errors.

This command acts on disks in a disk group but not dedicated spares for linear disk groups, or leftover disks.

The command automatically fixes media errors for all RAID levels, regardless of whether the `fix` parameter is specified or its setting. Media errors occur when the system cannot read one of the copies of mirror data, due to a disk error such as an unrecoverable disk error (URE).

The disk-group scrub task is almost continually active, but has very little impact on I/O activity. You can use a disk group while it is being scrubbed. To check the progress of a disk-group scrub (VRSC) 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

standard

## Syntax

```
scrub disk-groups
    [fix yes|no]
    <disk-groups>
```

## Parameters

`fix yes|no`

Optional. Specifies whether to automatically fix redundancy data (parity) issues that are found. The default is `yes`.

- `yes`:
  - For RAID 5, RAID 6, and ADAPT: Finds and fixes parity mismatches. For parity errors in RAID 6 and ADAPT, the code uses one of the parity blocks as a detector and one as a corrector so if one block has an error, that block is fixed. If more than one block has an error or for RAID 5, parity is updated to make it consistent.
  - For RAID 1 and RAID 10: Finds and fixes mirror mismatches by copying data from one disk to the other.
- `no`:
  - For RAID 5, and RAID 6, and ADAPT: Finds but does not fix parity mismatches.
  - For RAID 1 and RAID 10: Finds but does not fix parity mismatches.

`<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 RAID-6 disk group `dg1` to find and automatically fix media errors and parity errors.

```
# scrub disk-groups dg1
```

Start scrubbing RAID-1 disk group `dg1` to find and automatically fix media errors, and find but not fix mirror mismatches.

```
# scrub disk-groups dg1 fix no
```

## See also

`abort scrub` (with the `disk-group` parameter)

```
set advanced-settings  
show disk-groups
```

# scrub volume

## Description

Analyzes specified volumes to find and fix disk errors.

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:

- Find and fix parity mismatches for RAID 5, RAID 6, and ADAPT.
- Find, but not fix, mirror mismatches for RAID 1 and 10. The system reads both copies of mirror data to find any mismatches.
- Find and fix media errors for all RAID levels. Media errors occur when the system cannot read one of the copies of mirror data, due to a disk error such as an unrecoverable disk error (URE).

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 linear disk group 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

standard

## Syntax

```
scrub volume
  [fix yes|y|no|n|default]
  [num-blocks <#>]
  [num-stripes <#>]
  [start-lba <LBA>]
  <volumes>
```

## Parameters

`fix yes|y|no|n|default`

Optional. Sets whether to automatically correct errors found during the analysis. If this parameter is omitted, the system default is used.

- `yes` or `y`: Errors are corrected.
- `no` or `n`: Errors are reported but not fixed.
- `default`: Use the system default.

`num-blocks <#>`

Optional. Applies to NRAID and RAID 1. If the `start-lba` parameter is specified, the `num-stripes` parameter can also be specified to limit the number of stripes to scrub. If the `num-blocks` parameter is omitted, the scrub operation will run from the specified LBA to the end of the logical media.

`num-stripes <#>`

Optional. Applies to RAID 5, 6, and 10. If the `start-lba` parameter is specified, the `num-stripes` parameter can also be specified to limit the number of stripes to scrub. If the `start-lba` parameter is specified and the `num-stripes` parameter is omitted, the scrub operation will run from the specified LBA to the end of the logical media.

`start-lba <LBA>`

Optional. The LBA on which to start the scrub, specified in either decimal or hexadecimal format. If hexadecimal format is used, 0x must be appended to the beginning of the LBA. This parameter must be entered if the `num-stripes` parameter is specified.

`<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
```

Start scrubbing volume `vol1`, starting at LBA 20 and scrubbing 10 stripes.

```
# scrub volume start-lba 20 num-stripes 10 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

standard

## Syntax

```
set advanced-settings
[auto-map enabled|disabled|on|off]
[auto-stall-recovery enabled|disabled|on|off]
[auto-unmap enabled|disabled|on|off]
[auto-write-back enabled|disabled|on|off]
[background-scrub enabled|disabled|on|off]
[controller-failure enabled|disabled|on|off]
[disk-firmware-update] enabled|disabled|on|off]
[dynamic-spare enabled|disabled|on|off|alternate]
[emp-poll-rate <rate>]
[fan-failure enabled|disabled|on|off]
[hedged-reads-timeout-level 0|1|2|3|4]
[host-cache-control 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]
[remanufacture enabled|disabled|on|off]
[restart-on-capi-fail enabled|disabled|on|off]
[scrub-schedule enabled|disabled|on|off]
[single-controller]
[slot-affinity enabled|disabled|on|off]
[slow-disk-detection enabled|disabled|on|off]
[smart enabled|disabled|on|off|detect-only]
[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-map enabled|disabled|on|off

Optional. Automatically maps initiators or hosts to volumes or volume groups that are mapped to a host group when those initiators or hosts are added to the host group.



`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-unmap` `enabled|disabled|on|off`

Optional. Automatically unmaps initiators or hosts from volumes or volume groups that are mapped to a host group when those initiators or hosts are removed from the host group.

`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-scrub` `enabled|disabled|on|off`

Optional. Sets whether disks in disk groups are automatically checked for disk defects to ensure system health.

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

`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.

`disk-firmware-update` `enabled|disabled|on|off`

Optional. Used to enable or disable Intelligent Drive Firmware Update. Enabled by default.

This feature attempts to upgrade firmware for all drives in the system by intelligently using system resources. You must run `activate disk-firmware` to begin the firmware update process.

If drive firmware update is in progress, disabling this option stops the background update process. However, the in-progress batch does not stop. See `activate disk-firmware` for more information.

`dynamic-spare` `enabled|disabled|on|off|alternate`

Optional. Enables or disables the dynamic spares feature. This feature lets you use all of your disks in fault-tolerant disk groups without designating a disk as a spare. With dynamic spares enabled, if a disk fails and you replace it with a compatible disk, the storage system rescans the bus, finds the new disk, automatically designates it a spare, and starts reconstructing the disk group. A compatible disk has enough capacity to replace the failed disk and is the same type. If a spare or available compatible disk is already present, the dynamic spares feature uses that disk to start the reconstruction and the replacement disk can be used for another purpose. The dynamic spares feature does not apply to ADAPT disk groups.

- `disabled` or `off`: The dynamic spares feature is disabled. This is the default.
- `enabled` or `on`: The dynamic spares feature is enabled.
- `alternate`: The dynamic spares feature is enabled but spare selection is restricted to the enclosure that contains the failed disk.

`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. Typically you can use the default, 5 seconds.

- Increasing the interval might slightly improve processing efficiency, but changes in device status are communicated less frequently. For example, this increases the amount of time before LEDs are updated to reflect status changes.
- Decreasing the interval slightly decreases processing efficiency, but changes in device status are communicated more frequently. For example, this decreases the amount of time before LEDs are updated to reflect status changes.

`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.

`hedged-reads-timeout-level 0|1|2|3|4`

Optional. Sets the waiting period for read requests before the hedged reads feature triggers. This feature reduces latency for read requests by using RAID parity information to reconstruct requested data if the read wait period is exceeded. Levels are:

- 0: Disabled. The hedged reads method is not used.
- 1: 1.75 seconds wait time. This setting is the default.
- 2: 2.25 seconds wait time.
- 3: 2.75 seconds wait time.
- 4: 3.25 seconds wait time.

All wait times are approximations.

`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`: Hosts can use the SCSI `MODE SELECT` command to change the write-back cache setting. This is the default.
- `enabled` or `on`: Hosts cannot override the storage system's write-back cache setting.

`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. Some operating systems do not look beyond LUN 0 if they do not find a LUN 0 or cannot handle noncontiguous LUNs. This parameter handles these situations by enabling the host drivers to continue probing for LUNs until they reach the LUN to which they have access. This parameter controls the SCSI sense data returned for volumes that are not accessible because they don't exist or have been hidden through volume mapping (this does not apply to volumes of offline disk groups).

- `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.
- `illegal`: Sends a reply that there is no LUN and that the request is an illegal request. Sense data returned is sensekey = 5, code = 25h, qualifier = 0. If the system is used in a VMware environment, use this option. This option is the default.

`partner-firmware-upgrade enabled|disabled|on|off`

Optional. Sets whether component firmware versions are monitored and will be automatically updated on the partner controller.

- `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 to continue using its current caching mode for better performance.

- `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.

`remanufacture enabled|disabled|on|off`

Optional. Sets whether the system should use Autonomous Drive Regeneration (ADR) to attempt remanufacture of a disk drive that experiences a head failure.

If the operation succeeds, the disk can continue to be used but will have less capacity.

- `disabled` or `off`: Disk remanufacturing is disabled.
- `enabled` or `on`: Disk remanufacturing is enabled.

ADR is supported only for ADAPT disk groups.

---

 **CAUTION** ADR will not run on a storage system that uses FDE drives and is in a secured state.

---

`restart-on-capi-fail enabled|disabled|on|off`

Optional. Sets whether a Storage Controller that experiences a CAPI hang will be forced to restart. This is enabled by default. A CAPI hang is perceived as a management-interface hang. As part of the restart process, a dump file is created and event 107 is logged. To provide the dump file to technical support for debugging, use the Save Logs action in the SMC.

`scrub-schedule enabled|disabled|on|off`

Optional. Sets whether disk-group scrub runs only when scheduled. This option lets you schedule scrub times when the system load is expected to be light.

- `disabled` or `off`: Scheduling background disk-group scrub is not available. This option is the default.
- `enabled` or `on`: Scheduling background disk-group scrub is available.

To use this feature, `background-scrub` must be enabled, and you will need to take additional steps to configure the schedule. See `create task` and `create schedule` for information.

`single-controller`

Optional. For a system that lacks a second controller module for redundancy 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.

`slot-affinity` `enabled`|`disabled`|`on`|`off`

Optional. When a disk fails, reconstruction is performed using a spare disk. This parameter controls whether, after the failed disk is replaced with a new disk, all data will be transferred from the spare to the new disk to preserve the original layout of the disks in the linear disk group.

- `enabled` or `on`: When the failed disk is replaced with a new disk, the data that was reconstructed in the spare disk (and any new data that was written to it) is copied back to the disk in the slot where the data was originally located. For the copyback operation, the reconstructed disk is called the source disk, and the newly replaced disk is called the destination disk. All of the data is copied from the source disk to the destination disk and the source disk then becomes a spare disk again.
- `disabled` or `off`: Copyback is not performed.

`slow-disk-detection` `enabled`|`disabled`|`on`|`off`

Optional. Enables or disables the slow-disk detection feature. This feature identifies drives that are performing below expectations compared to their peers. If a slow drive is detected, the system issues a notification to help with debug analysis so you can determine the impact of the drive on the system as a whole.

- `disabled` or `off`: Slow-disk detection is disabled.
- `enabled` or `on`: Slow-disk detection is enabled. This option is the default.

`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. When SMART is enabled, the system checks for SMART events 1 minute after a restart and every 5 minutes thereafter. SMART events are recorded in the event log.

- `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.

`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 cache policy will change from write-back to write-through when the temperature exceeds the critical operating range. The actual heat threshold isn't a single fixed number but can be triggered by many different elements within the system, each of which has a different heat threshold.

- `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
```

Enable the auto map feature.

```
# set advanced-settings auto-map on
```

### See also

`add spares`

`remove spares`

`scrub disk-groups`

`show advanced-settings`

# set alert

## Description

Enables you to add comments to and acknowledge specified alerts.

Acknowledging a resolved alert will immediately remove that alert from the active list.

If you acknowledge an unresolved alert, it will remain in the acknowledged list until it is resolved, at which point it will be deleted.

## Minimum role

standard

## Syntax

```
set alert
  [acknowledge]
  [clear-comment]
  [comment "<comment-text>"]
  <alert-IDs>
```

## Parameters

`acknowledge`

Optional. Acknowledges the specified alerts.

`clear-comment`

Optional. Deletes the comment for one or more alerts specified with the `<alert-IDs>` parameter. Do not specify both this parameter and the `comment` parameter.

`comment "<comment-text>"`

Optional. Adds or replaces the comment for one or more alerts specified with the `<alert-IDs>` parameter. For example, you could leave a comment for another user that a replacement component has been ordered. Do not specify both this parameter and the `clear-comment` parameter.

Input rules:

- The value can have a maximum of 256 bytes.
- The value can include spaces and printable UTF-8 characters except: `<` `>`

`<alert-IDs>`

A comma-separated list of the IDs of alerts to operate on.

## Examples

Acknowledge resolved alert 134.

```
# set alert acknowledge 134
```

Add a comment for alert 5.

```
# set alert comment "Night shift: Please replace the cable" 5
```

Clear the comments for alerts 0 and 1.

```
# set alert clear-comment 0,1
```

## See also

`clear alerts`

```
show alert-condition-history  
show alerts
```

# set ciphers

## Description

Configures a cipher list that the storage system can use to securely communicate with hosts through HTTPS.

Transport Layer Security (TLS) is used in every browser worldwide to provide secure HTTP (HTTPS) functionality. TLS 1.3 is the most secure version compared to the previous versions. TLS 1.3 ciphers are set on the system by default.

A cipher suite is a set of algorithms that help secure a network connection that uses TLS. In the TLS handshake, the client communicates the list of cipher suites that it supports to the server. Cipher suites are usually listed from most secure to least secure so that the most secure cipher suite becomes the first choice. The server compares the list of cipher suites that it supports with the list from the client. When the server finds a match, it informs the client and uses the selected cipher suites to establish a secure connection.

The set of algorithms that cipher suites usually contain include: a key exchange algorithm, a bulk encryption algorithm, and a Message Authentication Code (MAC) algorithm. For example, a typical cipher suite is `TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384`, where:

- `TLS` indicates the protocol.
- `ECDHE` signifies the key exchange algorithm.
- `RSA` signifies the authentication algorithm.
- `AES_256_CBC` indicates the bulk encryption algorithm.
- `SHA384` indicates the MAC algorithm.

The choice of cipher suites in the TLS connection explain the difference between having a secure connection and one that can be exploited. In order to avoid certain attacks, you may need to disable specific ciphers or entire cipher suites due to security issues.

Each cipher string can be optionally preceded by `!`, `-`, or `+`:

- If `!` is used then the ciphers are permanently deleted from the list. The ciphers deleted can never reappear in the list even if they are explicitly stated.
- If `-` is used then the ciphers are deleted from the list, but some or all of the ciphers can be added again by later options.
- If `+` is used then the ciphers are moved to the end of the list. This option doesn't add any new ciphers it just moves matching existing ones.

Additionally the cipher string `@STRENGTH` can be used at any point to sort the current cipher list in order of encryption algorithm key length.

The cipher settings apply to both controller modules.


If you change the cipher list, the command will prompt you to restart both Management Controllers to activate the ciphers.

The change will take effect when the restart is complete.

---

**NOTE** IANA cipher format is not supported.

---

 **IMPORTANT** Running the CLI `restore defaults` command will reset the cipher list to the system default.

---

## Minimum role

manage



**Syntax**

```
set ciphers  
list <cipher-string>
```

**Parameters**

```
list <cipher-string>
```

One or more ciphers separated by colons (with no spaces). Wildcard characters are not supported.

**Examples**

Set the cipher list.

```
# set ciphers list ALL:!AES128:!AES256:!SHA256:ECDHE-PSK-CAMELLIA127-SHA256:!ADH:@STRENGTH
```

**See also**

```
reset ciphers  
show ciphers
```

# 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, precision, temperature scale, timeout, and units settings are read from the user's account, and can be overridden by using this command.

## Minimum role

monitor

## Syntax

```
set cli-parameters
  [api|api-embed|console|ipa|json|wbi]
  [base 2|10]
  [brief enabled|disabled|on|off]
  [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

api|api-embed|console|ipa|json|wbi

Optional. Sets the output mode:

- **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. Enabling this option enables the `brief` parameter.
- **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.
- **ipa**: Alternate form of XML output which displays as `api-embed` format with `brief` mode enabled.
- **json**: Standard JavaScript Object Notation (JSON) output.
- **wbi**: A JSON-like format used internally by the SMC.

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 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.

`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.

`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 API format, which is intended for scripting, disable paging.

`precision <#>`

Optional. Sets the number of decimal places (1 to 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 to 43200 seconds (2 to 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 `0.11709TB` is instead shown as `117.1GB`.

## Examples

Set CLI parameters.

```
# set cli-parameters timeout 600 console pager off precision 2 units GB temperature-scale f
```

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

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

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

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

Set the CLI to show output in console format.

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

Set the CLI to show output in JSON format.

```
# set cli-parameters json
```

## 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

standard

## 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 <timezone-offset-or-name>
```

To configure use of NTP:

```
set controller-date
  ntp enabled | disabled | on | off
  ntpaddress <address>
  timezone <timezone-offset-or-name>
```

## Parameters

jan | feb | mar | apr | may | jun | jul | aug | sep | oct | nov | dec

The month.

<day>

The day number (1 to 31).

<hh>:<mm>:<ss>

The hour (0 to 23), the minutes (0 to 59), and the seconds (0 to 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 <address>`

The network address of an available NTP server. The value can be an IPv4 address, IPv6 address, or FQDN.

`timezone <timezone-offset-or-name>`

The system's time zone as either:

- An offset in hours (-12 through +14) and optionally minutes (00 to 59) from Coordinated Universal Time (UTC), in the format `+|-<hh>[:<mm>]`. 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.
- A time zone name shown by the `show timezones` command.

`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
```

Same as above, specifying a time zone name instead of a time zone offset.

```
# set controller-date timestamp 1320273050 timezone Australia/Hobart
```

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
show timezones
```

# set debug-log-parameters

## Description

Sets the types of debug messages to include in the Storage Controller debug log.

---

**NOTE** This command is for use by or with direction from technical support.

---

## Minimum role

standard

## 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:

- `autotest`: Auto-test debug messages. Disabled by default.
- `awt`: Auto-write-through cache triggers debug messages. Disabled by default.
- `bkcfig`: Internal configuration debug messages. Enabled by default.
- `cache`: Cache debug messages. Enabled by default.
- `cache2`: Extra cache debugging messages that may occur frequently enough to fill logs. Disabled by default.
- `capi`: Internal Configuration API debug messages. Enabled by default.
- `capi2`: Internal Configuration API verbose debug messages. Disabled by default.
- `cs`: Not supported.
- `disk`: Disk interface debug messages. Enabled by default.
- `dns`: Not supported.
- `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`: Inter-controller heartbeat debug messages. Disabled by default.
- `host`: Host interface debug messages. Enabled by default.
- `host2`: Host/SCSI debug messages. Disabled by default.
- `init`: Host-port initiator mode debug messages. Disabled by default.
- `ioa`: I/O interface driver debug messages (standard). Enabled by default.
- `iob`: I/O interface driver debug messages (resource counts). Disabled by default.
- `ioc`: I/O interface driver debug messages (upper layer, verbose). Disabled by default.
- `ioid`: 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`: Not supported.
- `raid`: RAID debug messages. Enabled by default.
- `res2`: Internal debug messages. Disabled by default.
- `resmgr`: Reservation Manager debug messages. Disabled by default.
- `rtm`: Remote Target 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 degraded-disk-policy

## Description

Sets the action for the system to take when it determines that a disk is degraded.

This determination is made based on criteria configured with the `set degraded-disk-threshold` command.

A degraded-disk policy will never fail a disk that would result in the loss of data, such as failing a disk in a non-fault-tolerant disk group.

## Minimum role

standard

## Syntax

```
set degraded-disk-policy
    [disk-error-notification informational|warning|none]
    [disk-error-policy fail|reconstruct|none]
```

## Parameters

`disk-error-notification` informational|warning|none

Optional. Specifies the severity of event to generate when a disk is determined to be degraded due to errors.

- `informational`: Generate an event with Informational severity.
- `warning`: Generate an event with Warning severity.
- `none`: Do not generate an event.

`disk-error-policy` fail|reconstruct|none

Optional. Specifies the action to take when a disk is determined to be degraded due to errors.

- `fail`: Fail the degraded disk and log event 547. To set this option you must also set the `disk-error-notification` parameter to `warning`.
- `reconstruct`: Use a spare disk to reconstruct the degraded disk's disk group and then fail the degraded disk.
- `none`: Only log event 534.

## Examples

When a disk is determined to be degraded, have the system generate an event with Informational severity.

```
# set degraded-disk-policy disk-error-notification informational disk-error-policy none
```

When a disk is determined to be degraded, have the system fail the disk if doing so will not cause data loss, and generate an event with Warning severity.

```
# set degraded-disk-policy disk-error-notification warning disk-error-policy fail
```

## See also

```
clear degraded-disk
set degraded-disk-threshold
show degraded-disk-policy
show degraded-disk-thresholds
```

# set degraded-disk-threshold

## Description

Sets criteria for the system to identify degraded disks based on a trend of degrading quality of service.

Degrading quality of service includes disks that demonstrate a consistent or increasing number of recovered errors (sense key 1) or unrecovered errors (sense key 3).

When a configured threshold is reached, a degraded-disk policy is enacted. The policy is configured with the `set degraded-disk-policy` command.

When a disk is identified as degraded, its health becomes `Degraded`, as does the enclosure health and overall system health. If the disk is a member of a disk group, the disk group's health will also become `Degraded`.

If a disk accumulates errors before a threshold value is set, and the newly set value has already been reached, an event will not be logged until the next time that threshold is reached.

Changing a threshold after a disk has been degraded will not automatically clear the degraded status. The disk will remain degraded.

Before changing a threshold, run the `clear degraded-disk` command for all disks to reset their health to `OK` and to clear their error counts.

A degraded-disk policy will never fail a disk that would result in the loss of data, such as failing a disk in a non-fault-tolerant disk group.

## Minimum role

standard

## Syntax

```
set degraded-disk-threshold
  name <threshold-name>
  target recoverable-errors|unrecoverable-errors
  [{threshold-a <period>.<duration>.<threshold-value>}|clear]
  [{threshold-b <period>.<duration>.<threshold-value>}|clear]
  [{threshold-c <period>.<duration>.<threshold-value>}|clear]
  [{threshold-lifetime <threshold-value>}|clear]
```

## Parameters

name <threshold-name>

Specifies one of the following values that identifies the disk tier and RAID redundancy level:

- `archive-single`: Archive tier, single redundancy RAID.
- `archive-dual`: Archive tier, dual redundancy RAID.
- `archive`: Archive tier, any RAID level.
- `standard-single`: Standard tier, single redundancy RAID.
- `standard-dual`: Standard tier, dual redundancy RAID.
- `standard`: Standard tier, any RAID level.
- `performance-single`: Performance tier, single redundancy RAID.
- `performance-dual`: Performance tier, dual redundancy RAID.
- `performance`: Performance tier, any RAID level.

- `all-single`: All disks, single redundancy RAID.
- `all-dual`: All disks, dual redundancy RAID.
- `all`: All disks, any RAID level.

Disk tiers are defined as:

- `archive`: Disks with rotation speeds below 10K RPM. In this system, these are midline SAS disks.
- `standard`: Disks with rotation speeds greater than or equal to 10K RPM. In this system, these are enterprise SAS disks.
- `performance`: SSDs.
- `all`: Disks are not differentiated by disk tier.

RAID redundancy levels are defined as:

- `single`: Disks used in a RAID level other than RAID 6.
- `dual`: Disks used in RAID 6.

`target recoverable-errors|unrecoverable-errors`

Specifies the type of errors that will increase the threshold count:

- `recoverable-errors`: Soft errors (sense key 1).
- `unrecoverable-errors`: Medium errors (sense key 3).

`{threshold-a <period>.<duration>.<threshold-value>}|clear`

Optional. Specifies the first of up to three disk-error thresholds, where:

- `period`: `<hour>|<day>|<week>`
- `duration`: A numeric value for the duration of the period.
- `threshold-value`: A numeric value for the threshold count.
- `clear`: Clear the threshold count and no longer degrade a disk.

`{threshold-b <period>.<duration>.<threshold-value>}|clear`

Optional. Specifies the second of up to three disk-error thresholds. See the description for `threshold-a`, above.

`{threshold-c <period>.<duration>.<threshold-value>}|clear`

Optional. Specifies the third of up to three disk-error thresholds. See the description for `threshold-a`, above.

`{threshold-lifetime <threshold-value>}|clear`

Optional. Specifies either:

- `<threshold-value>`: A numeric value for the lifetime threshold.
- `clear`: Clear the threshold count and no longer degrade a disk.

## Examples

Degrade any standard disk should it incur three unrecoverable-errors over the period of one day.

```
# set degraded-disk-threshold name standard target unrecoverable-errors threshold-a day.1.3
```

Degrade any standard disk should it incur eight unrecoverable-errors over the period of the next week. This command would overwrite the threshold set in the previous example.

```
# set degraded-disk-threshold name standard target unrecoverable-errors threshold-a week.1.8
```

Degrade any archive disk should it incur 6 unrecoverable-errors over the period of the next 2 days and degrade an archive disk should it incur 7 unrecoverable-errors over the period of 1 week.

```
# set degraded-disk-threshold name archive target unrecoverable-errors threshold-a day.2.6  
threshold-b week.1.7
```

Clear threshold-a and threshold-b and no longer degrade any archive disk.

```
# set degraded-disk-threshold name archive target recoverable-errors threshold-a clear  
threshold-b clear
```

Degrade any archive disk should it incur five recoverable-errors over any period of time.

```
# set degraded-disk-threshold name archive target recoverable-errors threshold-lifetime 5
```

#### **See also**

```
clear degraded-disk  
set degraded-disk-policy  
show degraded-disk-policy  
show degraded-disk-thresholds
```

# set disk

## Description

Performs a secure erase on a specified disk.

This is called repurposing the disk, and only applies to an FDE-capable disk.

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` command.

---

**NOTE** Repurposing a disk is not permitted when the system is in the `Secured`, `Locked` state. Use the `show fde-state` command to view the system FDE security status.

---

## Minimum role

standard

## Syntax

```
set disk
  [noprompt]
  repurpose
  <disk>
```

## Parameters

`noprompt`

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

`repurpose`

Specifies to secure erase the specified disk.

`<disk>`

The ID of the disk to be repurposed. Only one disk may be repurposed at a time. For disk syntax, see ["Command syntax" on page 21](#).

## 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
```

## See also

`set fde-lock-key`

`set fde-state`

`show disks` (with the `fde` parameter)

`show fde-state`

# set disk-group

## Description

Changes parameters for a specified disk group.

## Minimum role

standard

## Syntax

```
set disk-group
  [name <new-name>]
  [owner a|b]
  [spare-capacity <size>[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] |default]
  [spear disabled|off|basic|strict|trust]
  <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. The name can include printable UTF-8 characters except: " , < \

owner a|b

Optional for a linear 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.

---

spare-capacity <size>[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB] |default

Optional. For an ADAPT disk group, this specifies the target spare capacity.

- **<size>[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]:** Sets the target spare capacity to a specific size. The unit is optional (B represents bytes). If no unit is specified, GiB will be used, regardless of the current base. Whichever unit is set, internally the value will be rounded down to the nearest GiB. If the value is set to 0, the absolute minimum spare space will be used. If this parameter is omitted, the default setting will be used.
- **default:** Sets the target spare capacity to the sum of the two largest disks in the disk group, which is sufficient to fully recover fault tolerance after loss of any two disks in the group.

spear disabled|off|basic|strict|trust]

Optional. Enables or disables SPEAR for the disk group, or modifies the SPEAR mode if SPEAR is currently enabled. SPEAR improves data integrity by checking stripe consistency with each read access.

---

**NOTE** This parameter requires the following: RAID 6 or ADAPT disk groups with 4KB drive sectors, and Protection Information (PI) type 0 and 1 on controller host ports.

---

- `disabled` or `off`: SPEAR is disabled. This is the default.
- `basic`: SPEAR is enabled in `basic` mode. User data is not returned for SPEAR errors.
- `strict`: SPEAR is enabled in `strict` mode. User data is not returned for SPEAR errors or when SPEAR is unavailable. SPEAR must be disabled or in `basic` mode prior to enabling `strict` mode.
- `trust`: SPEAR is set to `trust` mode. User data is returned for SPEAR errors and when SPEAR is unavailable. SPEAR must be in `basic` mode prior to enabling `trust` mode.

<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 linear disk group `dg1` to `dg2`.

```
# set disk-group name dg2 dg1
```

### See also

`expand disk-group`

`show disk-groups`

# set disk-parameters

## Description

Sets parameters that affect disk operation.

## Minimum role

standard

## Syntax

```
set disk-parameters
  [remanufacture enabled|disabled|on|off]
  [smart enabled|disabled|on|off|detect-only]
```

## Parameters

remanufacture enabled|disabled|on|off

Optional. Sets whether the system should use Autonomous Drive Regeneration (ADR) to attempt remanufacture of a disk drive that experiences a head failure.

If the operation succeeds, the disk can continue to be used but will have less capacity.

- `disabled` or `off`: Disk remanufacturing is disabled.
- `enabled` or `on`: Disk remanufacturing is enabled.

ADR is supported only for ADAPT disk groups.

---

 **CAUTION** ADR will not run on a storage system that uses FDE drives and is in a secured state.

---

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.

Disks equipped with Self-Monitoring Analysis and Reporting Technology (SMART) 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 5 minutes thereafter. SMART events are recorded in the event log. Changes to the SMART setting take effect after a rescan or a controller restart.

## Examples

Enable SMART.

```
# set disk-parameters smart on
```

Enable automatic remanufacturing of disks that experience head failures.

```
# set disk-parameters remanufacture enabled
```

## See also

show disk-parameters



# set dns-management-hostname

## Description

Sets a domain hostname for each controller module to identify it for management purposes.

A controller configured to use DHCP addressing will send the management hostname to a DHCP server. The DHCP server will in turn register or update the controller's fully qualified domain name (FQDN) on DNS servers. The FQDN is created by appending the management hostname to the DNS domain string that identifies the controller.

## Minimum role

standard

## Syntax

```
set dns-management-hostname
    [controller a|b]
    name <hostname>
```

## Parameters

controller a|b

Optional. Specifies whether to change controller A or B, only. If this parameter is omitted, changes affect the controller being accessed.

name <hostname>

A hostname to use for a controller. The name must differ for each controller.

- A name can have from 1 to 63 bytes.
- A name is not case sensitive.
- A name must start with a letter and end with a letter or number.
- A name can include letters, numbers, or hyphens; no periods.

Running the `reset dns-management-hostname` command will reset the hostname to its default value.

## Examples

Set the domain hostname for controller A.

```
# set dns-management-hostname controller a name vlan3-ctlra
```

## See also

```
clear dns-parameters
reset dns-management-hostname
set dns-parameters
show dns-management-hostname
show dns-parameters
```

# set dns-parameters

## Description

Configures settings to resolve domain names using the Domain Name Service (DNS).

Configuring the storage system to communicate with a DNS server within your network will allow network changes, such as frequent IP address changes in a DHCP environment, to occur without interrupting notifications sent by the system to users.

After a reachable DNS server is configured on the system, or if DHCP is enabled and a DHCP server is reachable, a DNS server may be automatically acquired. Otherwise, you can configure an SMTP server using a name such as `mysmtpserver.example.com`. Further, you could configure search domain `example.com` and SMTP server `mysmtpserver` and reach the same destination.

You must use this command to configure DNS parameters before you configure email parameters in any environments where DNS will be required to resolve server names.

The priority of DNS servers and search domains is:

- User-supplied, using this command
- DHCPv6
- DHCPv4

## Minimum role

standard

## Syntax

```
set dns-parameters
    [controller a|b|both]
    nameservers <nameserver-IP-list>
    [search-domains <domain-name-list>]
```

## Parameters

`controller a|b|both`

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

`nameservers <nameserver-IP-list>`

An ordered list of up to three name server addresses that are recognized within your network to be queried by the DNS resolver. You can specify a comma-separated list containing from one to three IPv4 or IPv6 addresses. The resolver will query the network in the order prescribed by the list until reaching a valid destination address. Any valid setting is treated as enabling DNS resolution for the system.

`search-domains <domain-name-list>`

Optional. An ordered list of domain names to search when resolving hostnames that are configured in the storage system. You can specify a comma-separated list containing from one to three domain names, with a maximum of 253 characters per domain name. The resolver will query the network in the order prescribed by the list until finding a match.

## Examples

Configure the system to query the name server at IP address 8.8.8.8, or at 8.8.6.6 if 8.8.8.8 is unsuccessful or unreachable, to resolve any SMTP server name with a domain of `site1.com`, followed by `site2.com`, and finally by `site3.com`.

```
# set dns-parameters nameservers 8.8.8.8,8.8.6.6 search-domains
site1.com,site2.com,site3.com
```

**See also**

```
clear dns-parameters  
reset dns-management-hostname  
set dns-management-hostname  
set email-parameters  
show dns-parameters  
show dns-management-hostname  
show email-parameters
```

# set email-parameters

## Description

Sets SMTP notification parameters for events and managed logs.

## Minimum role

standard

## Syntax

```
set email-parameters
  [alert-notification-level all|none]
  domain <domain>
  email-list <email-addresses>
  [include-logs enabled|disabled|on|off]
  [notification-level crit|error|warn|resolved|info|none]
  [port <port-number>]
  security-protocol tls|ssl|none
  [sender <sender>]
  [sender-password <password>]
  server <address>
```

## Parameters

alert-notification-level all|none

Optional. Sets whether the system should send notifications of alerts.

- **all**: Sends notifications for all alerts. This is the default.
- **none**: Disables email notification of alerts.

If no notification level is specified, the previous notification level will remain.

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 must follow these rules:

- Can have a maximum of 253 characters.
- The value cannot include a space or: \ " , ; < > ( )
- Must be in the form: <name>.<TLD> where:
  - <name> can include multiple subdomains separated by periods (.).
  - <TLD> is a valid top-level domain (TLD).
  - Both are required.
  - Neither can begin or end with a hyphen (-) or a period (.).

For example: MyDomain.com. If the domain name is not valid, some email servers will not process the message.

---

**NOTE** Alternatively, you can specify the domain by using a valid IP address enclosed in square brackets, []. If the brackets are omitted, email notifications fail to send.

---

`email-list <email-addresses>`

Enter from one to four comma-separated email addresses for recipients of event notifications. Each email address must use the format `<username>@<domain>` and 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|resolved|info|none`

Optional. 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.
- `resolved`: Sends notifications for Resolved, Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables email notification of events. This is the default. If this option is specified, no other parameters are required and their current values are not changed. Email notification of alerts will still occur if the `alert-notification-level` parameter is set to `all`.

If no notification level is specified, the previous notification level will remain.

`port <port-number>`

Optional. The port number to use for communication with the SMTP server. Configure this parameter only if you want to override use of standard SMTP network port 25. Valid port numbers are 1 to 65535.

`security-protocol tls|ssl|none`

Specifies whether to use a security protocol when communicating with the SMTP server.

- `tls`: Enables Transport Layer Security (TLS) authentication. The standard ports for TLS are 25 or 587.
- `ssl`: Enables Secure Sockets Layer (SSL) authentication. The standard port for SSL is 465.
- `none`: Do not use a security protocol. The standard port is 25. This setting is the system default.

`sender <sender>`

Optional, unless `security-protocol` is set to `tls` or `ssl`.

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`.

When a secure protocol is used, this sender name must correspond to the password specified by the `sender-password` parameter, and be a valid user on the configured SMTP server.

If this parameter is omitted, the system name is used as the sender name.

`sender-password <password>`

Optional. This parameter is required for a secure SMTP server (using TLS or SSL) and must correspond to the username specified by the `sender` parameter. The sender password can have a maximum of 32 bytes. The value can include alphanumeric characters and: ^ \_ + : , . @

This parameter is not applicable if the `security-protocol` parameter is set to `none`. If the `security-protocol` parameter is set to `tls` or `ssl` and this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed obscured for security reasons.

```
server <address>
```

The network address of the SMTP mail server to use for the email messages. The value can be an IPv4 address, IPv6 address, or FQDN. If DNS is configured, this parameter may specify a server name. The value can have a maximum of 255 bytes.

### Examples

For a server that requires TLS authentication through standard port 587 for SMTP notifications, set the system to do the following:

- Send an email from `RAIDsystem@mydomain.com` to both `sysadmin@mydomain.com` and `JSmith@domain2.com` when a non-Informational event occurs.
- Send an email with attached logs to `logcollector@mydomain.com` when logs need to be transferred.

```
# set email-parameters server 10.1.9.10 sender RAIDsystem security-protocol tls port 587
sender-password Abcd_1234 domain mydomain.com notification-level warn include-logs enabled
email-list sysadmin@mydomain.com,JSmith@domain2.com,,logcollector@mydomain.com
```

### See also

```
set dns-parameters
show dns-parameters
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

standard

## 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>

Optional. 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>

Optional. The number of the rack containing the enclosure, from 0 to 255.

rack-position <rack-position>

Optional. 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 fde-import-key

## 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

standard

## 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 to 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--01/10/2019"
```

Please re-enter the import passphrase to confirm: **"Customer lock--01/10/2019"**

## See also

```
clear fde-keys  
set fde-lock-key  
set fde-state  
show fde-state
```

# set fde-lock-key

## 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.

When a system and its disks are in the `Secured`, `Locked` state, you must enter the passphrase for the system's lock key ID to restore access to data. Disk groups will be dequarantined, pool health will be restored, and volumes will become accessible.

You cannot set the lock key if any disks are failed or unusable. Use the `show disks` command to check whether any disks have `Usage` value `FAILED` or `UNUSABLE`. In order to set the lock key, all failed disks must be removed from the system. For disks in the `UNUSABLE` state due to a key mismatch, use the `set fde-import-key` to unlock these disks and bring them into the system before issuing the `set fde-lock-key` command.

If any disks are in leftover state (`Usage` value `LEFTOVR`), the command will proceed and identify the disks that remain in that state.

## Minimum role

standard

## 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` parameter. 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 to 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--01/10/2019"
```

**See also**

```
clear fde-keys  
set fde-import-key  
set fde-state  
show fde-state
```

# set fde-state

## 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. The security level can follow Federal Information Processing Standards (FIPS) or FDE, based on the capability of the disks. Use `show disks` to see what the disks support.

Alternatively, the system can be repurposed, where each disk is secure erased.

## Minimum role

standard

## 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`

Optional. The system and all its disks are secured, using the specified FDE system passphrase, which must have been previously configured.

- If the system disks are all FDE-capable, all disks are secured at the FDE level.
- If the system disks are all FIPS-capable, all disks are secured at the FIPS level.
- If the system disks are a mixture of FIPS and FDE, each disk is secured at its hardware-supported security level. FIPS disks are FIPS secured. FDE disks are FDE secured. This configuration is not recommended.

`passphrase <value>`

Optional. A value that matches the previously configured passphrase. Values that include a space must be enclosed in double quotes.

## Examples

Secure the system using FDE.

```
# set fde-state secure passphrase "Customer lock--01/10/2019"
```

A lost passphrase will result in unrecoverable data loss. Please re-enter the passphrase to confirm: **"Customer lock--01/10/2019"**

**See also**

```
clear fde-keys  
set fde-import-key  
set fde-lock-key  
show fde-state
```

# set host

## Description

Sets the name of a host and optionally the profile of the host and the initiators it contains.

---

**NOTE** If your storage configuration has virtual pools greater than 2PB, use host-side driver settings to increase the host I/O timeout interval (Block Device Timeout) to 80 seconds.

---

## Minimum role

standard

## Syntax

```
set host
  [name <new-name>]
  [profile standard|hp-ux|openvms]
  <hostname>
```

## 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|openvms

Optional.

- `standard`: Default profile.
- `hp-ux`: The host uses Flat Space Addressing.
- `openvms`: The host does not allow LUN 0 to be assigned to a mapping.

---

 **CAUTION** Changing this parameter can disrupt access from connected hosts.

---

<hostname>

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

standard

## Syntax

```
set host-group  
  name <new-name>  
  <host-group>
```

## Parameters

name <new-name>

A new name for the host group. Input rules:

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

<host-group>

The current name of the host group. A value that includes a space must be enclosed in double quotes.

## Examples

Change the name of HostGroup1 to MyHostGroup.

```
# set host-group name MyHostGroup HostGroup1
```

## See also

show host-groups

# set initiator

## Description

Sets the name of an initiator and optionally its profile.

## Minimum role

standard

## Syntax

```
set initiator
  id <initiator>
  [nickname <name>]
  [profile standard|hp-ux|openvms]
```

## Parameters

`id <initiator>`

The ID of the initiator. For SAS, the ID is a WWPN. A WWPN can include a colon between each byte but the colons will be discarded.

`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|openvms`

Optional.

- `standard`: Default profile.
- `hp-ux`: The host uses Flat Space Addressing.
- `openvms`: The host does not allow LUN 0 to be assigned to a mapping.

---

 **CAUTION** Changing this parameter can disrupt access from connected initiators.

---

## Examples

For SAS initiator 21000024ff3dfed1, set its name to SAS-port1 and profile to HP-UX.

```
# set initiator id 21000024ff3dfed1 nickname SAS-port1 profile hp-ux
```

## See also

`show initiators`



# set ipv6-network-parameters

## Description

Sets IPv6 parameters for the network port in each controller module.

## Minimum role

standard

## Syntax

```
set ipv6-network-parameters
  [autoconfig enabled|disabled|on|off]
  [controller a|b|both]
  [gateway <gateway>]
  [reset-link]
```

At minimum, autoconfig or gateway must be specified.

## Parameters

autoconfig enabled|disabled|on|off

Optional.

- **enabled** or **on**: Specifies to use an automated method (either DHCPv6 or SLAAC, as defined by the network configuration) to automatically configure the address. If a DHCPv6 address is available, DHCPv6 will provide an interface address. If DHCPv6 cannot provide an address, the SLAAC address will be the single interface address. This is the default.
- **disabled** or **off**: Specifies to use manual mode. This mode uses static IPv6 addresses set with the `add ipv6-address` command. To use manual mode, at least one and up to four IPv6 addresses must already be set.

---

**NOTE** Enabling `autoconfig` will deactivate any static IPv6 addresses, which will no longer be reachable. The static IPv6 addresses will otherwise remain in the configuration, but will not be bound to any interface unless `autoconfig` is subsequently disabled.

---

controller a|b|both

Optional. Specifies whether to change controller A, B, or both. If this parameter is omitted, changes affect the local controller only.

gateway <gateway>

Optional. Specifies a gateway IP address for the port. The value must be a valid IPv6 address. The value cannot include a prefix or `/prefixLength` notation. The address cannot be used elsewhere in the network port configuration. All addresses share a single gateway.

reset-link

Optional. Returns network port addressing to the default settings. This parameter runs only on the local controller and cannot run with any other parameter. Allow up to two minutes for the operation to complete.

## Examples

For controller A, enable autoconfig and set the gateway address.

```
# set ipv6-network-parameters autoconfig enabled controller a gateway
001:0db8:85a3:0000:0000:8a2e:0370:1111
```

**See also**

add ipv6-address  
remove ipv6-address  
set network-parameters  
show ipv6-addresses  
show ipv6-network-parameters

# set ldap-parameters

## Description

Configures the LDAP server parameters required to authenticate and authorize LDAP users.

All insecure protocols and services must be disabled before the LDAP feature can be enabled. Only secure protocols can be enabled while LDAP is enabled.

---

**NOTE** The command does not query specified LDAP servers to ensure that they can be reached. If the server cannot be reached, the user verification will fail.

---

---

**NOTE** Running the `restore defaults` command will clear the LDAP configuration and other settings. For more information about restoring defaults, see ["Settings changed by restoring defaults" on page 472](#).

---

For more information about the LDAP feature, see the *Storage Management Guide*.

## Minimum role

manage

## Syntax

```
set ldap-parameters
  [alt-port <port-number>]
  [alt-server <server-address>]
  ldap enabled|disabled|on|off
  [port <port-number>]
  [server <server-address>]
  [user-search-base <search-string>]
```

## Parameters

alt-port <port-number>

Optional. Specifies the port to use for communication with the alternate LDAP server. The value can be any valid port 1 to 65535. The standard ports are 389 and 636. The default is 636.

alt-server <server-address>

Optional. Specifies the network address of the alternate LDAP server. The value can be an IPv4 address, IPv6 address, or FQDN. This server will listen on the port specified by the `alt-port` parameter. The `alt-server` and `server` parameters cannot be set to the same value.

ldap enabled|disabled|on|off

Enables or disables use of LDAP. Disabled by default. If you enable this parameter you must specify the `server`, `port`, and `user-search-base` parameters.

port <port-number>

Optional. Specifies the port to use for communication with the primary LDAP server. The value can be any valid port 1 to 65535. The standard ports are 389 and 636. The default is 636.

`server <server-address>`

Required if the `ldap` parameter is enabled; otherwise optional. Specifies the network address of the primary LDAP server. The value can be an IPv4 address, IPv6 address, or FQDN. This server will listen on the port specified by the `port` parameter. The `server` and `alt-server` parameters cannot be set to the same value.

`user-search-base <search-string>`

Required if the `ldap` parameter is enabled; otherwise optional. Specifies where to start searching for users in the LDAP directory tree. The search string can include the following attributes, separated by commas:

- `cn=<common-name>`
- `ou=<organizational-unit>`
- `o=<organization>`
- `c=<country>`
- `dc=<domain>`

For more information about LDAP name format, see: [https://msdn.microsoft.com/en-us/library/aa366101\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/aa366101(v=vs.85).aspx)

### Examples

Configure the client to connect to the primary LDAP server, and to an alternate LDAP server in case the primary connection fails. The `user-search-base` setting defines the domain and organizational unit.

```
# set ldap-parameters ldap enabled server 10.235.217.52 port 389 alt-server 10.235.217.51  
alt-port 636 user-search-base ou=colo,dc=bigco2,dc=com,dc=local
```

Disable LDAP.

```
# set ldap-parameters ldap off
```

### See also

`show ldap-parameters`

# set led

## Description

Turns a specified device's identification LED on or off to help you locate the device.

For LED descriptions, see your product's installation or FRU documentation.

## Minimum role

standard

## Syntax

To set a disk LED:

```
set led
  disk <ID>
  enable|disable|on|off
```

To set the LEDs for an enclosure and its I/O modules:

```
set led
  [controller a|b]
  enable|disable|on|off
  enclosure <ID>
```

To set the LED for a fan module:

```
set led
  fan-module <ID>
  enable|disable|on|off
```

## Parameters

controller a|b

Optional; for use with the enclosure parameter. Specifies the I/O module to locate. This affects the identification LED on the I/O module and on the enclosure.

disk <ID>

Specifies the disk to locate. For disk syntax, see ["Command syntax" on page 21](#). This overrides the fault LED on the disk.

enable|disable|on|off

Specifies to turn the LED on or off.

enclosure <ID>

Specifies the enclosure to locate. This affects the identification LED on the enclosure and on each I/O module.

fan-module <ID>

Specifies the fan module to locate. The ID is the slot number of the fan module, a value from 0 to 5.

## Examples

Identify disk 5 in enclosure 1.

```
# set led disk 1.5 on
```

Stop identifying enclosure 1.

```
# set led enclosure 1 off
```

Identify controller B in enclosure 1.

```
# set led enclosure 1 controller b on
```

Identify the fan module in slot 3.

```
# set led fan-module 3 on
```

# set network-parameters

## Description

Sets parameters for the network port in each controller module.

You can manually set static IPv4 or IPv6 values for a network port, or you can specify that IP values should be set automatically for a network port through communication with a Dynamic Host Configuration Protocol (DHCP) server.

The addressing mode can be set differently on each controller.

IPv4 and IPv6 can be used concurrently. This command can be used to configure use of IPv4. To configure use of IPv6, use the `set ipv6-network-parameters` command.

Each controller has the following factory-default IP settings:

- DHCP: disabled
- Controller A IP address: 10.0.0.2
- Controller B IP address: 10.0.0.3
- IP subnet mask: 255.255.255.0
- Gateway IP address: 10.0.0.1

When DHCP is enabled, the following initial values are set and remain set until the system is able to contact a DHCP server for new addresses.

- Controller IP addresses: 169.254.x.x (where the value of x.x is the lowest 16 bits of the controller serial number)
- IP subnet mask: 255.255.0.0
- Gateway IP address: 10.0.0.1

169.254.x.x addresses (including gateway 169.254.0.1) are on a private subnet that is reserved for unconfigured systems and the addresses are not routable. This prevents the DHCP server from reassigning the addresses and possibly causing a conflict where two controllers have the same IP address. As soon as possible, change these IP values to proper values for your network.

To switch a controller from DHCP addressing to static addressing, you must set the IP address, netmask, and gateway values.

---

**NOTE** The following IP addresses are reserved for internal use by the storage system: 169.254.255.1, 169.254.255.2, 169.254.255.3, 169.254.255.4, and 127.0.0.1. Because these addresses are routable, do not use them anywhere in your network.

---

## Minimum role

standard

## Syntax

```
set network-parameters
  [controller a|b|both]
  [dhcp]
  [gateway <gateway>]
  [ip <address>]
  [netmask <netmask>]
  [ping-broadcast enabled|disabled|on|off]
  [reset-link]
```

## Parameters

`controller a|b|both`

Optional. For IP-related parameters, this specifies whether to change controller A, B, or both. If this parameter is omitted and both controllers are set to use DHCP or are set to use `ping-broadcast`, changes affect both controllers. Otherwise, if this parameter is omitted and the `ip` parameter, `netmask` parameter, or `gateway` parameter is set, changes affect the controller being accessed.

`dhcp`

Optional. Specifies to use DHCP to set network-port IP values for both controllers, unless one controller is specified by using the controller parameter.

`gateway <gateway>`

Optional. A gateway IP address for the port.

`ip <address>`

Optional. An IP address for the port. Specify the address 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 is the default.

`netmask <netmask>`

Optional. An IP subnet mask for the port.

`ping-broadcast enabled|disabled|on|off`

Optional. Enables the storage system to respond when a ping to a broadcast address is issued on the system's subnet. This is enabled by default.

`reset-link`

Optional. Returns network port addressing to the default settings. This parameter runs only on the local controller and cannot run with any other parameter. Allow up to two minutes for the operation to complete.

## Examples

Manually set network-port IP values for each controller (disabling DHCP for both controllers, if it was enabled) using IPv4 addressing. Then enable DHCP for controller A without affecting controller B.

```
# set network-parameters ip 192.168.0.10 netmask 255.255.255.0 gateway 192.168.0.1
controller a
# set network-parameters ip 192.168.0.11 netmask 255.255.255.0 gateway 192.168.0.1
controller b
# set network-parameters dhcp controller a
```

## See also

`set ipv6-network-parameters`  
`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

standard

## Syntax

```
set ntp-parameters
  [ntp enabled|disabled|on|off]
  [ntpaddress <address>]
  [timezone <timezone-offset-or-name>]
```

## 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 <address>`

Optional. The network address of an available NTP server. The value can be an IPv4 address, IPv6 address, or FQDN.

`timezone <timezone-offset-or-name>`

Optional. The system's time zone as either:

- An offset in hours (-12 through +14) and optionally minutes (00 to 59) from Coordinated Universal Time (UTC), in the format `+|-<hh>[:<mm>]`. 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.
- A time zone name shown by the `show timezones` command.

## 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
```

Set the system to use the time zone for Puerto Rico.

```
# set ntp-parameters timezone America/Puerto_Rico
```

## See also

```
set controller-date
show controller-date
show ntp-status
show timezones
```

# 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 from 8 to 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, one numeric character, and one non-alphanumeric 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 user LabAdmin.

```
# set password LabAdmin
Enter new password: *****
Re-enter new password: *****
```

Change the password for user JDoe.

```
# set password JDoe password Abcd_1234
```

## See also

show users

# set prompt

## Description

Sets the prompt for the current CLI session.

This setting does not persist beyond the current session.

## Minimum role

monitor

## Syntax

```
set prompt  
  <prompt>
```

## Parameters

<prompt>

The new prompt. Input rules:

- The value is case sensitive.
- The value can have a maximum of 16 characters.
- The value can include printable UTF-8 characters except: " < \
- A value that includes a space must be enclosed in double quotes.

## Examples

Change the prompt from "# " to "CLI\$ " and start entering a show command.

```
# set prompt "CLI$ "
```

```
Success: Command completed successfully. (2014-07-17 16:44:25)
```

```
CLI$ show ...
```

# set protocols

## Description

Enables or disables management services and protocols.

In console mode, if you enable an insecure protocol the command will prompt for confirmation.

## Minimum role

standard

## Syntax

```
set protocols
  [debug enabled|disabled|on|off]
  [debug-response <response-message>]
  [ftp enabled|disabled|on|off]
  [http enabled|disabled|on|off]
  [https enabled|disabled|on|off]
  [sftp enabled|disabled|on|off]
  [sftp-port <port>]
  [slp enabled|disabled|on|off]
  [snmp enabled|disabled|on|off]
  [ssh enabled|disabled|on|off]
  [ssh-port <port>]
  [telnet enabled|disabled|on|off]
```

## Parameters

`debug enabled|disabled|on|off`

Optional. Enables or disables debug capabilities, including Telnet debug ports and privileged diagnostic user IDs. This is disabled by default. You cannot enable this mechanism if LDAP is enabled.

For security, attempting to enable this parameter causes the controller to create a challenge message. The challenge message includes the controller serial number and a challenge string. You must email the challenge message to technical support for authorization. If authorization is granted, a response message is returned. The response message is a password string that expires 5 minutes after it is generated and can be used only one time. Use the `debug-response` parameter to submit the response message to the controller, which enables the debug protocol. The debug protocol remains enabled for 15 minutes to allow you to log in to a debug port. Login sessions started during that time will remain open indefinitely until logout or a system restart.

---

**NOTE** Properly shut down the debug console by entering the command `set protocols debug disabled`. Do not just close the console directly or by using the `exit` command.

---

`debug-response <response-message>`

Optional. Submits the content of the debug authorization response message, received after successful use of the `debug` parameter, to the controller to enable the debug protocol.

`ftp enabled|disabled|on|off`

Optional. Enables or disables File Transfer Protocol (FTP), an interface for installing firmware updates, installing security certificates and keys, and downloading logs. This is disabled by default. Using SFTP is preferred. You cannot enable this

mechanism if LDAP is enabled.

```
http enabled|disabled|on|off
```

Optional. Enables or disables the standard SMC web server. This is disabled by default. You cannot enable this mechanism if LDAP is enabled.

```
https enabled|disabled|on|off
```

Optional. Enables or disables the secure SMC web server. This is enabled by default.

```
sftp enabled|disabled|on|off
```

Optional. Enables or disables SSH File Transfer Protocol (SFTP), a secure interface for installing firmware updates, installing security certificates and keys, and downloading logs. All data sent between the client and server will be encrypted. This option is enabled by default.

To set the port numbers to use for SFTP and SSH, set the `sftp-port` and `ssh-port` parameters, respectively. The port numbers must differ.

```
sftp-port <port>
```

Optional. Specifies the port number to use for SFTP. Valid port numbers are 1 to 65535. The default is 1022.

```
slp enabled|disabled|on|off
```

Optional. Enables or disables the Service Location Protocol (SLP) interface. SLP is a discovery protocol that enables computers and other devices to find services in a LAN without prior configuration. This system uses SLP v2. 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.

```
ssh enabled|disabled|on|off
```

Optional. Enables or disables the secure shell CLI. This is enabled by default.

```
ssh-port <port>
```

Optional. Specifies the port number to use for SSH. Valid port numbers are 1 to 65535. The default is 22.

```
telnet enabled|disabled|on|off
```

Optional. Enables or disables the standard CLI. This is disabled by default. You cannot enable this mechanism if LDAP is enabled.

## Examples

Disable insecure HTTP connections and enable FTP.

```
# set protocols http disabled ftp enabled
```

Enable Telnet, which is an insecure protocol.

```
# set protocols telnet enabled
```

Enable SFTP and set it to use port 2020.

```
# set protocols sftp enabled sftp-port 2020
```

## See also

```
set cli-parameters
```

```
show protocols
```

# set proxy-server

## Description

Enables or disables use of a proxy server.

The proxy server is a shared configuration option for all storage system features that require a proxy for external network communication. For environments that are behind a firewall and do not have direct access to the Internet, you can configure a proxy server to act as an intermediary between the storage system and the external URL, for example to receive the manifest. Only HTTP is supported to the proxy server, though the proxy itself can support HTTPS traffic to the final endpoint.

## Minimum role

manage

## Syntax

```
set proxy-server
  [clear]
  [host <address>]
  [password <password>]
  [port <port-number>]
  [state enabled|disabled]
  [username <username>]
```

## Parameters

clear

Optional. Clears all settings for the proxy server and disables it.

host <address>

Optional. Specifies the network address for the proxy server. The value can be an IPv4 address, IPv6 address, or FQDN.

password <password>

Optional. Specifies the password for the user specified by the `username` parameter, if required by the proxy server. Input rules:

- The value is case sensitive.
- The value can include printable UTF-8 characters except a space or: " ' , < > \
- For other restrictions, see the proxy server's documentation.

port <port-number>

Optional. Specifies one or more port numbers on the proxy server. The allowed port numbers are 1 to 65535.

state enabled|disabled

Optional. Enables or disables the proxy server.

username <username>

Optional. Specifies the username to access the proxy server, if required by the proxy server.. Input rules:

- The value is case sensitive.
- The value can include printable UTF-8 characters except a space or: " ' , < \ :
- For other restrictions, see the proxy server's documentation.

**Examples**

Set the username, password, host, and port to access the proxy server, and enable it.

```
# set proxy-server username testusername password 12345678 host 12.456.78.9 port 26 state
enabled
```

Clear proxy server settings and disable it.

```
# set proxy-server clear
```

**See also**

```
show proxy-server
```

# set remote-system

## Description

Changes remote-system credentials stored in the local system.

Do this when the user name or password to access a remote system has been changed in that system.

## Minimum role

standard

## Syntax

```
set remote-system
  password <password>
  username <username>
  <IP-address>
```

## Parameters

password <password>

Optional. The new password to access the remote system. The value is displayed in clear text.

username <username>

Optional. The new username to access the remote system.

<IP-address>

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

An address can be an IPv4 address, IPv6 address, or FQDN.

## Examples

Set the password `Abcd_1234` for remote system `System2`.

```
# set remote-system password Abcd_1234 System2
```

## See also

```
create remote-system
delete remote-system
remote
show remote-systems
```



# 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.

## Minimum role

standard

## 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.
- [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  
day|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 2019-01-01 00:01 every 1 days expires 2019-12-31 00:01" task-name Task1 Sched1
```

**See also**

show schedules

show tasks

# 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

standard

## Syntax

```
set snmp-parameters
  [add-trap-host <address>]
  [alert-notification-level all|none]
  [del-trap-host <address>]
  [enable crit|error|warn|resolved|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. The value can be an IPv4 address, IPv6 address, or FQDN. Three trap hosts can be set.

`alert-notification-level all|none`

Optional. Enables or disables SNMP notification of alerts.

- `all`: The system will send SNMP notifications for alerts. This setting is the default.
- `none`: The system will not send SNMP notifications for alerts.

If this parameter is omitted, the previous notification level remains.

`del-trap-host <address>`

Optional. Specifies the network address of a destination host to delete. The value can be an IPv4 address, IPv6 address, or FQDN.

`enable crit|error|warn|resolved|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.
- `resolved`: Sends notifications for Resolved, 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 to 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-host-list>`

Optional. Replaces the current list of trap destinations. Each value can be an IPv4 address, IPv6 address, or FQDN.

`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 syslog-parameters

## Description

Sets remote syslog notification parameters for events.

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. This feature supports User Datagram Protocol (UDP) but not Transmission Control Protocol (TCP).

## Minimum role

standard

## Syntax

```
set syslog-parameters
  [alert-notification-level all|none]
  [host <address>]
  [host-ip <address>]
  [host-port <port-number>]
  [notification-level crit|error|warn|resolved|info|none]
```

## Parameters

alert-notification-level all|none

Optional. Enables or disables syslog notification of alerts.

- all: The system will send syslog notifications for alerts. This is the default.
- none: The system will not send syslog notifications for alerts.

If this parameter is omitted, the previous notification level will remain.

host <address>

Optional. The network address for the host. The value can be an IPv4 address, IPv6 address, or FQDN. If notification-level is other than none, the host parameter must be specified.

host-ip <address>

Deprecated. Use the host parameter instead.

host-port <port-number>

Optional. A specific port number on the host. The allowed port numbers are 1 to 65535.

notification-level crit|error|warn|resolved|info|none

Optional. 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.
- resolved: Sends notifications for Resolved, Warning, Error, and Critical events.
- info: Sends notifications for all events.
- none: Disables syslog notification.

If notification-level is other than none, the host parameter 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 10.1.1.10 host-port 514
```

**See also**

```
show syslog-parameters
```

```
test
```

# set system

## Description

Sets the system's name, contact person, location, and description.

The name, location, and contact are included in event messages. All four values are included in system debug logs for reference by service personnel. When using the SMC, the system name appears in the browser title bar or tab.

Input rules for each value:

- The value is case sensitive.
- The value can have a maximum of 79 bytes.
- The value can include spaces and printable UTF-8 characters except: " < > \
- A value that includes a space must be enclosed in double quotes.

## Minimum role

standard

## Syntax

```
set system
  [contact <value>]
  [info <value>]
  [location <value>]
  [name <value>]
```

## Parameters

contact <value>

Optional. The name of the person who administers the system. The default is Uninitialized Contact.

info <value>

Optional. A brief description of what the system is used for or how it is configured. The default is Uninitialized Info.

location <value>

Optional. The location of the system. The default is Uninitialized Location.

name <value>

Optional. A name to identify the system. The default is Uninitialized Name.

## 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 system-cache-parameters

## Description

Sets system cache options prior to installing disks in the system.

The settings (known as the system cache mode) will apply to both controller modules.

For this command to succeed, the system cannot contain any disk groups and the controller cache cannot contain any unwritten data. After the command runs, each Storage Controller will restart. While a Storage Controller is restarting, communication will temporarily be lost with the corresponding Management Controller and there may be a temporary loss of data availability. Settings persist across controller restarts.

Before creating any disk groups, you can configure the cache block size that the system will use to create disk groups. Block size is the logical size in bytes of a data unit on disk. Sector size is the physical size of a data unit on disk. The system supports use of 512-byte sector disks or 4K-byte sector disks. 4K-sector disks use the disks' surfaces more effectively for large files, and allow stronger error correction. Advanced Format 4K disks support both native 4K sectors (4Kn) and emulation of 512-byte sectors (512e). 512-byte emulation is intended to provide support for legacy storage elements that are based on 512-byte sectors, with some loss of write performance.

For linear storage, before creating any disk groups, you can configure use of end-to-end (E2E) protection information (PI) for I/O operations between hosts and disks. The system supports use of either discrete E2E PI or full E2E PI. Discrete E2E PI checks for the protection information associated with data blocks handled by the host-interface controllers, and the data blocks moved between the disk controllers and the disks. Full E2E PI propagates the protection information for data blocks at all points between the HBAs and the disks. A disk group that has been created to use discrete PI cannot dynamically be changed to use full PI. However, disks formerly used in a discrete-PI disk group can be used in a full-PI disk group (and vice-versa) if the PI mode is changed or the disks are moved to a different system. For more information about E2E PI, see the topic about end-to-end protection information in the Storage Management Guide.

---

**NOTE** After cache options are set, newly found disks that are unsupported for the system cache mode will not be available for use. This could occur if disks are inserted from another system, an expansion enclosure is switched on, and so forth.

---

## Minimum role

standard

## Syntax

```
set system-cache-parameters
  [cache-block-size 512|4k]
  [pi-mode enabled|disabled|on|off]
```

## Parameters

cache-block-size 512|4k

Optional.

- 512: Specifies to use a 512-byte block size. This option is not supported if `pi-mode` is enabled.
- 4k: Specifies to use a 4K-byte block size. If `pi-mode` is enabled, 8 bytes of protection information will be added to each block.

pi-mode enabled|disabled|on|off

Optional.



- `enabled` or `on`: Enables PI. This option is not supported if `cache-block-size` is set to 512.
- `disabled` or `off`: Disables PI. If `cache-block-size` is set to 4k, disk groups will use full E2E PI.

### Examples

Set the system's cache block size to 4K bytes.

```
# set system-cache-parameters cache-block-size 4k
```

Set the system to use PI.

```
# set system-cache-parameters pi-mode enabled
```

Set the system to use 4K cache block size but not E2E PI.

```
# set system-cache-parameters cache-block-size 4k pi-mode disabled
```

### See also

`set volume-cache-parameters`

`show cache-parameters`

# set user

## Description

Changes preferences for a specified user for the session or permanently.

The system requires at least one user with the `manage` role to exist.

A user with the `manage` role can change any parameter except `name`. A user with the `standard` or `monitor` role can change any parameter for that user except `name`, `roles`, and `interfaces`.

---

**NOTE** If preference changes are made to the active user, those changes take effect for the current session. Otherwise, user changes take effect when the user next logs in.

---

## Minimum role

`monitor`

## Syntax

```
set user
  [authentication-type MD5|SHA|none]
  [base 2|10]
  [interfaces <interfaces>]
  [password <password>]
  [precision <#>]
  [privacy-password <encryption-password>]
  [privacy-type DES|AES|none]
  [roles <roles>]
  [session-preferences]
  [storage-size-base 2|10]
  [storage-size-precision <#>]
  [storage-size-units auto|MB|GB|TB]
  [temperature-scale celsius|c|fahrenheit|f]
  [timeout <#>]
  [trap-host <IP-address>]
  [trap-port <port-number>]
  [type novice|standard|advanced|diagnostic]
  [units auto|MB|GB|TB]
  <username>
```

## 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 the `trap-host` parameter.

- `MD5`: MD5 authentication. This is the default.
- `SHA`: SHA-1 authentication.
- `none`: No authentication.

base 2|10

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

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

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

interfaces <interfaces>

Optional. Specifies the interfaces that the user can access. Multiple values must be separated by commas and no spaces.

- cli: Command-line interface. This is enabled by default.
- wbi: Web-browser interface. This is enabled by default.
- ftp: SFTP/FTP interface. To remove FTP access, disable FTP by using the `set protocols` command.
- snmpuser: Allows an SNMPv3 user to view the SNMP MIB and receive SNMP trap notifications. This option requires the `trap-host` parameter. To use a trap destination port other than the default port, also specify the `trap-port` parameter.
- none: No interfaces.

A command that specifies `snmpuser` cannot also specify a non-SNMP interface. To enable or disable protocols that can be used to access interfaces, use the `set protocols` command.

password <password>

Optional in console mode; required for API mode. Sets a new password for the user. Input rules:

- The value is case sensitive.
- The value can have 8 to 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, one numeric character, and one non-alphanumeric 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 to 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. Input rules:

- The value is case sensitive.
- The value can have from 8 to 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, one numeric character, and one non-alphanumeric character.

`privacy-type DES|AES|none`

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

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

`roles <roles>`

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

- `monitor`: User can view but not change system settings. This is the default.
- `standard`: User can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP/FTP; performing file uploads from the SMC; using the `restore defaults` command.
- `manage`: User can view and change system settings.
- `diagnostic`: For use by or with direction from technical support.

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 to 43200 seconds (2 to 720 minutes). The default is 1800 seconds (30 minutes).

`trap-host <IP-address>`

Optional. For an SNMPv3 user, this specifies the network address of the host that will receive SNMP traps. The value can be an IPv4 address or IPv6 address or FQDN.

`trap-port <port-number>`

Optional. For an SNMPv3 user, this parameter specifies the target port of the host that will receive SNMP traps. The default port is 162.

`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 `0.11709TB` is instead shown as `117.1GB`.

<username>

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 `testsnmp`.

```
# set user testsnmp authentication-type SHA password
```

### See also

`set password`

`show users`

# set user-group

## Description

Changes the settings for an LDAP user group.

A user-group member with the `standard` or `manage` role can change any parameter except name. A member with the `monitor` role can change any parameter for that user except name, roles, and interfaces.

User group changes take effect when a member of the group subsequently logs in after changes have been made to the settings of an LDAP user group.

## Minimum role

monitor

## Syntax

```
set user-group
  [base 2|10]
  [interfaces <interfaces>]
  [precision <#>]
  [roles <roles>]
  [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]
  <user-group-name>
```

## 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. 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 group can access. Multiple values must be separated by commas and no spaces.

- `cli`: Command-line interface. This is enabled by default.
- `wbi`: Web-browser interface. This is enabled by default.
- `ftp`: SFTP interface.
- `none`: No interfaces.

Only secure protocols are supported for the above interfaces. To enable or disable interface protocols, use the `set protocols` command.

`precision <#>`

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

`roles <roles>`

Optional. Specifies the user group role as one or more of the following values:

- `monitor`: User group can view but not change system settings. This is the default.
- `standard`: User group can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP; performing file uploads from the SMC; using the `restore defaults` command.
- `manage`: User group can view and change system settings.
- `diagnostic`: For use by or with direction from technical support.

Multiple values must be separated with a comma (with no spaces). If multiple values are specified, the user group'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 to 43200 seconds (2 to 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 0.11709TB is instead shown as 117.1GB.

`<user-group-name>`

Specifies the user group to change. A name that includes a space must be enclosed in double quotes.

## Examples

Change user group StorageAdmins to have the manage role for the CLI and SMC interfaces.

```
# set user-group interfaces cli,wbi roles manage StorageAdmins
```

## See also

```
create user-group  
delete user-group  
set ldap-parameters  
show audit-log  
show user-groups
```




# set volume

## Description

Changes parameters for a volume.

---

 **CAUTION** Applying new parameters may disrupt access from connected hosts.

---

## Minimum role

standard

## Syntax

```
set volume
  [identifying-information <description>]
  [name <new-name>]
  [ovms-uid <ID>]
  <volume>
```

## Parameters

`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.

`ovms-uid <ID>`

Optional. For a volume to be accessed by an OpenVMS host, assign a volume ID from 1 to 32767 to identify the volume to the host. If you specify this parameter you cannot specify the `identifying-information` parameter.

`<volume>`

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

## Examples

Rename volume Vol1 to Vol2.

```
# set volume name Vol2 Vol1
```

Set identifying information for Vol3.

```
# set volume identifying-information "Project X data" Vol3
```

**See also**

show maps

show volumes

# set volume-cache-parameters


## Description

Sets cache options for specified volumes.

---

**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

standard

## Syntax

```
set volume-cache-parameters
  [optimization standard|standard-atomic-write|cache-hit-atomic-write]
  [read-ahead-size disabled|adaptive|stripe|512KB|1MB|2MB|4MB|8MB|16MB|32MB]
  [write-policy write-back|write-through|wb|wt]
  <volume>|all
```

## Parameters

optimization standard|standard-atomic-write|cache-hit-atomic-write

Optional. Sets the cache optimization mode:

- **standard**: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy. This is the default.
- **standard-atomic-write**: This controller cache mode includes the **standard** mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
- **cache-hit-atomic-write**: This controller cache mode includes the **cache-hit** mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

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 512KB, 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>|all`

Specifies either:

- The name or serial number of the volume to change. A name that includes a space must be enclosed in double quotes.
- `all`: Apply the changes to all volumes.

### Examples

Set the cache policy, optimization mode, and read-ahead size for volume `V1`.

```
# set volume-cache-parameters write-policy wb optimization standard read-ahead-size stripe
V1
```

### See also

```
set system-cache-parameters
show cache-parameters
show volumes
```

# show advanced-settings

## Description

Shows the settings for advanced system-configuration parameters.

## Minimum role

monitor

## Syntax

```
show advanced-settings
```

## Output

### Disk Group Background Scrub

Shows whether disks in disk groups are automatically checked for disk defects to ensure system health.

- **Disabled:** Background disk-group scrub is disabled.
- **Enabled:** Background disk-group scrub is enabled.

### 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.

### 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.
- **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.
- **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 an available compatible disk to reconstruct a degraded disk group if no compatible spare is present. The dynamic spares feature does not apply to ADAPT disk groups.

- **Disabled:** The dynamic spares feature is disabled.
- **Enabled:** The dynamic spares feature is enabled.
- **Alternate:** The dynamic spares feature is enabled but spare selection is restricted to the enclosure that contains the failed disk.

#### 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.

#### 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:** Hosts can use the SCSI `MODE SELECT` command to change the write-back cache setting. This is the default.
- **Enabled:** Hosts cannot override the storage system's write-back cache setting.

#### Sync Cache Mode

Shows how the SCSI `SYNCHRONIZE CACHE` command is handled:

- **Immediate:** Good status is returned immediately and cache content is unchanged.
- **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.
- **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.
- **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.

#### 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.
- **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.
- **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.
- **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.
- **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.

#### 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.
- **Enabled:** The managed logs feature is enabled.

#### Single Controller Mode

For a system that lacks a second controller module for redundancy 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.

#### Restart on CAPI Fail

Shows whether a Storage Controller that experiences a CAPI hang will be forced to restart. A CAPI hang is perceived as a management-interface hang. As part of the restart process, a dump file is created and event 107 is logged. To provide the dump file to technical support for debugging, use the Save Logs action in the SMC.

#### Slot Affinity

Shows whether the slot affinity feature is enabled or disabled. For information about this feature, see the description of the `set advanced-settings` command's `slot-affinity` parameter.

### Remanufacture

Shows whether the Autonomous Drive Regeneration (ADR) feature is enabled or disabled. ADR attempts remanufacture of a disk drive that experiences a head failure. ADR is supported only for ADAPT disk groups.

### Hedged Reads Timeout Level

Shows the waiting period for read requests before the hedged reads feature triggers. This feature reduces latency for read requests by using RAID parity information to reconstruct requested data if the read wait period is exceeded. Levels are:

- 0: Disabled. The hedged reads method is not used.
- 1: 1.75 seconds wait time. This setting is the default.
- 2: 2.25 seconds wait time.
- 3: 2.75 seconds wait time.
- 4: 3.25 seconds wait time.

All wait times are approximations.

### Auto Map

Shows whether the auto map feature is enabled or disabled. When auto map is enabled, the system automatically maps initiators or hosts to volumes or volume groups that are mapped to a host group when those initiators or hosts are added to the host group.

### Auto Unmap

Shows whether the auto unmap feature is enabled or disabled. When auto unmap is enabled, the system automatically unmaps initiators or hosts from volumes or volume groups that are mapped to a host group when those initiators or hosts are removed from the host group.

### Slow Disk Detection

Shows whether slow-disk detection is enabled or disabled. This feature identifies drives that are performing below expectations compared to their peers. If a slow drive is detected, the system issues a notification to help with debug analysis so you can determine the impact of the drive on the system as a whole.

- **Disabled:** Slow-disk detection is disabled.
- **Enabled:** Slow-disk detection is enabled.

### Scrub Schedule

Shows whether disk-group scrub runs only when scheduled.

- **Disabled:** Scheduling background disk-group scrub is not available. This option is the default.
- **Enabled:** Scheduling background disk-group scrub is available.

### Disk Firmware Update

Shows whether the system uses intelligent scheduling to run disk firmware updates.

- **Disabled:** System does not use intelligent scheduling for disk firmware updates.
- **Enabled:** System uses intelligent scheduling by updating sets of drives in phases selected to avoid taking any disk group offline. This option is the default.

## Examples

Show advanced system-configuration settings.

```
# show advanced-settings
```



**Basetypes**

advanced-settings-table  
status

**See also**

set advanced-settings

# show alert-condition-history

## Description

Shows the history of the alert conditions that have generated alerts.

The most recent 3000 alert conditions are maintained in this log history, regardless of whether they are resolved or unresolved.

## Minimum role

monitor

## Syntax

```
show alert-condition-history
  [component <component-name>|<component-type>]
  [id <condition-sequence-number>]
  [last <number-of-conditions>]
```

## Parameters

component <component-name>|<component-type>

Optional. Shows alert conditions for a specific component name or type.

- A valid name is any value shown by the `Component` property.
- A valid type is any of the following values: `controller`, `disk`, `enclosure`, `expander`, `fan`, `fan_control_module`, `fan_module`, `firmware_info`, `host_port`, `iom`, `mgmt_port`, `midplane`, `power_supply`, `sas_port`, `sensor`, `slot`, `storage_pool`, `super_cap`, `system`.

id <condition-sequence-number>

Optional. Shows a specific condition by its `Index` value.

last <number-of-conditions>

Optional. Shows the specified number of most recent alert conditions.

## Output

Component

The component name.

Index

The alert condition sequence number.

Resolved

Shows whether the alert is resolved.

Time Detected

The date and time when the alert condition was detected.

Time Resolved

If `Resolved` is `Yes`, the date and time when the alert condition was resolved.

Reason

A message describing the alert condition.

**Examples**

Show last three alert conditions that generated alerts.

```
# show alert-condition-history last 3
```

Show the alert condition having sequence number 356.

```
# show alert-condition-history id 356
```

Show alert conditions for a specific component.

```
# show alert-condition-history component mgmtport_a
```

**Basetypes**

conditions

status

**See also**

clear alerts

set alert

show alerts

# show alerts

## Description

Shows information about the active alerts on the storage system.

---

**NOTE** The system presents a maximum of 512 alerts that are either unresolved, or resolved but unacknowledged. If further alerts are detected, resolved alerts are deleted to generate active alerts. If all 512 alerts are active, no new alerts are generated.

---

## Minimum role

monitor

## Syntax

```
show alerts
  [component <component-name>|<component-type>]
  [unresolved|resolved|acknowledged|unacknowledged]
  [detail]
```

## Parameters

component <component-name>|<component-type>

Optional. Shows active alerts for a specific component name or type.

- A valid name is any value shown by the `Component` property in the command output.
- A valid type is any of the following values: controller, disk, enclosure, expander, fan, fan\_control\_module, fan\_module, firmware\_info, host\_port, iom, mgmt\_port, midplane, power\_supply, sas\_port, sensor, slot, storage\_pool, super\_cap, system.

unresolved|resolved|acknowledged|unacknowledged

Optional. Shows only alerts with the specified status.

detail

Optional. Shows the time each active alert was detected and resolved, and the user-defined comment (if any) for the alert.

## Output

ID

The alert sequence number.

Component

The component name.

Severity

- **INFORMATIONAL:** The system configuration does not match recommendations. No change is required, but for optimal system performance and security, you should resolve the issue.
- **WARNING:** A problem occurred that may affect system stability or performance but not data integrity. Evaluate the problem and correct it if necessary.
- **CRITICAL:** A failure occurred that may cause a controller to shut down or could affect data integrity or system stability. Correct the problem *immediately*.
- **UNKNOWN:** The system is unable to determine the state of a component. In some configurations, this situation is normal. In other situations, resolving other system issues should resolve this issue as well.

Resolved

Shows whether the alert is resolved.

Acknowledged

Shows whether the alert has been acknowledged.

Time Detected

Shown by the `detail` parameter. The most recent date and time when the alert condition was detected.

Time Resolved

Shown by the `detail` parameter. If `Resolved` is Yes, the date and time when the alert condition was resolved.

Reason

A message describing the alert condition.

Recommended Action

The recommended action to take to resolve the alert condition.

Comment

A user-defined comment (if any) set by using the `set alert` command.

### Examples

Show active alerts.

```
# show alerts
```

Show active alerts for a specific component.

```
# show alerts component controller_a
```

Show resolved alerts for sensor components.

```
# show alerts resolved component sensor
```

Show detailed information about unresolved alerts.

```
# show alerts unresolved detail
```

### Basetypes

alerts

status

### See also

clear alerts

set alert

show alert-condition-history

# show audit-log

## Description

Shows audit log data.

All user login and logout attempts and operations performed through the CLI, SMC, and FTP/SFTP interface are recorded in the audit log. Failed login attempts are also recorded.

The audit log will contain the timestamp, username, and command that was run as well as the status code returned by that command. The audit log contains a subset of the data that is stored in controller logs. The audit log will not contain specific value changes, such as old and new settings.

Audit logs record host IP information for all interfaces. Audit logs also record snmpset commands.

Each controller maintains its own audit log. Each audit log can contain up to 2MB of data, after which it will wrap.

Audit log data will persist after restarting the Storage Controller or running the `restore defaults` command. Audit logs are not associated with the managed logs feature. Audit logs will be cleared during factory refurbishment.

Audit log data is not mirrored to the partner controller. In a failover scenario, the failed controller's audit log cannot be retrieved until the failed controller is recovered. When the failed controller comes back online its audit log should be accessible.

## Minimum role

monitor

## Syntax

```
show audit-log
    [a|b|both]
    [last <number-of-entries>]
```

## Parameters

a|b|both

Optional. Specifies to show the audit log for controller A, B, or both. If this parameter is omitted, the audit log is shown for the current controller.

last <number-of-entries>

Optional. Shows the specified number of most recent entries. If this parameter is omitted, all events are shown.

## Output

All audit log entries for the specified controller(s) are listed in chronological order by date and time. An entry may contain the following fields:

- Date and time
- Facility ID and name (for internal use)
- Process
- C: Controller ID
- UID: Username
- GID: Group name
- SID: Session ID
- A: Action

- SSID: MC subsystem ID
- RC: Return code
- M: Message

The group name is logged only for LDAP users. The group name and session ID are logged only when authentication is successful and a session has been created. The subsystem ID and return code are for diagnostic purposes.

### Examples

Show the audit log for controller B only.

```
# show audit-log b
```

### Basetypes

```
audit-log  
status
```

### See also

```
show user-groups
```

# 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:** 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.

#### PI-Format

Shows whether this product supports disks that are formatted to use protection information (PI). This setting cannot be changed.

- **Enabled:** The system supports PI Type 2 disks.
- **Disabled:** The system does not support PI Type 2 disks.

#### Cache Block Size

Shows the system's cache block size.

### 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 fan 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.

#### Cache Flush

- `Enabled`: If the controller loses power, it will automatically write cache data to the memory 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.
- `write-through`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

#### Cache Optimization

If a volume is specified, its cache optimization mode:

- `standard`: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy.
- `standard-atomic-write`: This controller cache mode includes the `standard` mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
- `cache-hit-atomic-write`: This controller cache mode includes the `cache-hit` mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

#### 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 512KB, even though they are not striped.
- **512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB:** Size selected by a user.

### Examples

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

```
# show cache-parameters V1
```

### Basetypes

```
cache-settings  
cache-parameter (if a volume is specified)  
status
```

### See also

```
set system-cache-parameters  
set volume-cache-parameters  
show volumes
```

# show certificates

## Description

Displays a list of available device certificates that have been added to the storage system.

The command shows information about device certificates by default, or you can use parameters to filter the output. Use the `truststore` parameter to see information about root and intermediate certificates in the trust store.

## Minimum role

manage

## Syntax

```
show certificates
  [controller a|b|both]
  [detail]
  [name <name>]
  [pem]
  [service web]
  [truststore]
```

## Parameters

`controller a|b|both`

Optional. Shows certificates on the specified controller. The default value is `both`.

`detail`

Optional. Provides list-view information about each certificate, including additional information not shown in the table view.

`name <name>`

Optional. Provides information only about the certificate specified by name. The name provided must be a valid name of a certificate on the system.

`pem`

Optional. Displays certificate data in PEM format. The `pem` and `detail` parameters cannot be specified together.

`service web`

Optional. Limits display of certificates to the indicated service.

`truststore`

Optional. Displays all certificates in the trust store.

## Output

### Output without the `truststore` parameter

Certificate Name

The name of the certificate, either system-generated or user-supplied when the certificate is added to the system.

Certificate Type

Shows the certificate type: Device-Cert

Controller

Displays the controller on which the certificate is installed.

WEB

Displays an x if the certificate is currently active for the web service.

Active Services

Shown by the `detail` parameter. Displays the service that is actively using the certificate, if any.

Identity

Shown by the `detail` parameter. The identity provided when the certificate was added to the system.

Valid From

Shows the certificate start date.

Valid Till

Shows the certificate expiration date.

Issued To

The name or organization the certificate was granted to.

Issued By

The organization or entity that granted the certificate.

State

Shown if the `detail` parameter is omitted. The current status of the certificate:

- Available
- Unavailable

---

**NOTE** By default, the command displays certificates on both controllers. If the partner controller is down or not communicating, certificates from the partner are shown as Unavailable.

---

Certificate Status

Shows the source of the certificate:

- `Customer-supplied`: The certificate was uploaded by the end user.
- `System-generated`: The certificate was generated by the system.
- `Unknown status`: The origin of the certificate cannot be determined.

Default Services

Displays any service associated with the certificate by default.

---

**NOTE** A default service applies only to system-generated certificates and can be set only during manufacturing. If a default certificate is available for a service and a customer-supplied certificate for that service has been removed or not added, the system uses the default certificate.

---

Certificate Text

Shown by the `detail` parameter. Displays the certificate content as text.

#### Output with the `truststore` parameter

Certificate Name

The name of the certificate, either system-generated or user-supplied when the certificate is uploaded to the system.

Certificate Type

Shows the certificate type: `Trust-Cert`

Controller

Displays the controller on which the certificate is installed.

Valid From

Shows the certificate start date.

Valid Till

Shows the certificate expiration date.

Issued To

The name or organization the certificate was granted to.

Issued By

The organization or entity that granted the certificate.

State

Shown if the `detail` parameter is omitted. The current status of the certificate:

- Available
- Unavailable

---

**NOTE** By default, the command displays certificates on both controllers. If the partner controller is down or not communicating, certificates from the partner are shown as `Unavailable`.

---

Certificate Status

Shows the source of the certificate:

- `Customer-supplied`: The certificate was uploaded by the end user.
- `System-generated`: The certificate was generated by the system.
- `Unknown status`: The origin of the certificate cannot be determined.

Certificate Text

Shown by the `detail` parameter. Displays the certificate content as text.

### Examples

Show all device certificates.

```
# show certificates
```

Show certificate details for a certificate specified by name.

```
# show certificates detail name bobCert_12345
```

Display all certificates in the trust store.

```
# show certificates truststore
```

Display trust store certificates on controller A.

```
# show certificates truststore controller A
```

### Basetypes

certificates

status

### See also

activate certificate

add certificate (API command)

create certificate-signing-request

remove certificate

# show ciphers

## Description

Shows the ciphers that the system is using to securely communicate with hosts.

## Minimum role

manage

## Syntax

```
show ciphers
```

## Output

- Active cipher list
- User-supplied cipher list (set with the `set ciphers` command)
- Default cipher list

## Examples

Show the cipher list.

```
# show ciphers
```

## Basetypes

```
ciphers  
status
```

## See also

```
reset ciphers  
set ciphers
```

# 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 to 43200 seconds (2 to 720 minutes).

### Output Format

- **Console:** Supports interactive use of the CLI by displaying easily readable output. This mode automatically sizes fields according to content and adjusts content to window resizes.
- **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 which displays like `api-embed` format with `brief` mode enabled.
- **json:** Standard JavaScript Object Notation (JSON) output.
- **wbi:** A JSON-like format used internally by the SMC.

### 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.

### 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.

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.
- **Disabled:** Output is not halted. When displaying output in API mode, which is intended for scripting, disable paging.

### Precision

The number of decimal places (1 to 10) shown for display of storage-space sizes.



## Units

The unit for display of storage-space sizes:

- **Auto:** Sizes are shown in units determined by the system.
- **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 **0.11709TB** is instead shown as **117.1GB**.

## Temperature Scale

- **Fahrenheit:** Temperatures are shown in degrees Fahrenheit.
- **Celsius:** Temperatures are shown in degrees Celsius.

## Examples

Show current CLI settings.

```
# show cli-parameters
```

## Basetypes

```
cli-parameters  
status
```

## See also

```
set cli-parameters
```

# 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`
- Configured DNS settings from `show dns-parameters`
- The DNS management hostname for each controller from `show dns-management-hostname`
- Controller firmware and hardware version information from `show versions` with the `detail` and `frus` parameters
- Host and expansion port information from `show ports`
- Disk information from `show disks`
- Disk-slot information from `show disks` with the `encl` parameter
- 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`

## Examples

Show information about the system configuration.

```
# show configuration
```

## Basetypes

```
system  
controllers  
dns-parameters  
mgmt-hostnames  
versions  
fru-versions  
port  
drives  
enclosure-list  
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> (UTC), reported by the controller being accessed.

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 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 API output are described in ["API basetype properties" on page 374](#).

## 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 format `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 controllers

## Description

Shows information about each controller module.

## Minimum role

monitor

## Syntax

```
show controllers
```

## Output

Controller ID

Controller module ID: A or B.

Serial Number

- Serial number.
- Not Available: The controller module is down or not installed.

Hardware Version

Hardware version.

CPLD Version

Complex Programmable Logic Device firmware version.

MAC Address

Network port MAC address.

WWNN

Storage system World Wide Node Name (WWNN).

IP Address

Network port IP address.

IP Subnet Mask

Network port IP subnet mask.

IP Gateway

Network port gateway IPv4 address.

IP6 Link Local

The link-local IPv6 address.

IP6 Link Local GW

The network port gateway IPv6 address.

Autoconfig

- enabled: Uses an IPv6 address computed by SLAAC and an address assigned by a DHCPv6 server, depending on the network configuration.
- disabled: Uses static IPv6 addresses set with the `add ipv6-address` command.

DHCPv6

The IP address assigned by a DHCPv6 server.

#### SLAAC IP Address

The IP address computed by SLAAC.

#### IP6 Auto Gateway

The IPv6 address of a gateway system (auto-discovered, not configured).

#### IP6 Address (1-4)

From one to four manually set IPv6 addresses. Only shown when the controller is set to manual IPv6 addressing.

#### IP6 Gateway (1-4)

From one to four manually set network-port gateway IPv6 addresses. Only shown when the controller is set to manual IPv6 addressing.

#### Disks

Number of disks in the storage system.

#### Disk Groups

Number of disk groups 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

#### Failed Over to This Controller

Indicates whether the partner controller has failed over to this controller:

- No: The partner controller has not failed over to this controller.
- Yes: The partner controller has either failed or been shut down, and its responsibilities have been taken over by this controller. There will be a delay between the time that the value of `Status` becomes `Down` for one controller and the time that the value of `Failed Over to This Controller` becomes `Yes` for the other controller. This time period is the time that it takes for a controller to take over the responsibilities of its partner.

#### Fail Over Reason

If `Failed Over to This Controller` is `Yes`, a reason for the failover appears; otherwise, `Not applicable` appears.



## Multi-core

Shows whether the controller module is using multiple processing cores.

- **Enabled:** Multiple cores are active.
- **Disabled:** A single core is active.

## Health

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

## Health Reason

If Health is not OK, a message describes the reason for the health state.

## Health Recommendation

If Health is not OK, a message describes recommended actions to resolve the 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.
- **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.

```
# show controllers
```

**Basetypes**

controllers

status

**See also**

show configuration

show frus

# show debug-log-parameters

## Description

Shows which debug message types are enabled (On) or disabled (Off) for inclusion in the Storage Controller debug log.

---

**NOTE** This command is for use by or with direction from technical support.

---

## Minimum role

monitor

## Syntax

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

## Output

For a description of each message type parameter, see `set debug-log-parameters`.

## Examples

Show debug log parameters.

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

## Basetypes

debug-log-parameters

status

## See also

```
set debug-log-parameters
```

# show degraded-disk-policy

## Description

Shows the policy settings to enact when the system determines that a disk is degraded.

## Minimum role

monitor

## Syntax

```
show degraded-disk-policy
```

## Output

Disk Error Notification

- Informational: Generate an event with Informational severity.
- Warning: Generate an event with Warning severity.
- None: Do not generate an event.

Disk Error Action

- Fail: Fail the disk.
- Reconstruct: Use a spare disk to reconstruct the degraded disk's disk group and then fail the degraded disk.
- None: Take no action.

## Examples

Show degraded-disk policy settings.

```
# show degraded-disk-policy
```

## Basetypes

degraded-disk-policy

status

## See also

set degraded-disk-policy

set degraded-disk-threshold

show degraded-disk-thresholds

# show degraded-disk-thresholds

## Description

Shows the configured criteria for the system to identify degraded disks.

If no parameter is specified, the command shows information for all degraded disks.

## Minimum role

monitor

## Syntax

```
show degraded-disk-thresholds  
    [name <threshold-name>]
```

## Parameters

name <threshold-name>

Optional. Specifies one of the following values (which identifies the disk tier and RAID redundancy level) for which to show information:

- `archive-single`: Archive tier, single redundancy RAID.
- `archive-dual`: Archive tier, dual redundancy RAID.
- `archive`: Archive tier, any RAID level.
- `standard-single`: Standard tier, single redundancy RAID.
- `standard-dual`: Standard tier, dual redundancy RAID.
- `standard`: Standard tier, any RAID level.
- `performance-single`: Performance tier, single redundancy RAID.
- `performance-dual`: Performance tier, dual redundancy RAID.
- `performance`: Performance tier, any RAID level.
- `all-single`: All disks, single redundancy RAID.
- `all-dual`: All disks, dual redundancy RAID.
- `all`: All disks, any RAID level.

Disk tiers are defined as:

- `archive`: Disks with rotation speeds below 10K RPM.
- `standard`: Disks with rotation speeds greater than or equal to 10K RPM.
- `performance`: SSDs.
- `all`: Disks are not differentiated by disk tier.

RAID redundancy levels are defined as:

- `single`: Disks used in a RAID level other than RAID 6.
- `dual`: Disks used in RAID 6.

## Output

Name

The threshold name.

Target

- Recoverable Errors: Soft errors (sense key 1).
- Unrecoverable Errors: Medium errors (sense key 3).

ThresholdA, ThresholdB, ThresholdC

Configured criteria for how many errors of the target type must occur within a certain time period for a disk to be considered degraded. The format is <period>.<duration>.<threshold-value>, where:

- <period>: Hour, day, or week.
- <duration>: A numeric value for the duration of the period.
- <threshold-value>: A numeric value for the threshold count.
- --: Threshold is not set.

ThresholdLifetime

Configured criteria for how many errors of the target type must occur for a disk to be considered degraded.

- <threshold-value>: A numeric value for the threshold count.
- --: Threshold is not set.

### Examples

Show information for all threshold names.

```
# show degraded-disk-thresholds
```

Show information for threshold name archive-single only.

```
# show degraded-disk-thresholds name archive-single
```

### Basetypes

```
degraded-disk-thresholds  
status
```

### See also

```
set degraded-disk-policy  
set degraded-disk-threshold  
show degraded-disk-policy
```

# show disk-affinity

## Description

Shows information about spare disks being used in disk-group reconstruction and copyback operations. Dedicated spares or global spares may be used.

## Minimum role

monitor

## Syntax

```
show disk-affinity
```

## Output

Location

The disk location in the format <enclosure-ID>.<slot-number>.

Serial Number

The serial number of the disk.

Disk Group

The name of the disk group that contains the disk.

Usage

- Available: The disk is available to be placed into service for a disk group (i.e., is a spare).
- Assigned: The disk is currently assigned to a disk group.

State

- From: Data is being copied from this disk to another disk.
- To: Data is being copied to this disk from another disk.
- N/A: This disk is not being used in a reconstruction or copyback operation.

Jobs

- CPYBK: The disk is being used in a copyback operation.
- PRERCON: The disk is being used in a preemptive reconstruct operation.
- RCON: The disk is being used in a reconstruct operation.
- Blank if no job is running.

Job%

- 0% to 99%: Percent complete of running job.
- Blank if no job is running (job has completed).

## Examples

Show disk information.

```
# show disk-affinity
```

**Basetypes**

disk-affinity  
status

**See also**

show disks  
show disk-groups



# show disk-group-statistics

## Description

Shows live performance statistics for disk groups.

The command shows 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.

Statistics shown only in API output are described in ["API basetype properties" on page 374](#).

## Minimum role

monitor

## Syntax

```
show disk-group-statistics  
    [disk-group <disk-group>]
```

## 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.

## 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.

### 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-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  
    [detail]  
    [pool <pool>]  
    [<disk-groups>]
```

## Parameters

detail

Optional. This parameter shows additional detail about disk groups.

pool <pool>

Optional. Specifies the name or serial number of the pool that contains the disk groups for which to show information. If this parameter is omitted, information is shown for disk groups in all pools.

---

**NOTE** For linear disk groups, the pool name is the disk group name (the disk group always occupies 100% of the pool).

---

<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

Name

The name of the disk group.

Blocksize

Shown by the `detail` parameter. The size of a block, in bytes.

Size

The capacity of the disk group, formatted to use the current base, precision, and units.

Free

The amount of free space in the disk group, formatted to use the current base, precision, and units.

Pool

The name of the pool that contains the disk group.

Own

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

Current Owner

Shown by the `detail` parameter. See `Own`.

#### Preferred Owner

Shown by the `detail` parameter. Controller that owns the disk group and its volumes during normal operation.

#### RAID

The RAID level of the disk group.

#### Disks

The number of disks in the disk group.

#### Interl Vols

The number of volumes in an interleaved disk group.

#### Stripe Parity Error Assessment on Read (SPEAR)

Shown by the `detail` parameter.

- **Disabled:** SPEAR is disabled for the disk group.
- **Enabled:** SPEAR is enabled for the disk group.

#### Spares

Shown by the `detail` parameter. For a linear disk group, the number of spares assigned to the disk group.

#### Chk

- For RAID levels except NRAID and RAID 1, the chunk size for the disk group.
- For NRAID and RAID 1, not applicable (N/A).

#### Chunk Size

Shown by the `detail` parameter. See `Chk`.

#### 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.
- **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.

#### Current Job

- CPYBK: The disk group is being used in a copyback operation.
- DRSC: A disk is being scrubbed.
- EXPD: The disk group is being expanded.
- INIT: The disk group is initializing.
- PRERCON: At least one disk in the disk group is being preemptively reconstructed.
- QDAR: The ADAPT disk group is being recovered.
- RBAL: The ADAPT disk group is being rebalanced.
- RCON: At least one disk in the disk group is being reconstructed.
- VRFY: The disk group is being verified.
- VRSC: The disk group is being scrubbed.
- Blank if no job is running.

#### Job%

- 0% to 99%: Percent complete of running job
- Blank if no job is running (job has completed)

#### Current Job Completion

Shown by the detail parameter. See Job%.

#### Serial Number

Shown by the detail parameter. The serial number of the disk group.

#### Active Drive Spin Down Enable

Shown by the detail parameter. Not applicable.

#### Active Drive Spin Down Delay

Shown by the detail parameter. Not applicable.

#### Sec Fmt

The sector format of disks in the disk group.

- 512n: All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.
- 512e: All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.
- 4K: All disks use 4096-byte native sector size. Each logical block and physical block is 4096 bytes.
- 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).

#### Sector Format

Shown by the detail parameter. See Sec Fmt.

#### Stripe Width

Shown by the detail parameter. For an ADAPT disk group, this specifies the stripe width to use.

- 8+2: Each stripe contains 8 data chunks and 2 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 12 disks. This option is the default.
- 16+2: Each stripe contains 16 data chunks and 2 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 20 disks. This option has less overhead, but also less redundancy, than the 8+2 option.
- 8+3: Each stripe contains 8 data chunks and 3 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 12 disks. This option provides the best reliability.
- 16+3: Each stripe contains 16 data chunks and 3 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 20 disks. This option provides better reliability than both 8+2 and 16+2 and has less overhead than both 8+2 and 8+3.

#### Target Spare Capacity

Shown by the `detail` parameter.

- `<size>`: The target spare capacity in GiB. If the value is 0, the absolute minimum spare space will be used.
- `default`: The target spare capacity will be the sum of the two largest disks in the disk group, which is sufficient to fully recover fault tolerance after loss of any two disks in the group.
- For a non-ADAPT disk group, N/A.

#### Actual Spare Capacity

Shown by the `detail` parameter.

- For an ADAPT disk group, the actual spare capacity in GiB.
- For a non-ADAPT disk group, N/A.

#### Critical Disk Capacity

Shown by the `detail` parameter. For an ADAPT disk group, the amount of storage space that is not currently protected against disk loss, in GiB. (Normally all data is protected against loss of two disks.)

#### Degraded Disk Capacity

Shown by the `detail` parameter. For an ADAPT disk group, the amount of storage space that is protected against loss of a single disk only, in GiB. (Normally all data is protected against loss of two disks.)

#### Linear Volume Partition Boundary

Shown by the `detail` parameter. The block size by which volumes are aligned in a linear ADAPT disk group. Disk group space is allocated in multiples of this size to such volumes.

#### Metadata Size

Shown by the `detail` parameter. The amount of metadata the disk group is currently using.

#### Health

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

#### Reason

If Health is not OK, a message describes the reason for the health state.

Health Reason

Shown by the `detail` parameter. See Reason.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

Health Recommendation

Shown by the `detail` parameter. See Action.

### Examples

Show information about all disk groups.

```
# show disk-groups
```

Show information about disk group dg0002.

```
# show disk-groups dg0002
```

Show additional information about disk group dg0002.

```
# show disk-groups dg0002 detail
```

### Basetypes

disk-groups

status

### See also

show disks

show pools

# 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.
- **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 value cannot be changed.

Timeout Retry Maximum

Maximum number of times a timed-out I/O operation can be retried before the operation is failed. This value cannot be changed.

Attempt Timeout

Number of seconds before an I/O operation is aborted and possibly retried. This value cannot be changed.

Overall Timeout

Total time in seconds before an I/O operation is failed regardless of the `Attempt Timeout` and `Timeout Retry Maximum` settings. This value cannot be changed.

Remanufacture

Shows whether the Autonomous Drive Regeneration (ADR) feature is enabled or disabled. ADR attempts remanufacture of a disk drive that experiences a head failure. ADR is supported only for ADAPT disk groups.

## Examples

Show disk settings.

```
# show disk-parameters
```

## Basetypes

drive-parameters

status

## See also

```
set disk-parameters
```



# 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 API output are described in ["API basetype properties" on page 374](#).

## Minimum role

monitor

## Syntax

To show live statistics:

```
show disk-statistics
    [error-stats]
    [<disks>]
```

To show historical statistics:

```
show disk-statistics
    all
    [count <number-of-data-samples>]
    [filename <filename>.csv]
    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.

`error-stats`

Optional. Specifies to show live error statistics for all disks or specified disks. If you specify this parameter, do not specify the `all`, `count`, `historical`, or `time-range` parameters.

`filename <filename>.csv`

Optional. Specifies to save historical statistics, in CSV format, to a file on the controller. To access the file, use SFTP/FTP.

`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 for live statistics. Required for historical statistics. Specifies a comma-separated list of disks for which to show information. If this parameter is omitted, information will be shown for all disks. For disk syntax, see "[Command syntax](#)" on [page 21](#).

## Output

### Live output

Location

The disk location in the format <enclosure-ID>.<slot-number>.

Serial Number

The serial number of the disk.

Pwr Hrs

The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.

Bps

The data transfer rate, in bytes per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

IOPS

The number of input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.

Reads

The number of read operations since these statistics were last reset or since the controller was restarted.

Writes

The number of write operations since these statistics were last reset or since the controller was restarted.

Data Read

The amount of data read since these statistics were last reset or since the controller was restarted.

Data Written

The amount of data written since these statistics were last reset or since the controller was restarted.

Lifetime Read

The amount of data read from the disk in its lifetime.

Lifetime Written

The amount of data written to the disk in its lifetime.

Reset Time

Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when these statistics were last reset, either by a user or by a controller restart.

## Live output with the `error-stats` parameter

Location

The disk location in the format `<enclosure-ID>.<slot-number>`.

Serial Number

The serial number of the disk.

SMART `<port#>`

The number of SMART events recorded.

Time `<port#>`

The number of timeouts accessing the disk.

NResp `<port#>`

The number of times the disk did not respond.

Spin `<port#>`

The number of attempts by the storage system to spin up the disk.

Med `<port#>`

The number of media errors generated by the disk, as specified by its manufacturer.

NMed `<port#>`

The number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.

BAsgn `<port#>`

The number of times blocks were reassigned to alternate locations.

BBlk `<port#>`

The number of bad blocks encountered.

## Historical output

Durable ID

The disk ID in the format `disk_<enclosure-number>.<disk-number>`.

Serial Number

The serial number of the disk.

Total I/Os

The total number of read and write operations since the last sampling time.

Reads

Shown by the `all` parameter. The number of read operations since the last sampling time.

Writes

Shown by the `all` parameter. The number of write operations since the last sampling time.

Data Transferred

The total amount of data read and written since the last sampling time.

Data Read

Shown by the `all` parameter. The amount of data read since the last sampling time.

Data Written

Shown by the `all` parameter. The amount of data written since the last sampling time.

Total IOPS

The total number of read and write operations per second since the last sampling time.

Read IOPS

Shown by the `all` parameter. The number of read operations per second since the last sampling time.

Write IOPS

Shown by the `all` parameter. The number of write operations per second since the last sampling time.

Total B/s

The total data transfer rate, in bytes per second, since the last sampling time.

Read B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for read operations since the last sampling time.

Write B/s

Shown by the `all` parameter. The data transfer rate, in bytes per second, for write operations since the last sampling time.

Queue Depth

Shown by the `all` parameter. The average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.

I/O Resp Time

The average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time

Shown by the `all` parameter. The average response time, in microseconds, for write operations since the last sampling time.

Average I/O Size

Shown by the `all` parameter. The average data size of read and write operations since the last sampling time.

Average Read I/O Size

Shown by the `all` parameter. The average data size of read operations since the last sampling time.

Average Write I/O Size

Shown by the `all` parameter. The average data size of write operations since the last sampling time.

Number of Disk Errors

Shown by the `all` parameter. The total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.

Sample Time

Date and time, in the format `<year>-<month>-<day> <hour>:<minutes>:<seconds>`, when the data sample was taken.

## Examples

Show live statistics for disks 1.1 and 2.1.

```
# show disk-statistics 1.1,2.1
```

Show live error statistics for all disks.

```
# show disk-statistics error-stats
```

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 disks

## Description

Shows information about all disks or disk slots in the storage system.

The command will show information about all installed disks by default, or you can use parameters to filter the output.

---

**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.

---

If a disk is undergoing an erase operation, the command reports the disk as `UNUSABLE`, with a health condition of `Degraded`. The `Jobs` field shows `ERASE`.

## Minimum role

monitor

## Syntax

To show information about disks:

```
show disks
  [disk-group <disk-groups>] | [<disks>]
  [detail] | [fde] | [perf] | [protection-info] | [temp]
```

To show information about disks having specific Usage values:

```
show disks usage available|failed|leftover|pool|spares|unusable
```

To show information about all disk slots:

```
show disks encl
```

To show information about disk firmware status:

```
show disks firmware
```

## Parameters

detail

Optional. This parameter shows additional detail about the disk.

If a disk is undergoing an erase operation, the output detail shows the `ERASE` job and related information: disk Usage is `UNUSABLE`; Remanufacture status is shown; Health is set to `Degraded`; Health Reason and Health Recommendation are described.

```
disk-group <disk-groups>
```

Optional. A comma-separated list of the names or serial numbers of disk groups for which to show disk 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

Optional. For all or specified disks, this option shows Full Disk Encryption information. Information shown includes the FDE state and lock key ID.

firmware

Optional. Displays firmware status and version details of each disk in the storage system.

perf

Optional. For all or specified disks, this parameter shows performance statistics from the latest historical sample for each disk. Statistics shown include total I/Os (reads and writes), total amount of data transferred, and average I/O response time.

protection-info

Optional. For all or specified disks, this option shows whether each disk is formatted for PI operation.

temp

Optional. Shows the temperature for all installed disks.

usage available|failed|leftover|pool|spares|unusable

Optional. Shows information about disks having specific Usage values:

- available: Disks whose usage is AVAIL.
- failed: Disks whose usage is FAILED.
- leftover: Disks whose usage is LEFTOVR.
- pool: Disks whose usage is LINEAR POOL.
- spares: Disks whose usage is DEDICATED SP or GLOBAL SP.
- unusable: Disks whose usage is UNUSABLE.

For explanation of usage values, see the Usage property description below.

You cannot use this parameter with any other parameter.

<disks>

Optional. A comma-separated list of the IDs or serial numbers of disks about which to show information. For disk syntax, see ["Command syntax" on page 21](#).

## Output

Properties are described in alphabetical order.

Assurance Level

Shown by the `detail` parameter. The method configured to be used for data erasure.

- Secure: Performs data erasure using cryptographic erase based on the Subsystem Security Class method that applies to the system's SED (FDE-capable) drives.
- Sanitize: Performs data erasure with the `SANITIZE` SCSI command, using the system's SAS interface.

---

**NOTE** The `Sanitize` option is not available on storage systems that consist of SATA drives.

---

- Unsupported: The disk doesn't support assurance level options.

Copyback State

Shown by the `detail` parameter. The state of the disk (source or destination) if it is involved in a copyback operation.

- From: This disk is being used as the source of a copyback operation.
- To: This disk is being used as the target of a copyback operation.
- N/A: This disk is not being used in a copyback operation.

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 `encl` or `perf` parameter.

- `SATA`: SATA disk.
- `SAS`: Enterprise SAS spinning disk.
- `SATA-S`: Single-ported SATA disk.
- `SSD SAS`: SAS solid-state disk.
- `SAS MDL`: Midline SAS spinning disk.

#### Disk Group

Shown by default or by the `detail` parameter. The name of the disk group that contains the disk.

#### Drive Spin Down Count

Shown by the `detail` parameter. The number of times the DSD feature has spun down this disk.

#### Encl

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

#### FDE State

Shown by the `detail` or `encl` 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, FIPS`: The system is secured to the FIPS standard and the disk is unlocked.
- `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.

#### FIPS Capable

Shows whether the disk can be secured with Federal Information Processing Standards (FIPS).

#### Firmware Update Status

Shown by the `firmware` parameter. Indicates the update status of drive firmware on each drive after the user has run `activate disk-firmware`.

- `Unsupported`: The drive model is not in the user-specified model list, or there is no model list because `activate disk-firmware` has not been run.
- `Updated`: Current drive firmware revision matches the uploaded firmware file version and the disk model is in the user-specified model list.
- `Not Updated`: The disk model is in the user-specified model-list but the current firmware does not match the version of the uploaded drive firmware.
- `N/A`: No drive firmware update file has been uploaded to the controller.

#### Health

Shown by default or by the `detail` or `encl` or `perf` parameter.



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

#### Health Reason

Shown by the `detail` parameter. If Health is not OK, a message describes the reason for the health state.

#### Health Recommendation

Shown by the `detail` parameter. If Health is not OK, a message describes recommended actions to resolve the issue.

#### I/O Resp Time

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

#### Jobs

Shown by default.

- CPYBK: The disk is being used in a copyback operation.
- DRSC: The disk is being scrubbed.
- ERASE: The disk is being erased.
- EXPD: The disk group is being expanded.
- INIT: The disk group is being initialized.
- PRERCON: The disk is being used in a preemptive reconstruct operation.
- RBAL: The ADAPT disk group is being rebalanced.
- RCON: The disk is being used in a reconstruct operation.
- REFT: The ADAPT disk group's fault-tolerant stripes are being rebalanced.
- RMAN: The disk in an ADAPT disk group that is being remanufactured.
- 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.
- ID: The disk's identification LED is illuminated.
- Remove: The disk is ready to be removed from the enclosure.
- Blank if the disk is not part of a disk group or is spun down.

#### Location

Shown by default and by any parameter except `encl`. The disk location in the format `<enclosure-ID>.<slot-number>`.

#### Lock Key ID

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

#### Model

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

#### PI-Formatted

Shown by the `detail` or `protection-info` parameter.

- **Yes:** Formatted for PI operation.
- **No:** Not formatted for PI operation.
- **Unsupported:** Cannot support PI operation.

#### 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 `encl` or `perf` or `firmware` parameter. The firmware revision number.

#### Revision

Shown by the `detail` parameter. See `Rev`, above.

#### Sec Fmt

Shown by default or by the `detail` or `encl` or `perf` or `temp` 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.
- **4K:** All disks use 4096-byte native sector size. Each logical block and physical block is 4096 bytes.

#### Sector Format

Shown by the `detail` parameter. See `Sec Fmt` above.

#### 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 `encl` 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.
- `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 `encl` 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% to 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.

#### Supports Unmap

Shown by the `detail` parameter. Shows whether the disk supports the SCSI UNMAP command.

#### 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.

#### 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 Gb/s. A footnote indicates that it is normal behavior for the rate to vary.

Some 6Gb/s disks might not consistently support a 6Gb/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3Gb/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.

#### Usage

Shown by default or by the `detail` or `protection-info` parameter.

- **AVAIL:** Available
- **DEDICATED SP:** The disk is a spare assigned to a linear disk group.
- **FAILED:** The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.
- **GLOBAL SP:** The disk is a global spare.
- **LEFTOVR:** The disk is a leftover.
- **LINEAR POOL:** The disk is a member of a linear disk group.
- **UNUSABLE:** The disk cannot be used in a disk group. Possible reasons include:
  - The system is secured and the disk is data locked with a different passphrase.
  - The system is secured/locked (no passphrase available) and the disk is data/locked.
  - The system is secured and the disk is not FDE capable.
  - The disk is from an unsupported vendor.
  - The disk is being erased.

#### Vendor

Shown by default and by any parameter except `protection-info` or `temp`. The vendor of the disk.

### Examples

Show disk information.

```
# show disks
```

Show disk-slot information.

```
# show disks encl
```

Show disk performance statistics.

```
# show disks perf
```

Show Full Disk Encryption information.

```
# show disks encl
```

Show disk temperature information.

```
# show disks temp
```

Show disk-protection information.

```
# show disks protection-info
Show detailed information for disk 1.1:
# show disks 1.1 detail
Show information about available disks only:
# show disks usage available
```

**Basetypes**

```
drives
enclosure-list
status
```

**See also**

```
show disk-groups
```

# show dns-management-hostname

## Description

Shows the management hostname for each controller module.

If DNS server functionality is operational and reachable by the controller's nslookup service, the FQDN for each controller is also shown. If nslookup output is not available, the domain name will be blank.

## Minimum role

monitor

## Syntax

```
show dns-management-hostname
```

## Output

Controller

The controller ID: A or B.

DNS management-hostname

The controller's management hostname.

Domain Name (DNS)

The controller's FQDN, if available.

## Examples

Show the management hostname for each controller module.

```
# show dns-management-hostname
```

## Basetypes

mgmt-hostnames

status

## See also

```
clear dns-parameters
```

```
set dns-management-hostname
```

```
reset dns-management-hostname
```

```
set dns-parameters
```

```
show dns-parameters
```

# show dns-parameters

## Description

Shows configured DNS settings for each controller module.

## Minimum role

monitor

## Syntax

```
show dns-parameters  
    [controller a|b|both]
```

## Parameters

controller a|b|both

Optional. Specifies whether to show addresses for controller A, controller B, or both. If this parameter is omitted, information is shown for both controllers.

## Output

Controller

The controller ID: A or B.

Name Servers

Configured name server IP address values.

Search Domains

Configured domain name values.

## Examples

Show the system's DNS settings.

```
# show dns-parameters
```

## Basetypes

dns-parameters

status

## See also

clear dns-parameters

set dns-parameters

set email-parameters

show email-parameters

# 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.
- Enabled: Email notification is enabled.

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.

Security Protocol

- TLS: Transport Layer Security (TLS) authentication is enabled.
- SSL: Secure Sockets Layer (SSL) authentication is enabled.
- None: No authentication is enabled.

Server Port

The port on which the configured SMTP server is listening. This is either automatically configured to a default setting by the system, or has been overridden by the user.

Email Server

The IP address or domain name 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.

Email Sender Password

The sender password. For a configured sender, the password is represented by eight asterisks.

Alert Notification

Shows the filter for which alert notifications will be sent:

- all: Sends notifications for all alerts.
- none: Disables email notification for alerts.



### Event Notification

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.
- `resolved`: Sends notifications for Resolved, Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables email notification and clears the settings.

This parameter does not apply to managed-logs notifications.

### 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.

### Examples

Show settings for email notification.

```
# show email-parameters
```

### Basetypes

```
email-parameters  
status
```

### See also

```
set dns-parameters  
set email-parameters  
show dns-parameters
```

# show enclosures

## Description

Shows information about the enclosures in the storage system. Full detail available in 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.

Top Level Assembly Part Number

The enclosure TLA part number, if present.

GEM Version <controller-ID>

The GEM firmware component version in each controller's Expander Controller.

Midplane Type

An abbreviation that describes the enclosure midplane's rack-unit height, maximum number of disks, maximum data rate to disks (Gb/s), and hardware version.

Health

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

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

#### Baseplane information

Encl

The number of the enclosure.

Baseplane ID

The number of the baseplane.

Name

The name of the baseplane.

Health

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

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

#### Examples

Show information about all enclosures in the system.

```
# show enclosures
```

#### Basetypes

enclosures

status

#### See also

set enclosure

show sensor-status

# show event-subscriber

## Description

Shows event subscribers used by the Redfish interface.

## Minimum role

monitor

## Syntax

```
show event-subscriber  
    [<subscriber-ID>]
```

## Parameters

<subscriber-ID>

Optional. Shows information for a specific event subscriber. If an invalid event subscriber is specified, the command shows an empty table instead. If this parameter is omitted, information is shown for all subscribers.

## Output

Destination

The subscription destination.

Protocol

The subscription protocol: Redfish.

Context

The subscription context.

Subscription Type

The subscription type.

Subscription ID

The subscriber ID generated by the system when the subscriber is added.

Registry Prefix

The registry prefix.

Resource Type

The resource type.

Delivery Retry Policy

The delivery retry policy.

Controller

The controller on which the subscriber was added: A or B. This has no effect on which controller issues notifications.

## Examples

Show all subscribers.

```
# show event-subscriber
```

Show information for event-subscriber-1.

```
# show event-subscriber event-subscriber-1
```

## Basetypes

event-subscriber

status

**See also**

add event-subscriber  
delete event-subscriber  
set event-subscriber

# 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 <number-of-events>]
  [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, but not Informational or Resolved 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, 043020235900 represents April 30 2020 at 11:59:00 PM. 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 <number-of-events>`

Optional. Shows the specified number of most recent 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, `043020235900` represents April 30 2020 at 11:59:00 PM. 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: `[3]`
- 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:
  - `INFORMATIONAL`: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
  - `WARNING`: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.
  - `ERROR`: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
  - `CRITICAL`: A failure occurred that may cause a controller to shut down. Correct the problem *immediately*.
  - `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 2020 at 11:59:00 PM through May 2 2020 at 11:59:00 AM.

```
# show events from 043020235900 to 050220115900
```

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 from-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.

---

**NOTE** This command is 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  
    [stats]
```

## Parameters

stats

Optional. Shows PHY error statistics.

## Output

Encl

The enclosure that contains the SAS expander.

Baseplane

The number of the baseplane.

Expander

The number of the 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.
- SC-P: Storage Controller primary PHY.
- SC-A: Storage Controller alternate 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 PHYs when the partner I/O module is not installed. Appears for Drive, SC, or Ingress PHYs when a connection problem exists such as a broken connector.
- **Firmware reboot:** PHY disabled because of a firmware reboot.
- **Disk 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.
- **Did not initialize:** PHY is enabled but not ready because it did not pass COMINIT.

#### Change Cnt

Shown by the `stats` parameter. The number of times the PHY originated a `BROADCAST (CHANGE)`. A `BROADCAST (CHANGE)` is sent if doubleword synchronization is lost or at the end of a Link Reset sequence.

#### Code Viol

Shown by the `stats` parameter. The number of times the PHY received an unrecognized or unexpected signal.

#### Disparity

Shown by the `stats` parameter. 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.

#### CRC Errors

Shown by the `stats` parameter. In a sequence of SAS transfers (frames), the data is protected by a cyclic redundancy check (CRC) value. The `CRC Errors` value specifies the number of times the computed CRC does not match the CRC stored in the frame, which indicates that the frame might have been corrupted in transit.

#### Conn CRC

Shown by the `stats` parameter. The number of times the lane between two expanders experienced a communication error.

Lost DWORD

Shown by the `stats` parameter. The number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.

InvlD DWORD

Shown by the `stats` parameter. The number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.

ResErrCnt

Shown by the `stats` parameter. The number of times the expander performed a reset of error counters.

Flag Bits

Shown by the `stats` parameter. PHY status bits, for internal use.

### Examples

Show expander status for each enclosure.

```
# show expander-status
```

### Basetypes

```
sas-status-controller-a  
status
```

### See also

```
clear expander-status
```

# show fan-modules

## Description

Shows information about each fan module in the storage system.

To see information about both fans in each fan module, use the `show fans` command.

## Minimum role

monitor

## Syntax

```
show fan-modules
```

## Output

Encl

The ID of the enclosure that contains the fan module.

Id

The fan module position, shown as an index value that starts at 0 and increments from left to right as viewed from the back of the enclosure.

Name

The name of the fan module.

Health

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

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

## Examples

Show about all fan modules in the system.

```
# show fan-modules
```

## Basetypes

fan-modules

status

## See also

`show fans`

`show power-supplies`

# show fans

## Description

Shows information about each fan in the storage system.

To see information about the fan modules that contain each pair of fans, use the `show fan-modules` command.

## Minimum role

monitor

## Syntax

```
show fans
```

## Output

Name

The fan name.

Location

The fan location in 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:

- N/A

Serial Number

The fan serial number, if available.

Part Number

The fan part number, if available.

Firmware Version

The firmware revision of the fan FRU, if available.

Hardware Version

The hardware revision of the fan FRU, if available.

Health

- OK
- Degraded
- Fault

- Unknown
- N/A

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

### **Examples**

Show about all fans in the system.

```
# show fans
```

### **Basetypes**

fan

status

### **See also**

```
show power-supplies
```

# show fde-state

## Description

Shows full disk encryption information for the storage system.

---

**NOTE** If you insert an FDE disk into a secured system and the disk does not come up in the expected state, perform a manual rescan by using the `rescan` command.

---

## Minimum role

monitor

## Syntax

```
show fde-state
```

## Output

FDE Security Status

- Secured. The system is secured with a passphrase using FDE.
- Secured FIPS: The system is secured with a passphrase to the FIPS standard.
- Secured, Lock Ready. The system is secured and lock keys have been cleared. 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.
- Unsecured. The system is not secured with a passphrase.

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

status

## See also

clear fde-keys

set fde-import-key

set fde-lock-key

set fde-state

# show fenced-data

## Description

Shows information about fenced data blocks in the storage system.

The command will show information for all fenced blocks by default, or you can use parameters to filter the output.

Fenced data blocks are blocks of data on disk which, for either of the following reasons, cannot be recovered and have been lost:

- Typically, fenced data occurs when a disk in a non-fault-tolerant disk group detects an unrecoverable media error.
- Fenced data can also occur if multiple unrecoverable blocks are detected which exceed the capacity of the RAID error-recovery algorithms.

Unrecoverable data blocks are "fenced" by marking them unreadable by the storage system. A data block remains fenced until the host writes the block, at which time it is again accessible.

For NRAID and RAID 0, fenced data is not tracked. Errors are returned directly during host reads.

For RAID 1 and 10, fenced blocks correspond with the data blocks where unrecoverable errors are detected, normally when a disk group is not fault tolerant and the remaining good disk has a media error.

For RAID 3, 5, 6, 50, and ADAPT for linear storage, a single unrecoverable error detected while not fault tolerant can result in two or more blocks being fenced. This is because each parity block protects multiple data blocks. Thus, for RAID 3, 5, and 50, if a block returns an unrecovered error during reconstruction, that block is lost (because it cannot be read). The block being reconstructed is also lost because there is not enough information to reconstruct the data for that block. RAID 6 and ADAPT will similarly mark multiple bad blocks if a combination of failed disks and media errors results in unrecoverable data.

When the controller module fences data, it logs events 542 and 543.

## Minimum role

monitor

## Syntax

```
show fenced-data  
  [all]  
  [disk-groups <disk-groups>]  
  [volumes <volumes>]
```

## Parameters

all

Optional. Shows information about all fenced data blocks.

disk-groups <disk-groups>

Optional. The names or serial numbers of disk groups for which to show fenced data block information. A name that includes a space must be enclosed in double quotes.

volumes <volumes>

Optional for linear storage. The names or serial numbers of linear volumes for which to show fenced data block information. A name that includes a space must be enclosed in double quotes.

## Output

Volume Name

The volume name for which fenced data is reported.



Volume Serial Number

The volume serial number for which fenced data is reported.

Volume LBA

The LBA in the volume at which fenced data is reported.

Vdisk Name

The name of the disk group for which fenced data is reported.

Vdisk Serial Number

The serial number of the disk group for which fenced data is reported.

Vdisk LBA

The LBA in the disk group at which fenced data is reported.

### **Examples**

Show information about fenced data blocks for all volumes.

```
# show fenced-data all
```

### **Basetypes**

fenced-data

status

### **See also**

show disk-groups

show events

show volumes

# show firmware-bundles

## Description

Displays the active firmware bundle and an available firmware bundle stored in the system's controller modules.

The available bundle is either the previous active bundle or a bundle loaded by a user.

The active and available firmware bundles will be synchronized between partner controller modules.

To view information about available drive firmware that has been uploaded to the controller, use the `disk` parameter.

## Minimum role

monitor

## Syntax

```
show firmware-bundles  
    [disk]
```

## Parameters

`disk`

Optional. Displays drive firmware images stored in the controller.

---

**NOTE** To upload a drive firmware image to the controller, you must use either FTP or the SMC.

---

## Output

### Without a parameter

Bundle Version

Version name of the firmware bundle.

Build Date

Build date of the firmware bundle.

Status

Status of the firmware bundle. Status could be one of the following:

- **Active:** Indicates that the firmware is actively running on the controller.
- **Available:** Indicates that the firmware is installed on the controller, and is available to be activated.
- **Invalid:** Indicates that the firmware is invalid due to compatibility or signature failure or was not activated in a previous activation attempt.
- **Inactive:** Indicates an inactive bundle.

Health

Health of the firmware bundle. Health could be one of the following:

- **OK:** Indicates that this firmware is actively running on the controller.
- **Degraded:** Indicates that this firmware is incomplete or not in sync with the partner controller.
- **Failed:** Indicates that firmware is corrupted or incompatible or some components failed to load correctly.

Reason

If `Health` is not `OK`, a message describes the reason for the health state..

Action

If Health is not OK, a message describes recommended actions to resolve the issue..

#### **With the disk parameter**

Bundle Name

The name of drive firmware image stored in the controller.

Rev

The revision number of the drive firmware image.

Status

Status of the drive firmware image. Status could be:

- Active: The firmware has been activated in some or all of the supported drives.
- Available: The firmware is installed on the controller and available to activate.

#### **Examples**

Show firmware bundles.

```
# show firmware-bundles
```

#### **Basetypes**

```
firmware-bundles
```

```
status
```

#### **See also**

```
activate disk-firmware
```

```
activate firmware
```

```
show firmware-update-status
```

```
show versions
```

# show firmware-update-status

## Description

Displays the current status of any firmware update on the system.

## Minimum role

monitor

## Syntax

```
show firmware-update-status
```

## Output

Summary information including the type of activity, start time, completion time, estimated time to completion, percent completed, completion status, bundle version, and details about each process step.

## Examples

Show firmware update status on the system.

```
# show firmware-update-status
```

## Basetypes

```
update-status-summary  
status
```

## See also

```
activate firmware  
show firmware-bundles
```

# show frus

## Description

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

## Minimum role

monitor

## Syntax

```
show frus  
    [secrets]
```

## Parameters

secrets  
Optional. Shows additional information about the midplane.

## Output

### Output without the secrets parameter

Name

- CHASSIS\_MIDPLANE: Chassis and midplane circuit board
- RAID\_IOM: Controller module
- DISK\_EXPANDER: Disk expander

Description

The FRU description.

Part Number

The FRU part number.

Serial Number

The FRU serial number.

Revision

The hardware revision level.

Dash Level

The FRU template revision number.

FRU Shortname

A short description of the FRU.

Manufacturing Date

The date and time in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> when a PCBA was programmed or a power supply module was manufactured.

Manufacturing Location

The city, state/province, and country where the FRU was manufactured.

Manufacturing Vendor ID

The JEDEC ID (global manufacturing code) of the manufacturer.

#### FRU Location

The location of the FRU in the enclosure.

- MID-PLANE SLOT: Chassis midplane.
- LEFT IOM SLOT: Controller module or expansion module A, in the left slot as viewed from the back.
- RIGHT IOM SLOT: Controller module or expansion module B, in the right slot as viewed from the back.
- LEFT PSU SLOT: Power supply module on the left, as viewed from the back.
- RIGHT PSU SLOT: Power supply module on the right, as viewed from the back.
- LEFT 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.

#### Configuration SN

The configuration serial number.

#### FRU Status

- Absent: The FRU is not present.
- Fault: The FRU's health is Degraded or Fault.
- Invalid Data: The FRU ID data is invalid. The FRU's EEPROM is improperly programmed.
- OK: The FRU is operating normally.
- Power OFF: The FRU is powered off.

#### Enclosure ID

The enclosure number.

#### Output with the `secrets` parameter

##### FRU ID OUI

Organizationally Unique Identifier of the midplane.

- `<value>`: The OUI.
- `unassigned`: No OUI assigned.

##### FRU ID Revision Level

Revision level of the midplane.

- `<value>`: The FRU ID revision level.
- `unassigned`: No FRU ID revision level assigned.

##### Supplier Part Number

Part number assigned to the midplane by the supplier.

- `<value>`: The supplier part number.
- `unassigned`: No supplier part number assigned.

##### Supplier Serial Number

Serial number assigned to the midplane by the supplier.

- <value>: The supplier serial number.
- unassigned: No supplier serial number assigned.

Top Level Assembly Part Number

Part number assigned to the top level assembly.

- <value>: The top-level assembly part number.
- unassigned: No top-level assembly part number assigned.

Top Level Assembly Serial Number

Serial number assigned to the top level assembly.

- <value>: The top-level assembly serial number.
- unassigned: No top-level assembly serial number assigned.

OEM Part Number

Part number assigned to the midplane by the OEM.

- <value>: The OEM part number.
- unassigned: No OEM part number assigned.

OEM Serial Number

Serial number assigned to the midplane by the OEM.

- <value>: The OEM serial number.
- unassigned: No OEM serial number assigned.

SCSI Vendor ID

Vendor name returned by the SCSI INQUIRY command.

- <value>: The SCSI vendor ID.
- unassigned: No SCSI vendor ID assigned.

SCSI Product ID

Product identifier returned by the SCSI INQUIRY command.

- <value>: The SCSI product ID.
- unassigned: No SCSI product ID assigned.

### Examples

Show information about all FRUs in the system.

```
# show frus
```

Show additional information about the midplane:

```
# show frus secrets
```

### Basetypes

```
enclosure-fru
```

```
enclosure-fru-secrets
```

```
status
```

# show host-groups

## Description

Shows information about host groups and hosts.

The command will show information for all host groups (and hosts) by default, or you can use parameters to filter the output.

## Minimum role

monitor

## Syntax

```
show host-groups  
    [hosts <hosts>]  
    [groups <host-groups>]
```

## Parameters

hosts <hosts>

Optional. A comma-separated list of the names of hosts for which to show host and initiator information. If this parameter is omitted, information is shown for all hosts. A value that includes a space must be enclosed in double quotes.

groups <host-groups>

Optional. A comma-separated list of the names of host groups for which to show host-group, host, and initiator information. If this parameter is omitted, information is shown for all host groups. A value that includes a space must be enclosed in double quotes.

## Output

### Host group information

Name

The name of the host group.

Number of Members

The number of hosts in the host group.

### Host information

Name

The hostname.

Number of Members

The number of initiators in the host.

### Initiator information

Nickname

The nickname of the initiator.

Discovered

- Yes: The initiator was discovered and its entry was automatically created.
- No: The initiator was manually created.



Mapped

Shows whether the initiator is explicitly mapped to any volumes:

- Yes: At least one volume is explicitly mapped to the initiator.
- No: No volumes are explicitly mapped to the initiator.

Profile

- Standard: Default profile.
- HP-UX: The host uses Flat Space Addressing.
- OpenVMS: The initiator does not allow LUN 0 to be assigned to a mapping.

Host Type

The host-interface type: FC; iSCSI; SAS.

ID

For a SAS initiator, its WWPN.

### 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-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 to 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 API output are described in ["API basetype properties" on page 374](#).

## Minimum role

monitor

## Syntax

```
show host-port-statistics
    [ports <ports>]
```

## Parameters

ports <ports>

Optional. Specifies a comma-separated list of port IDs for which to show information. For port syntax, see ["Command syntax" on page 21](#). If this parameter is omitted, information is shown for all host ports.

## Output

Durable ID

The host port ID in the format `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 read operations, calculated over the interval since these statistics were last requested or reset.

Write Resp Time

The average response time in microseconds for 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 host-phy-statistics
```

```
show ports
```

# 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 a SCSI `INQUIRY` command or a SCSI `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 host groups 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.
- OpenVMS: The initiator does not allow LUN 0 to be assigned to a mapping.

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 group 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, vendor ID, and SCSI product 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 values and source

## Examples

Show inquiry data for controller modules in the system.

```
# show inquiry
```

## Basetypes

```
inquiry  
status
```

## See also

```
show versions
```

# show ipv6-addresses

## Description

Shows static IPv6 addresses assigned to each controller's network port.

## Minimum role

monitor

## Syntax

```
show ipv6-addresses  
[controller a|b|both]
```

## Parameters

controller a|b|both

Optional. Specifies whether to show addresses for controller A, controller B, or both. If this parameter is omitted, information is shown for both controllers.

## Output

Ctrl

The controller ID: A or B.

Index

The controller's index value for the address. The index is automatically assigned when adding a static IPv6 address.

Label

The name assigned to the address, or blank if the address is unnamed.

IPv6 Address

The IPv6 address with prefix length.

## Examples

Show static IPv6 addresses assigned to controller A.

```
# show ipv6-addresses controller a
```

## Basetypes

```
ipv6-addresses  
status
```

## See also

```
add ipv6-address  
remove ipv6-address  
set ipv6-network-parameters  
show ipv6-network-parameters
```



# show ipv6-network-parameters

## Description

Shows the IPv6 settings and health of each controller module's network port.

## Minimum role

monitor

## Syntax

```
show ipv6-network-parameters  
[controller a|b|both]
```

## Parameters

controller a|b|both

Optional. Specifies whether to show addresses for controller A, controller B, or both. If this parameter is omitted, information is shown for both controllers.

## Output

Autoconfig

- **enabled:** Uses an IPv6 address computed by SLAAC and an address assigned by a DHCPv6 server, depending on the network configuration.
- **disabled:** Uses static IPv6 addresses set with the `add ipv6-address` command.

Gateway

The network port gateway IPv6 address.

Link-Local Address

The link-local IPv6 address.

DHCPv6

Shown if Autoconfig is enabled. The IP address assigned by a DHCPv6 server.

SLAAC IP Address

Shown if Autoconfig is enabled. The IP address computed by SLAAC.

IPv6 Address (1-4)

Shown if Autoconfig is disabled. Shows from one to four manually set IPv6 addresses.

IPv6 Label (1-4)

Shown if Autoconfig is disabled. Shows the user-defined name, if set, for each manual IPv6 address.

## Examples

Show IPv6 network parameters for each controller module.

```
# show ipv6-network-parameters
```

## Basetypes

```
ipv6-network-parameters  
status
```

## See also

```
set ipv6-network-parameters
```

# show ldap-parameters

## Description

Shows LDAP settings.

## Minimum role

monitor

## Syntax

```
show ldap-parameters
```

## Output

LDAP protocol

Shows whether LDAP support is enabled or disabled.

User Search Base

Attributes that define where to start searching for users in the LDAP directory tree.

LDAP Server

The IP address or domain name of the primary LDAP server.

LDAP Server Port

The port number to use for communication with the primary LDAP server.

Alternate LDAP Server

The address of the alternate LDAP server.

Alternate LDAP Server Port

The port number to use for communication with the alternate LDAP server.

## Examples

Show LDAP settings.

```
# show ldap-parameters
```

## Basetypes

ldap-parameters

status

## See also

```
set ldap-parameters
```

# 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, or blank if a license is not installed.

Licensing Serial Number

The serial number to use when requesting a license.

Maximum Licensable Snapshots

Not applicable.

Base Maximum Snapshots

Not applicable.

Licensed Snapshots

Not applicable.

In-Use Snapshots

Not applicable.

Snapshots Expire

Not applicable.

Volume Copy

Shows whether the capability to copy volumes is enabled or disabled.

Volume Copy Expires

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 information for all mapped 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. 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 initiators for which to show mappings. A name that includes a space must be enclosed in double quotes.

## Output

### Without the initiator parameter

Serial Number

The serial number of the volume.

Name

The name of the volume.

Ports

- The controller host ports to which the mapping applies.
- Blank if not mapped or mapped as no-access.

LUN

- The 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`: Read and write.
- `read-only`: Read only.
- `no-access`: No access (masked).
- `not-mapped`: Not mapped.

#### Identifier

- For a SAS initiator, its WWPN.

#### Nickname

- For a host, its name in the format `<hostname>.*`, 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.

#### Profile

- `Standard`: Default profile.
- `HP-UX`: The host uses Flat Space Addressing.
- `OpenVMS`: The initiator does not allow LUN 0 to be assigned to a mapping.

### With the `initiator` parameter

#### ID

For a SAS initiator, its WWPN.

#### Name

See the section above.

#### Profile

See the section above.

#### Volume

The name of the volume.

#### Serial Number

See the section above.

#### LUN

See the section above.

#### Access

See the section above.

#### Ports

See the section above.

### Examples

Show mappings for all volumes.

```
# show maps
```

Show mapping information for all initiators.

```
# show maps initiator
```

**Basetypes**

volume-view  
host-group-view (with the initiator parameter)  
status

**See also**

show host-groups  
show initiators  
show volumes

# 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 10Mb/s.
- **100mbps:** The network port link speed is set to 100Mb/s.
- **1000mbps:** The network port link speed is set to 1000Mb/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.

Auto Negotiation

- **Disabled:** Either the network port has not been set, or it has been unset because the controller module was removed from its enclosure, or the port is connected to a switch and is set to use the link speed and duplex mode shown by the `Link Speed` and `Duplex Mode` fields.
- **Enabled:** The network port is set to auto-negotiate a link speed (up to the maximum speed shown by the `Link Speed` field) and duplex mode with a connected Ethernet switch.

Health

The health of the network connection.

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

Health Reason

If Health is not OK, a message describes the reason for the health state.

Health Recommendation

If Health is not OK, a message describes recommended actions to resolve the issue..

Ping Broadcast

- Enabled: The system will respond to a broadcast ping.
- Disabled: The system will not respond to a broadcast ping.

### 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.

NTP Server Address

- The network address of the current NTP server if NTP is enabled.
- The network address of the last-set NTP server 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 pools

## Description

Shows information about pools.

## Minimum role

monitor

## Syntax

```
show pools  
    [<pool>]
```

## Parameters

<pool>

Optional. The name or serial number of the pool for which to show information. 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.

Blocksize

The size of a block, in bytes.

Total Size

The total capacity of the pool.

Avail

The available capacity in the pool.

Volumes

The number of volumes in the pool.

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.
- 4K: All disks use 4096-byte native sector size. Each logical block and physical block is 4096 bytes.
- 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
- Unknown
- N/A

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

### **Examples**

Show information about all pools.

```
# show pools
```

### **Basetypes**

```
pools  
status
```

### **See also**

```
delete pools  
set pool
```

# show ports

## Description

Shows information about host ports in each controller.

## Minimum role

monitor

## Syntax

```
show ports
    [detail]
    [<port>]
```

## Parameters

detail

Optional. This parameter shows additional detail about the port status, including SFP information.

<port>

Optional. Shows information about the specified port only. Specify a controller ID and port number (see Examples). If this input is omitted, information is shown for all ports.

## Output

Ports

Controller ID and port number

Media

- SAS: Serial Attached SCSI

Target ID

For a SAS port, its WWPN.

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 Gb/s.
- Blank if not applicable.

Speed (C)

- Configured host-port link speed in Gb/s. Not shown for SAS.
- Blank if not applicable

## Health

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

## Reason

If Health is not OK, a message describes the reason for the health state.

## Action

If Health is not OK, a message describes recommended actions to resolve the 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.

## 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.

## 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
```

Show information about a single host port in a specific controller module.

```
# show ports A1
```

**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.

Id

The power supply position, shown as an index value that starts at 0 and increments from left to right as viewed from the back of the enclosure

Serial Number

The serial number of the power supply, if available.

Part Number

The power supply part number, if available.

Name

The power supply identifier and location.

Firmware Version

The firmware revision of the power supply.

Health

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

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue..

## Examples

Show information about each power supply in each enclosure.

```
# show power-supplies
```

## Basetypes

power-supplies

status

**See also**

show fans

show frus



# show protocols

## Description

Shows which management services and protocols are enabled or disabled.

## Minimum role

monitor

## Syntax

```
show protocols
```

## Output

Web Browser Interface (HTTP)

Shows whether the standard SMC web server is enabled or disabled.

Secure Web Browser Interface (HTTPS)

Shows whether the secure SMC web server is enabled or disabled.

Command Line Interface (Telnet)

Shows whether the standard CLI is enabled or disabled.

Secure Command Line Interface (SSH)

Shows whether the secure shell CLI is enabled or disabled.

Service Location Protocol (SLP)

Shows whether the SLP interface is enabled or disabled.

File Transfer Protocol (FTP)

Shows whether the insecure interface for installing firmware updates, installing security certificates and keys, and downloading logs is enabled or disabled.

Secure File Transfer Protocol (SFTP)

Shows whether the secure interface for installing firmware updates, installing security certificates and keys, and downloading logs is enabled or disabled.

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.

Service Debug (Debug)

Shows whether the Telnet debug port is enabled or disabled.

SSH Port

Shows the port number used for SSH.

SFTP Port

Shows the port number used for SFTP.

## Examples

Show the status of service and security protocols.

```
# show protocols
```

## Basetypes

security-communications-protocols

status

**See also**

set protocols

# show provisioning

## Description

Shows information about how the system is provisioned.

This command shows the associations between controllers, disks, 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> | volumes <volumes>]
  [no-mapping]
  [unhealthy]
```

## Parameters

[disks <disks>

Optional. Shows provisioning information for the specified list of disks. For disk syntax, see ["Command syntax" on page 21](#).

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" on page 21](#).

This command does not support the use of hyphens to indicate a range of ports.

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 pools whose health is not OK. If this parameter is omitted, provisioning information is shown for all pools.

## Output

### Volume information

Volume

- Volume name.
- Blank if the pool does not have a volume.

WWN

- Volume World Wide Name.
- Blank if the pool does not have a volume.

Ctrl

Owning controller of the pool.

Disks

Shorthand list of the disks within a pool.

Pool

Pool name.

Health

Health of the associated pool:

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

Mapped

Indicates whether the volume is mapped. This is useful when the `no-mapping` parameter is specified to hide detailed mapping information.

- Yes: The volume is mapped.
- No: The volume is not mapped.

### Mapping information

Ports

- Controller host ports that the mapping applies to.
- Blank if not mapped or mapped as `no-access`.

## LUN

- LUN that identifies the volume to a host.
- Blank if not mapped or mapped as `no-access`.

## Access

Type of host access to the volume:

- `read-write`: The host has read and write access to the volume.
- `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.

## Identifier

- For an FC initiator, its WWPN.
- For a SAS initiator, its WWPN.
- For an iSCSI initiator, its node name (typically the IQN).

## Nickname

Host nickname.

## Profile

- `Standard`: Default profile.
- `HP-UX`: The host uses Flat Space Addressing.
- `OpenVMS`: The initiator does not allow LUN 0 to be assigned to a mapping.

## Examples

Show provisioning for the system.

```
# show provisioning
```

Show provisioning for all unhealthy disk groups.

```
# show provisioning unhealthy
```

## Basetypes

```
provisioning
status
```

## See also

```
show disk-groups
show disks
show maps
show pools
```

# show proxy-server

## Description

Shows proxy server settings.

## Minimum role

monitor

## Syntax

```
show proxy-server
```

## Output

Host

The proxy server address.

Ports

Proxy server port numbers, if set.

Proxy State

The proxy state, either `Enabled` or `Disabled`.

User

The username to access the proxy server, if set.

## Examples

Show proxy server settings.

```
# show proxy-server
```

## Basetypes

proxy-server

status

## See also

```
set proxy-server
```

# 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 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:** The partner Management Controller is responding normally.
- **Not Operational:** The local Management Controller has established communication with the partner Management Controller, but the partner is not responding because it's not currently in active-active or failed-over state.

- **Not Communicating:** The partner Management Controller is not ready to communicate.
- **Unknown:** The operational status of the partner Management Controller cannot be determined.

#### System Ready

Shows whether the system is ready for running a script.

- **Ready:** The system is ready.
- **Not Ready:** The system is not ready.

#### Local Controller Ready

Shows the local controller's contribution towards System Ready.

- **Ready:** The local controller is ready.
- **Storage Controller is Not Ready:** The Storage Controller is not ready.
- **Management Controller is Not Ready:** The Management Controller is not ready.
- **Activity is currently in progress:** A partner firmware update, firmware installation, or log retrieval is in progress. Wait for that operation to complete and try again.

#### Local Controller Reason

The explanation for Local Controller Ready.

#### Other Controller Ready

Shows the partner controller's contribution towards System Ready.

- **Ready:** The partner controller is ready.
- **Storage Controller is Not Ready:** The Storage Controller is not ready.
- **Management Controller is Not Ready:** The Management Controller is not ready.
- **Activity is currently in progress:** A partner firmware update, firmware installation, or log retrieval is in progress. Wait for that operation to complete and try again.

#### Other Controller Reason

The explanation for Other Controller Ready.

### Examples

Show the redundancy status of the system.

```
# show redundancy-mode
```

### Basetypes

```
redundancy
status
```



# show remote-systems

## Description

Shows information about remote systems associated with the local system.

## 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. A name that includes a space must be enclosed in double quotes. An address can be an IPv4 address, IPv6 address, or FQDN.

## 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 `standard` or `manage` role in the remote system.

Status

- **Uninitialized:** This system hasn't communicated with the remote system.
- **Ready:** This system has contacted the remote system and it is ready to use.

- **Connected:** This system is transferring data to the remote system.
- **Not Connected:** The system is not connected to the remote system.

Last Connected

Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when successful communication was last established between the Management Controller in the local system and the Management Controller in the remote system. This value does not indicate when connection status was last determined, and will not be updated if the remote Management Controller 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

```
delete remote-system
```

# show sas-link-health

## Description

Shows the condition of SAS expansion-port connections.

## Minimum role

monitor

## Syntax

```
show sas-link-health
```

## Output

Encl

The enclosure ID.

Ctlr

The ID of the controller module or expansion module.

Name

The expansion port name.

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
- Unknown
- N/A

Reason

If Health is not OK, a message describes the reason for the health state.

Action

If Health is not OK, a message describes recommended actions to resolve the issue.

## Examples

Show the condition of SAS expansion-port connections in each enclosure.

```
# show sas-link-health
```

## Basetypes

expander-ports

status

# show schedules

## Description

Shows information about task schedules.

## Minimum role

monitor

## Syntax

```
show schedules
  [detail]
  [<schedule-name>]
```

## Parameters

detail

Optional. Shows additional detail about each schedule, with some longer field names, in a vertical format. If this parameter is omitted, output is shown with some shorter field names in a horizontal format.

[<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

Name

Shown by default. The schedule name.

Schedule Name

Shown by the `detail` parameter. The schedule name.

Specification

Shown by default. The schedule settings for running the associated task.

Schedule Specification

Shown by the `detail` parameter. 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.

Last Initiated Time

Shown by the `detail` parameter. The date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when the schedule was last 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 has occurred.

Tasks

Shown by the `detail` parameter. Information about tasks and task details 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 information about each environmental sensor in each enclosure.

Information shown includes temperature, voltage, and current for applicable components, and voltage, charge, capacitance, and resistance for the controller module supercapacitor pack.

For temperature and voltage ranges (both normal and error), see your product's Hardware Installation and Maintenance 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 sessions

## Description

Shows information about user sessions on the storage system.

When an active session reaches its timeout (1800 seconds by default), the session will be marked as expired, and will be removed 30 seconds later. If you reset the system, all sessions will be removed.

This information is for reference as a security measure.

## Minimum role

standard

## Syntax

```
show sessions  
    [detail]
```

## Parameters

detail

Optional. Shows additional information about user sessions.

## Output

Username

The name of the user for which session information is shown.

Interface

Shows whether the session is using the CLI or the SMC.

Host

For a CLI session, the connected system's IP address and port number.

State

Shown by the `detail` parameter. Shows whether the session is active or expired.

Timeout

Shown by the `detail` parameter. The time in seconds that the session can be idle before it automatically ends.

Idle Time

The time in seconds that the session has been idle.

First Access

Shown by the `detail` parameter. The date and time when the session started.

Last Access

Shown by the `detail` parameter. The date and time when the session was last accessed. It updates to the current time when a command is issued.

## Examples

Show active sessions on the storage system.

```
# show sessions
```

## Basetypes

sessions

status

# show shutdown-status

## Description

Shows whether each Storage Controller is active or shut down.

## Minimum role

monitor

## Syntax

```
show shutdown-status
```

## Output

Storage Controller A

- up: The controller is operational.
- down: The controller is shut down.
- not installed: The controller is not installed.

Storage Controller B

- up: The controller is operational.
- down: The controller is shut down.
- not installed: The controller is not installed.

Other MC Status

The operational status of the Management Controller in the partner controller. This is not factored into system health.

- Operational: The partner Management Controller is responding normally.
- Not Operational: The local Management Controller has established communication with the partner Management Controller, but the partner is not responding because it's not currently in active-active or failed-over state.
- Not Communicating: The partner Management Controller is not ready to communicate.
- Unknown: The operational status of the partner Management Controller cannot be determined.

## Examples

Show the shutdown status of each controller.

```
# show shutdown-status
```

## Basetypes

```
shutdown-status  
show-other-MC-status  
status
```

## See also

```
restart mc  
restart sc  
shutdown
```



# show snmp-parameters

## Description

Shows SNMP settings for event notification.

## Minimum role

monitor

## Syntax

```
show snmp-parameters
```

## Output

SNMP Trap Notification Level

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `resolved`: Sends notifications for Resolved, Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: No events are sent as traps and traps are disabled.

SNMP Trap Host IP<#>

The address of each trap host. The value can be an IPv4 address, IPv6 address, or FQDN.

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 `standard` or `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 `standard` or `manage` role.

Alert Notification

Shows whether the system will send SNMP notifications for alerts.

- `all`: The system will send SNMP notifications for alerts.
- `none`: The system will not send SNMP notifications for alerts.

## Examples

Show SNMP notification settings.

```
# show snmp-parameters
```

## Basetypes

```
snmp-parameters  
status
```

## See also

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

# show storage-configurations

## Description

Shows the available storage configurations on a system that consists of SATA drives.

Use `add storage` with the ID number to apply a storage configuration.

For increased reliability, all SATA drive configurations use ADAPT disk groups. Spare capacity is determined by the configuration, and you cannot alter it to increase storage space.

## Minimum role

monitor

## Syntax

```
show storage-configurations
```

## Output

For each available storage configuration, the following information is listed.

ID

The number for the configuration. Use this number with the `add storage` command to provision the specified configuration in the storage system.

Number of Disk Groups

The number of disk groups created with this configuration.

Stripe Width

Shows the ADAPT stripe width used with this configuration.

Interleaved

Indicates whether interleaved volumes are used with this configuration. If interleaved volumes are used, you must specify the `interleaved-volume-count` parameter with the `add storage` command.

Minimum Spare Capacity

The minimum spare capacity established for this configuration. This value applies to each disk group. The total spare capacity reserved by the system is larger for configurations that create more disk groups.

Maximum Raw Capacity

The maximum storage capacity available with this configuration.

## Examples

List the available configurations for a storage system using SATA drives.

```
# show storage-configurations
```

## Basetypes

```
storage-configurations
```

```
status
```

## See also

```
add storage
```

```
show disks
```

```
show disk-groups
```

# show syslog-parameters

## Description

Shows syslog notification parameters for events and managed logs.

## Minimum role

monitor

## Syntax

```
show syslog-parameters
```

## Output

Syslog Host

The IP address or domain name of the remote syslog server used 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.
- `resolved`: Sends notifications for Resolved, 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.

Alert Notification

Shows the filter for which alert notifications will be sent:

- `all`: Sends notifications for all alerts.
- `none`: Disables email notification for alerts.

## 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. This parameter shows additional detail about the system.

## Output

System Name

The name of the system.

System Contact

The name of the person who administers the system.

System Location

The location of the system.

System Information

A brief description of what the system is used for or how it is configured.

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

Shown by the detail parameter. The vendor name returned by the SCSI INQUIRY command.

SCSI Product ID

Shown by the detail parameter. The product identifier returned by the SCSI INQUIRY command.

Enclosure Count

The number of enclosures in the system.

## Health

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

## Health Reason

If Health is not OK, a message describes 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:** The partner Management Controller is responding normally.
- **Not Operational:** The local Management Controller has established communication with the partner Management Controller, but the partner is not responding because it's not currently in active-active or failed-over state.
- **Not Communicating:** The partner Management Controller is not ready to communicate.
- **Unknown:** The operational status of the partner Management Controller cannot be determined.

## PFU Status

Shows whether partner firmware update is running on the system, or is idle.

## Security System Management

- **FDE:** The system is secured using Full Disk Encryption.
- **Not in use:** FDE is supported but not enabled.
- **N/A:** FDE is not supported.

## Examples

Show information about the system.

```
# show system
```

## Basetypes

```
system  
status
```

## See also

```
set system  
show system-parameters
```

# show system-parameters

## Description

Shows certain storage system settings and configuration limits.

For a summary of the physical and logical limits of the storage system, see the system configuration limits topic in the SMC help.

## Minimum role

monitor

## Syntax

```
show system-parameters
```

## Output

ULP Enabled

Shows that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers. The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can choose any available path to access a LUN regardless of disk group ownership. When ULP is in use, the system's operating/cache-redundancy mode is shown as Active-Active ULP. ULP uses the T10 Technical Committee of INCITS Asymmetric Logical Unit Access (ALUA) extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.

Host Profiles Enabled

Shows whether host profiles are enabled.

Number of Host Ports

The number of host-interface ports in the controller enclosure.

Maximum Disks

The number of disks that the system supports.

Maximum Volumes

The number of volumes that the system supports.

Maximum Linear Disk Groups

The number of linear disk groups that the system supports.

Maximum LUNs

The number of LUNs that the system supports.

Maximum Linear Disk Groups per Controller

The number of linear disk groups that each controller supports.

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 Hosts

The maximum number of hosts for the system.

Maximum Initiators per Host

The maximum number of initiators that a host can contain.

Maximum Initiators

The maximum number of initiators for the system.

Local Controller

The ID of the controller you are accessing.

Serial Number

The last six digits of the midplane serial number.

Maximum number of ADAPT Disk Groups per Controller

The maximum number of ADAPT disk groups that each controller supports.

### Examples

Show settings and configuration limits for the storage system.

```
# show system-parameters
```

### Basetypes

```
system-parameters-table  
status
```

### See also

```
show system
```

# show tasks

## Description

Shows information about tasks.

## Minimum role

monitor

## Syntax

```
show tasks
    [detail]
    [<task-name>]
```

## Parameters

detail

Optional. Shows additional detail about each task.

<task-name>

Optional. Shows information about the specified task only. If this parameter is omitted, information is shown for all tasks.

## Output

### Any task type without detail

Name

The name of the task.

Type

The task type.

Status

The task status. Status values for each task type are listed in the following sections.

State

The current step of the task. State values for each task type are listed in the following sections.

Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

### StartScrub task with detail

Task Name

The name of the task.

Task Type

The task type, StartScrub.

Status

- Uninitialized: The task is not yet ready to run.
- Ready: The task is ready to run.



- **Active:** The task is running.
- **Error:** The task has an error.
- **Deleted:** The task is expired but this state is not yet synchronized to the partner controller.

#### Task State

The current step of the task, which is always `Start`.

#### Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

### StopScrub task with detail

#### Task Name

The name of the task.

#### Task Type

The task type, `StopScrub`.

#### Status

- **Uninitialized:** The task is not yet ready to run.
- **Ready:** The task is ready to run.
- **Active:** The task is running.
- **Error:** The task has an error.
- **Deleted:** The task is expired but this state is not yet synchronized to the partner controller.

#### Task State

The current step of the task, which is always `Start`.

#### Error Message

- If an error occurred while processing the task, the error message.
- Blank if no error has occurred.

### Examples

Show information about all tasks.

```
# show tasks
```

Show information about task `Task1`.

```
# show tasks Task1
```

### Basetypes

```
tasks
```

```
status
```

### See also

```
create schedule
```

```
create task
```

```
delete task
```

```
show schedules
```

# show timezones

## Description

Shows available timezones based on data from the public-domain TZ database.

Timezone names have the form <area>/<location>, where <area> is a continent or ocean and <location> is a significant location within that area, such as a city or island. For example, Pacific/Guam.

## Minimum role

monitor

## Syntax

```
show timezones
    [<region>]
```

## Parameters

<region>

Optional. Limits output to timezone names that contain a specified, case-insensitive string indicating an area or location. If this parameter is omitted, all available timezones are listed.

## Output

Timezone list.

## Examples

Show all timezones.

```
# show timezones
```

Show all timezones in Africa.

```
# show timezones africa
```

Show the timezone for Singapore.

```
# show timezones sing
```

## Basetypes

timezones

status

## See also

set controller-date

set ntp-parameters

# 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.

---

**NOTE** If you are uncertain whether to clear unwritable cache data, contact technical support for assistance.

---

## Minimum role

monitor

## Syntax

```
show unwritable-cache
```

## Output

Percentage 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 user-groups

## Description

Shows configured LDAP user groups.

Properties shown only in API output are described in ["API basetype properties" on page 374](#).

## Minimum role

monitor

## Syntax

```
show user-groups
    [<user-group-name>]
```

## Parameters

<user-group-name>

Optional. Shows settings for the specified user group only. If this parameter is omitted, settings are shown for all user groups.

## Output

Name

The user group name.

Roles

- `monitor`: User group can view but not change system settings.
- `standard`: User group can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP/FTP; performing file uploads from the SMC; using the `restore defaults` command.
- `manage`: User group can view and change system settings.
- `diagnostic`: For use by or with direction from technical support.

Type

The user group type: LDAP.

Locale

The display language.

WBI

- `x`: User group can access the web-browser interface (the SMC).
- Blank: User group cannot access this interface.

CLI

- `x`: User group can access the command-line interface.
- Blank: User group cannot access this interface.

FTP

- `x`: User group can access the SFTP interface.
- Blank: User group cannot access this interface.

**Examples**

Show information about all user groups.

```
# show user-groups
```

Show information about user group StorageAdmins.

```
# show user-groups StorageAdmins
```

**Basetypes**

usergroups

status

**See also**

create user-group

delete user-group

set user-group

# 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.
- *standard*: User can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP/FTP; performing file uploads from the SMC; using the `restore defaults` command.
- *manage*: The user can view and change system settings.
- *diagnostic*: For use by or with direction from technical support.

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.

WBI

- *x*: The user can access the web-browser interface (the SMC).
- *Blank*: The user cannot access this interface.

CLI

- *x*: The user can access the command-line interface.
- *Blank*: The user cannot access this interface.

## FTP

- `x`: The user can access the SFTP/FTP interface.
- `Blank`: The user cannot access this interface.

## SNMP

- `x`: The user can access the SNMPv3 interface.
- `Blank`: The user cannot access this interface.

## Authentication Type

- `MD5`: MD5 authentication.
- `SHA`: SHA-1 authentication.
- `none`: No authentication.

## Privacy Type

- `DES`: Data Encryption Standard.
- `AES`: Advanced Encryption Standard.
- `none`: No encryption.

## 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.

## Trap Host Port

The SNMP trap destination port of the host 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 versions

## Description

Shows firmware and hardware version information for the system.

## Minimum role

monitor

## Syntax

```
show versions
  detail
  [firmware active|available]
  frus
```

## 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.

firmware active|available

Optional. Shows information about the active bundle, all available installed bundles, or a specific bundle version.

- active: Accessible to users having any role to view the active bundle.
- available: Accessible to users having the `manage` role to view available bundles.

frus

Optional. Shows information about firmware versions for FRUs in each enclosure. If this parameter is omitted, only controller-module 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
```

Show version information for FRUs in each enclosure.

```
# show versions frus
```

Show version information for all installed bundles.

```
# show versions firmware available
```

## Basetypes

```
versions
firmware-versions
fru-versions
status
```

## See also

show inquiry



# show volume-names

## Description

Shows volume names and serial numbers.

## 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 [www.t10.org](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

For an FC initiator, its WWPN. For a SAS initiator, its WWPN. For an iSCSI initiator, its node name (typically the IQN).

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 v1.

```
# show volume-reservations v1
```

### Basetypes

```
volume-reservations
```

```
status
```

### See also

```
release volume
```

```
show volumes
```

# 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 API output are described in ["API basetype properties" on page 374](#).

## 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.

Eps

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.

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.

Reset Time

Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when these statistics were last reset, either by a user or by a controller restart.

**Examples**

Show live performance statistics for all volumes.

```
# show volume-statistics
```

Show live performance statistics for volume v0001.

```
# show volume-statistics v0001
```

**Basetypes**

```
show volume-statistics  
status
```

**See also**

```
reset all-statistics  
reset volume-statistics  
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]
  [pattern <string>]
  [pool <pool>]
  [protection-info]
  [type base|standard]
  [<volumes>]
```

## Parameters

details

Optional. Shows additional information about the volumes.

pattern <string>

Optional. Shows volumes whose names contain the specified string. The string can include the following wildcards, singly or in combination.

- \* Matches zero or more characters.
- ? Matches any one character. Use multiple ? wildcards to find names of a specific length. For example, Vol1?? will find names starting with Vol1 that are five characters long.
- [] Matches any character within the brackets, except a hyphen. Alphabetic characters are case sensitive. For example, [123] matches 1, 2, or 3. Use a hyphen between two characters to specify a range. For example, [0-9] matches any one digit. You can combine the list and range forms. For example, [xy1-3] matches x or y (but not X or Y), or 1, 2, or 3.

pool <pool>

Optional. The name or serial number of the pool that contains the volumes for which to show information.

protection-info

Optional. For all or specified disk groups, this parameter shows the host protection information (PI) for each volume.

type base|standard

Optional.

- base: Not supported.
- standard: Show only standard volumes.

If this parameter is omitted, all volumes are shown.

<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`, a message describes recommended actions to resolve the issue.

### Cache Opt

Shown by the `details` parameter. The cache optimization mode:

- `standard`: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller.
- `standard-atomic-write`: This controller cache mode includes the `standard` mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
- `cache-hit-atomic-write`: This controller cache mode includes the `cache-hit` mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

### Class

- `Linear`: The volume is in a linear pool.

### Desc

Shown by the `details` parameter.

- For OpenVMS, a numeric value (set with the `create volume` or `set volume` command) that identifies the volume to an OpenVMS host.
- Blank if not set.

### Health

- `OK`

### Metadata In Use

Shown by the `details` parameter. The amount of pool metadata currently being used by the volume.

### Name

The name of the volume.

### PI-Format

Shown by the `protection-info` parameter.

- `T1`: Host PI (Type 1) is enabled for the volume.
- `T0`: Host PI (Type 0) is disabled for the volume.

### Pool

The name of the pool that contains the volume.

## RAID

Shown by the `protection-info` parameter. The disk-group RAID level.

## 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 512KB, 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, a message describes the reason for the health state.

## Role

Shown by the `details` parameter.

- **Blank:** Not applicable.

## Serial Number

Shown by the `details` or `protection-info` parameter. The serial number of the volume.

## Type

- **standard:** Standard 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.
- **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.

## Examples

Show information about all volumes.

```
# show volumes
```

Show detailed information for volume `volA`.

```
# show volumes details volA
```

Show volumes whose names start with `Vol` followed by any single character, an underscore, and a two-digit number, such as `VolA_01` or `Vol3_10` but not `volA_01` or `Vol3_1`.

```
# show volumes pattern Vol?_[0-9][0-9]
```

Show host protection information for the volumes of linear disk group (pool) `DG1`.

```
# show volumes pool DG1 protection-info
```



**Basetypes**

volumes

status

**See also**

create volume

delete volumes

expand volume

set volume

show disk-groups

show maps

show pools


# 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

standard

## 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
```

# 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

standard

## Syntax

test

email | managedlogs | managedlogswarn | managedlogswrap | notification | snmp | syslog

[region crash1 | crash2 | crash3 | crash4 | ecdebug | mc | scdebug]

## Parameters

email | managedlogs | managedlogswarn | managedlogswrap | notification | snmp | syslog

- **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 and SNMP. (Event 312)
- **snmp:** This option behaves the same as the `notification` option.
- **syslog:** Specify this option to test receipt of notifications by the remote syslog server.

region crash1 | crash2 | crash3 | crash4 | ecdebug | mc | scdebug

Optional. For use with the managed logs feature, this parameter specifies the log type (debug-data region) for which to send notifications.

- **crash1, crash2, crash3, or crash4:** Specify one of these options to send notification for one of the Storage Controller's four crash logs.
- **ecdebug:** Specify this option to send notification for the Expander Controller log.
- **mc:** Specify this option to send notification for the Management Controller log.
- **scdebug:** Specify this option to send notification for the Storage Controller log, which includes the event log.

If this parameter is omitted, the command sends four representative log types: `crash1`, `ecdebug`, `scdebug`, and `mc`.

## Examples

Test receipt of event notifications by every interface that is configured to receive them.

```
# test notification
```

Test receipt of the managed-logs notification that the Storage Controller log needs to be transferred.

```
# test managedlogs region scdebug
```

**See also**


set email-parameters  
set snmp-parameters  
set syslog-parameters

# trust

## Description

Enables an offline or quarantined-offline disk group to be brought online for emergency data recovery.

---

 **CAUTION** This command is for use by or with direction from technical support. Improper use of trust may cause data corruption or data loss.

---

The `trust` command must be used in CLI console mode and 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 been quarantined due to inaccessible disks. 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 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 procedures outline the general steps for performing a trust operation, but the best procedure to follow for your situation may vary. Before starting these procedures, contact technical support for assistance in determining if the trust operation applies to your situation, and for assistance to perform it.

---

## CAUTION

- Do not use the `trust` command when the storage system is unstable. For example, if there are many power or topology-change events.
- The `trust` command can be run only on an offline or quarantined-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`.  
Performing trust on a quarantined-offline disk group can cause data corruption because it will bring a disk with stale data back into the disk group.
- Never update controller-module, expansion-module, or disk firmware when the disk group is offline or quarantined-offline.
- Never clear unwritten data cache when a disk group is offline or quarantined-offline.
- Do not use the `trust` command on a disk group with status `FTDN` or `CRIT`. Instead, add spares and let the system reconstruct the disk group.

---

## Steps for running the `trust` command

1. Disable background scrub of disks and disk group to avoid running scrubs automatically.
2. Remove global spares to avoid reconstruction if the disk group status becomes `CRIT` after trust or if any disks fail immediately after trust.

3. Identify the cause for the disk group becoming offline or quarantined-offline.
4. 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.
5. 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.
6. 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.

---

7. Enable the `trust` command.
8. Run the `trust` command on the disk group.
9. If the `trust` command determines that it would be unsafe to proceed, it will fail. If this happens you can either:
  - Contact Support for further assistance. This is recommended.
  - Proceed by re-enabling `trust` and running `trust` with the `unsafe` parameter. This is not recommended because in most cases it will result in an unstable disk group with data corruption.

#### After running the `trust` command

1. Reinsert the host-port cables.
2. Perform a complete backup of the disk group.
3. Delete the disk group.
4. Replace the failed disks with new disks.
5. Re-create the disk group.
6. Restore the data from the backup performed in step 2.
7. Restore original disk-group ownership.
8. Re-enable background scrub operations.

#### Minimum role

standard

#### Syntax

```
trust
  [enable|disable]
  [disk-group <disk-group>]
  [unsafe]
```

## Parameters

enable|disable

Optional.

- **enable:** Enables the `trust` command before use.
- **disable:** Disables the `trust` command if it is not used after being enabled. If `trust` is not explicitly disabled, it will be automatically disabled when the user's CLI session ends.


disk-group <disk-group>

Optional. The name or serial number of the disk group to trust. A name that includes a space must be enclosed in double quotes.

unsafe

Optional. Specifies to proceed with a trust operation that is determined to be unsafe because it must use out-of-sync or partially reconstructed disks.

---

 **CAUTION** In most cases using this option will result in an unstable disk group with data corruption. This option should only be used with assistance from technical support.

---

## Output

### With the `unsafe` parameter

Location

The enclosure ID and slot number of the disk.

Serial Number

The serial number of the disk.

Type

- **SATA:** SATA disk.
- **SAS:** Enterprise SAS spinning disk.
- **SATA-S:** Single-ported SATA disk.
- **SSD SAS:** SAS solid-state disk.
- **SAS MDL:** Midline SAS spinning disk.

State

- **AVAIL:** Available
- **FAILED:** The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.
- **GLOBAL SP:** Global spare
- **LEFTOVR:** Leftover
- **LINEAR POOL:** Used in a linear disk group

Partially Reconstructed

- **True:** The disk contains partially reconstructed data.
- **False:** The disk does not contain partially reconstructed data.

## Out Of Sync

- True: The disk data is out of sync with other disks in the disk group.
- False: The disk data is in sync with other disks in the disk group.

## Age

The age of the disk in the disk group. The age value starts at 1 and is incremented for all good disks in the disk group each time there is a change in the disk configuration of the disk group, such as when a disk is detected to have failed or be missing. Therefore, if a disk has a lower age than other disks in the disk group, that disk is out-of-sync with the other disk group members. This value can be used as a guide to decide which disks to physically remove before doing the trust operation to minimize the amount of corrupt data in the trusted disk group if you want to use the unsafe parameter.

## Examples

Trust a disk group which has enough good disks to complete the trust operation. The disk group may have out-of-sync or partially reconstructed disks but they are not needed to complete the trust operation. The command completes successfully.

```
# trust enable
```

```
Success: Command completed successfully. - Trust is enabled. (2020-04-17 04:29:28)
```

```
# trust disk-group data_1
```

```
Success: Command completed successfully. (data_1) - Trust operation completed successfully for this disk group. (2020-04-17 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. (2020-04-17 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. (2020-04-17 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. (2020-04-17 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. (2020-04-17 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. (2020-04-17 09:06:48)
```

```
# trust disk-group data_1 unsafe
```



Location	Serial Number	Type	State	Partially Reconstructed
1.2	SN	SAS	LEFTOVR	False
True	6			
1.4	SN	SAS	LINEAR POOL	False
False	7			
1.5	SN	SAS	LEFTOVR	True
False	4			

-----

WARNING: Found partially reconstructed and out-of-sync disk(s). Using these disks for trust will in most cases cause data corruption.

Because of the risk of data corruption, it is recommended that you continue the trust operation only with the supervision of Support personnel. If you are ready to continue, enter "continue" at the prompt or enter "abort" to abort the operation and leave the disk group offline.

> **continue**

If you continue with the trust operation, you risk corrupting data in this disk group. Enter "accept" at the prompt if you intend to accept this risk and proceed with the trust operation or enter "abort" to abort the operation and leave the disk group offline.

> **accept**

Success: Command completed successfully. (data\_1) - Trust operation completed successfully for this disk group. (2020-04-17 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. (2020-04-17 09:05:37)

# trust disk-group data\_1 unsafe

Location	Serial Number	Type	State	Partially Reconstructed
1.2	SN	SAS	LEFTOVR	False
True	6			
1.4	SN	SAS	LINEAR POOL	False
False	7			
1.5	SN	SAS	LEFTOVR	True
False	4			

-----

WARNING: Found partially reconstructed and out-of-sync disk(s). Using these disks for trust will in most cases cause data corruption.

Because of the risk of data corruption, it is recommended that you continue the trust operation only with the supervision of Support personnel. If you are ready to continue, enter "continue" at the prompt or enter "abort" to abort the operation and leave the disk group offline.

> **continue**

If you continue with the trust operation, you risk corrupting data in this disk group. Enter "accept" at the prompt if you intend to accept this risk and proceed with the trust operation or enter "abort" to abort the operation and leave the disk group offline.

> **abort**

Error: Command was aborted by user. (2020-04-17 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. (2020-04-17 17:40:01)

### **Basetypes**

out-of-sync-disks

### **See also**

show disk-groups

scrub disk-groups

# unfail controller

## Description

Allows the partner controller module to recover from a simulated failure performed with the `fail` command (which requires the `standard` role).

If you attempt to unfail a controller that is operating, the command will have no effect.

---

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

---

## Minimum role

monitor

## Syntax

```
unfail controller
```

## Examples

From controller A, unfail the partner controller.

```
# unfail controller
```

## See also

`fail`

`show controllers`

`show redundancy-mode`


# unmap volume

## Description

Deletes mappings for specified volumes.

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

standard

## Syntax

```
unmap volume
  initiator <initiators>|<hosts>|<host-groups>
  <volumes>
```

## Parameters

```
initiator <initiators>|<hosts>|<host-groups>
```

A comma-separated list of initiators, hosts, or host groups for which to delete mappings. For initiator, host, and host-group syntax, see ["Command syntax" on page 21](#).

```
<volumes>
```

A comma-separated list of volumes to unmap. For a volume, specify its name or serial number. A name that includes a space must be enclosed in double quotes.

## Examples

Delete mappings for Host1 to volumes vol1 and vol3.

```
# unmap volume initiator Host1.* vol1,vol3
```

Delete mappings for volume vol2.

```
# unmap volume vol2
```

## See also

```
map volume
show initiators
show maps
show volumes
```

# whoami

## Description

Shows domain information for the current user.

## Minimum role

monitor

## Syntax

whoami

## Parameters

User Name

The username.

User Type

- Local: The user's credentials reside in the storage system.
- LDAP: The user's credentials reside in an Active Directory LDAP server.

Group Name

Shows the group name for an LDAP user, or N/A for a local user.

## Examples

Show domain information for the current user.

```
# whoami
```

## Basetypes

logon-user-detail

status

## 4 API basetype properties

The previous chapter describes command output that is shown in console mode. This chapter describes the basetype properties that CLI commands display in API mode, 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. If a property has a corresponding numeric property, the numeric property's name and data type are shown in parenthesis. For descriptions of other elements see [Table 1 on page 17](#).
- References to embedded or nested basetypes that the output may show.

### advanced-settings-table

This basetype is used by `show advanced-settings`.

**Table 7** advanced-settings-table properties

Name	Type	Description
background-scrub (background-scrub-numeric)	string (uint32)	Shows whether disks in disk groups are automatically checked for disk defects to ensure system health. <ul style="list-style-type: none"><li>• Disabled (0): Background disk-group scrub is disabled.</li><li>• Enabled (1): Background disk-group scrub is enabled.</li></ul>
background-scrub-interval	uint16	Not supported.
partner-firmware-upgrade (partner-firmware-upgrade-numeric)	string (uint32)	Shows whether component firmware versions are monitored and will be automatically updated on the partner controller. <ul style="list-style-type: none"><li>• Disabled (0): Partner firmware upgrade is disabled.</li><li>• Enabled (1): Partner firmware upgrade is enabled.</li></ul>
utility-priority (utility-priority-numeric)	string (uint32)	Priority at which data-redundancy utilities, such as disk-group verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect disk-group background scrub, which always runs at "background" priority.) <ul style="list-style-type: none"><li>• High (0): Utilities have higher priority than host I/O. This can cause heavy I/O to be slower than normal.</li><li>• Medium (1): Utility performance is balanced with host I/O performance.</li><li>• Low (2): Utilities run at a slower rate with minimal effect on host I/O.</li></ul>
smart (smart-numeric)	string (uint32)	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none"><li>• Detect-Only (0): Each disk in the system retains its individual SMART setting, as will new disks added to the system.</li><li>• Enabled (1): SMART is enabled for all disks in the system and will be enabled for new disks added to the system.</li><li>• Disabled (2): SMART is disabled for all disks in the system and will be disabled for new disks added to the system.</li></ul>

**Table 7 advanced-settings-table properties (continued)**

Name	Type	Description
dynamic-spares (dynamic-spares-numeric)	string (uint32)	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. The dynamic spares feature does not apply to ADAPT disk groups. <ul style="list-style-type: none"> <li>Disabled (0): The dynamic spares feature is disabled.</li> <li>Enabled (1): The dynamic spares feature is enabled.</li> </ul>
emp-poll-rate	string	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.
host-cache-control (host-cache-control-numeric)	string (uint32)	Shows whether hosts are allowed to use the SCSI MODE SELECT command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> <li>Disabled (0): Hosts can use the SCSI MODE SELECT command to change the write-back cache setting. This is the default.</li> <li>Enabled (1): Hosts cannot override the storage system's write-back cache setting.</li> </ul>
sync-cache-mode (sync-cache-mode-numeric)	string (uint32)	Shows how the SCSI SYNCHRONIZE CACHE command is handled. <ul style="list-style-type: none"> <li>Immediate (0): Good status is returned immediately and cache content is unchanged.</li> <li>Flush to Disk (1): Good status is returned only after all write-back data for the specified volume is flushed to disk.</li> </ul>
missing-lun-response (missing-lun-response-numeric)	string (uint32)	Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access. <ul style="list-style-type: none"> <li>Not Ready (0): 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.</li> <li>Illegal Request (1): Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is sensekey = 5, code = 25h, qualifier = 0.</li> </ul>
controller-failure (controller-failure-numeric)	string (uint32)	Shows whether the cache policy will change from write-back to write-through when a controller fails. <ul style="list-style-type: none"> <li>Disabled (0): The controller failure trigger is disabled.</li> <li>Enabled (1): The controller failure trigger is enabled.</li> </ul>
super-cap-failure (super-cap-failure-numeric)	string (uint32)	Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails. <ul style="list-style-type: none"> <li>Disabled (0): The supercapacitor failure trigger is disabled.</li> <li>Enabled (1): The supercapacitor failure trigger is enabled.</li> </ul>
memory-card-failure (memory-card-failure-numeric)	string (uint32)	Shows whether the cache policy will change from write-back to write-through when the memory card is not detected during POST (Power-On Self-Test), fails during POST, or fails during controller operation. <ul style="list-style-type: none"> <li>Disabled (0): The memory-card failure trigger is disabled.</li> <li>Enabled (1): The memory-card failure trigger is enabled.</li> </ul>
power-supply-failure (power-supply-failure-numeric)	string (uint32)	Shows whether the cache policy will change from write-back to write-through when a power supply fails. <ul style="list-style-type: none"> <li>Disabled (0): The power-supply failure trigger is disabled.</li> <li>Enabled (1): The power-supply failure trigger is enabled.</li> </ul>
fan-failure (fan-failure-numeric)	string (uint32)	Shows whether the cache policy will change from write-back to write-through when a fan fails. <ul style="list-style-type: none"> <li>Disabled (0): The fan failure trigger is disabled.</li> <li>Enabled (1): The fan failure trigger is enabled.</li> </ul>
temperature-exceeded (temperature-exceeded-numeric)	string (uint32)	Shows whether the system will shut down a controller when its temperature exceeds the critical operating range. <ul style="list-style-type: none"> <li>Disabled (0): The over-temperature trigger is disabled.</li> <li>Enabled (1): The over-temperature trigger is enabled.</li> </ul>

**Table 7 advanced-settings-table properties (continued)**

Name	Type	Description
partner-notify (partner-notify-numeric)	string (uint32)	Shows whether the partner controller will be notified when a trigger condition occurs. <ul style="list-style-type: none"> <li>Disabled (0): Notification is disabled. The partner controller will continue using its current caching mode.</li> <li>Enabled (1): Notification is enabled. The partner controller will change to write-through mode for better data protection.</li> </ul>
auto-write-back (auto-write-back-numeric)	string (uint32)	Shows whether the cache policy will change from write-through to write-back when the trigger condition is cleared. <ul style="list-style-type: none"> <li>Disabled (0): Auto-write-back is disabled.</li> <li>Enabled (1): Auto-write-back is enabled.</li> </ul>
disk-dsd-enable (disk-dsd-enable-numeric)	string (uint32)	Not supported.
disk-dsd-delay	uint16	Not supported.
managed-logs (managed-logs-numeric)	string (uint32)	Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log-collection system to avoid losing diagnostic data as logs fill. <ul style="list-style-type: none"> <li>Disabled (0): The managed logs feature is disabled.</li> <li>Enabled (1): The managed logs feature is enabled.</li> </ul>
single-controller (single-controller-numeric)	string (uint32)	For a system that had two controller modules but now has only one and is intended to be used as a single-controller system, this property shows whether the operating/redundancy mode is set to Single Controller. This prevents the system from reporting the absent partner controller as an error condition. This parameter does not affect any other system settings. Installing a second, functional controller module will change the mode to Active-Active ULP. <ul style="list-style-type: none"> <li>Disabled (0): Single Controller mode is disabled.</li> <li>Enabled (1): Single Controller mode is enabled.</li> </ul>
auto-stall-recovery (auto-stall-recovery-numeric)	string (uint32)	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. <ul style="list-style-type: none"> <li>Disabled (0): Auto stall recovery is disabled.</li> <li>Enabled (1): Auto stall recovery is enabled.</li> </ul>
delete-override (delete-override-numeric)	string (uint32)	Not supported.
restart-on-capi-fail (restart-on-capi-fail-numeric)	string (uint32)	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 <b>Maintenance &gt; Support &gt; Collect Logs</b> panel in the SMC. <ul style="list-style-type: none"> <li>Disabled (0): The Storage Controller is not forced to restart.</li> <li>Enabled (1): The Storage Controller is forced to restart.</li> </ul>
large-pools (large-pools-numeric)	string (uint32)	Deprecated.
ssd-concurrent-access (ssd-concurrent-access-numeric)	string (uint32)	Not supported.



**Table 7 advanced-settings-table properties (continued)**

Name	Type	Description
slot-affinity (slot-affinity-numeric)	string (uint32)	Shows whether the slot affinity feature is enabled or disabled. For information about this feature, see the description of the <code>set advanced-settings</code> command's <code>slot-affinity</code> parameter. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
random-io-performance-optimization (random-io-performance-optimization-numeric)	string (uint32)	Shows whether random I/O performance optimization is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
cache-flush-timeout (cache-flush-timeout-numeric)	string (uint32)	Shows whether the cache flush timeout is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
remanufacture (remanufacture-numeric)	string (uint32)	Shows whether the Autonomous Drive Regeneration (ADR) feature is enabled or disabled. ADR attempts remanufacture of a disk drive that experiences a head failure. ADR is supported only for ADAPT disk groups. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
hedged-reads-timeout (hedged-reads-timeout-numeric)	string (uint32)	Shows the waiting period for read requests before the hedged reads feature triggers. This feature reduces latency for read requests by using RAID parity information to reconstruct requested data if the read wait period is exceeded. Levels are: <ul style="list-style-type: none"> <li>0: Disabled. The hedged reads method is not used.</li> <li>1: 1.75 seconds wait time. This setting is the default.</li> <li>2: 2.25 seconds wait time.</li> <li>3: 2.75 seconds wait time.</li> <li>4: 3.25 seconds wait time.</li> </ul> All wait times are approximations.
auto-map (auto-map-numeric)	string (uint32)	Shows whether the auto map feature is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
auto-unmap (auto-unmap-numeric)	string (uint32)	Shows whether the auto unmap feature is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
default-mapping (default-mapping-numeric)	string (uint32)	Shows whether default mapping is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
slow-disk-detection (slow-disk-detection-numeric)	string (uint32)	Shows whether slow-disk detection is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0): Slow-disk detection is disabled.</li> <li>Enabled (1): Slow-disk detection is enabled.</li> </ul>
scrub-schedule (scrub-schedule-numeric)	string (uint32)	Shows whether disk-group scrub runs only when scheduled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
disk-firmware-update (disk-firmware-update-numeric)	string (uint32)	Shows whether the system uses intelligent scheduling to run disk firmware update. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>

# alerts

This basetype is used by `show alerts`.

**Table 8** alerts properties

Name	Type	Description
id	uint32	Alert sequence number.
component	string	Component name.
serial-number	string	Component serial number.
description	string	Component description.
durable-id	string	Unique alert ID.
condition-id	string	Unique condition ID.
severity (severity-numeric)	string (uint32)	Alert severity. <ul style="list-style-type: none"><li>• <b>INFORMATIONAL</b> (0): The system configuration does not match recommendations. No change is required, but for optimal system performance and security, you should resolve the issue.</li><li>• <b>WARNING</b> (1): A problem occurred that may affect system stability or performance but not data integrity. Evaluate the problem and correct it if necessary.</li><li>• <b>CRITICAL</b> (3): A failure occurred that may cause a controller to shut down or could affect data integrity or system stability. Correct the problem <i>immediately</i>.</li><li>• <b>UNKNOWN</b> (4294967295): The system is unable to determine the state of a component. In some configurations, this situation is normal. In other situations, resolving other system issues should resolve this issue as well.</li></ul>
resolved (resolved-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• <b>No</b> (0): The alert condition is not resolved.</li><li>• <b>Yes</b> (1): The alert condition is resolved.</li></ul>
acknowledged (acknowledged-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• <b>No</b> (0): The alert has not been acknowledged.</li><li>• <b>Yes</b> (1): The alert has been acknowledged.</li></ul>
acknowledged-by	string	Username that acknowledged the alert.
acknowledged-time (acknowledged-time-numeric)	string (uint32)	Date and time when the alert was acknowledged. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
detected-time (detected-time-numeric)	string (uint32)	The most recent date and time when the alert condition was detected. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
resolved-time (resolved-time-numeric)	string (uint32)	Date and time when the alert condition was resolved. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00. If unresolved, N/A (0).
reminder-time (reminder-time-numeric)	string (uint32)	Not supported.
hit-count	uint32	Number of times an alert has occurred without being acknowledged.
basetype	string	Basetype of the component.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• <b>OK</b> (0)</li><li>• <b>Fault</b> (2)</li><li>• <b>N/A</b> (4)</li></ul>

**Table 8 alerts properties (continued)**

Name	Type	Description
reason (reason-numeric)	string (uint32)	A message describing the alert condition. The numeric property shows the message ID.
reason-id	uint32	Not used.
recommended-action (recommended-action-numeric)	string (uint32)	A message specifying the recommended action to take to resolve the alert condition. The numeric property shows the message ID.
comment	string	A user-defined comment (if any).

## audit-log

This basetype is used by `show audit-log`.

**Table 9 audit-log properties**

Name	Type	Description
audit-log	string	Audit log entry, specifying the date, time, user action, and other details.

## baseplanes

This basetype is used by `show enclosures`.

**Table 10 baseplanes properties**

Name	Type	Description
durable-id	string	Unique identity of the object.
enclosure-id	uint32	Enclosure ID.
baseplane-id	uint8	Baseplane ID.
dom-id	uint32	For internal use only.
name	string	Baseplane name.
location	string	Baseplane location.
status (status-numeric)	string (uint32)	Baseplane status. <ul style="list-style-type: none"> <li>• Unsupported (0)</li> <li>• OK (1)</li> <li>• Critical (2)</li> <li>• Warning (3)</li> <li>• Unrecoverable (4)</li> <li>• Not Installed (5)</li> <li>• Unknown (6)</li> <li>• Unavailable (7)</li> </ul>
extended-status	hex32	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Fault (2)</li> <li>• N/A (4)</li> </ul>
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to be taken to resolve the health issue.

**Table 10 baseplanes properties (continued)**

Name	Type	Description
conditions	Embedded;	see health-conditions.
unhealthy-component	Embedded;	see unhealthy-component.
expander-details	Embedded;	see expanders.

## cache-parameter

This basetype is used by `show cache-parameters`, when a volume is specified, to show volume cache properties.

**Table 11 cache-parameter properties**

Name	Type	Description
serial-number	string	The volume serial number.
volume-name	string	The volume name.
write-policy (write-policy- numeric)	string (uint32)	The volume's cache write policy. <ul style="list-style-type: none"><li>• <code>write-back (0)</code>: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput.</li><li>• <code>write-through (1)</code>: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.</li></ul>

**Table 11 cache-parameter properties (continued)**

Name	Type	Description
cache-optimization (cache-optimization-numeric)	string (uint32)	The volume's cache optimization mode. <ul style="list-style-type: none"> <li>• <code>standard (0)</code>: This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy.</li> <li>• <code>standard-atomic-write (3)</code>: This controller cache mode includes the <code>standard</code> mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.</li> <li>• <code>cache-hit-atomic-write (5)</code>: This controller cache mode of operation is optimized for workloads that are localized—that is, a substantial percentage of all accesses are hits in the controller's cache. In this mode, the cache is kept coherent with the partner controller. This mode also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.</li> </ul>
read-ahead-size (read-ahead-size-numeric)	string (uint32)	The volume's read-ahead cache setting. <ul style="list-style-type: none"> <li>• <code>Disabled (0)</code>: Read-ahead is disabled.</li> <li>• <code>Adaptive (-1)</code>: Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.</li> <li>• <code>Stripe (-2)</code>: 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 512KB, even though they are not striped.</li> <li>• 512 KB (524288)</li> <li>• 1 MB (1048576)</li> <li>• 2 MB (2097152)</li> <li>• 4 MB (4194304)</li> <li>• 8 MB (8388608)</li> <li>• 16 MB (16777216)</li> <li>• 32 MB (33554432)</li> </ul>

## cache-settings

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

**Table 12** cache-settings properties

Name	Type	Description
operation-mode (operation-mode-numeric)	string (uint32)	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none"><li>• Active-Active ULP (2): Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.</li><li>• Single Controller (3): The enclosure contains a single controller.</li><li>• Failed Over (4): Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</li><li>• Down (5): Both controllers are not operational.</li></ul>
pi-format (pi-format-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• Disabled (0): The system is set to use either 512-byte block size without PI or 4K-byte block size without PI.</li><li>• Enabled (1): The system is set to use 4K-byte block size with PI.</li></ul>
cache-block-size	uint16	The system's cache block size, which is increased by 8 bytes when PI is enabled. <ul style="list-style-type: none"><li>• 512 Bytes: The system is set to use 512-byte block size without PI.</li><li>• 520 Bytes: The system is set to use 512-byte block size with PI.</li><li>• 4096 Bytes: The system is set to use 4K-byte block size without PI.</li><li>• 4104 Bytes: The system is set to use 4K-byte block size with PI.</li></ul>
controller-cache-parameters	Embedded; see controller-cache-parameters.	

## certificates

This basetype is used by `show certificates`.

**Table 13** certificates properties

Name	Type	Description
certificate-name	string	The name of the certificate, either system-generated or user-supplied when the certificate is uploaded to the system.
certificate-type (certificate-type-numeric)	string (uint32)	Shows the certificate type. <ul style="list-style-type: none"><li>• Device-Cert (0): Designation for server or device certificates.</li><li>• Trust-Cert (1): Designation for trusted root or intermediate certificates.</li></ul>
certificate-controller (certificate-controller-numeric)	string (uint32)	The controller on which the certificate is installed. <ul style="list-style-type: none"><li>• B (0): Controller B.</li><li>• A (1): Controller A.</li></ul>
certificate-active-services	string	Displays the service that is actively using the certificate, if any.
certificate-service-web	string	Displays an <code>x</code> if the certificate is currently active for the web service. Otherwise, the value is blank.
certificate-service-wpa	string	Not supported.
certificate-service-ldap	string	Not supported.

**Table 13 certificates properties (continued)**

Name	Type	Description
certificate-identity-short	string	Not supported.
certificate-identity	string	Identity provided when the certificate was added to the system.
certificate-valid-from	string	The certificate start date.
certificate-valid-till	string	The certificate expiration date.
certificate-issued-to	string	The name or organization the certificate was granted to.
certificate-issued-by	string	The organization or entity that granted the certificate.
certificate-state (certificate-state-numeric)	string (uint32)	The current status of the certificate. <ul style="list-style-type: none"> <li>Unavailable (0)</li> <li>Available (1)</li> </ul>
certificate-status (certificate-status-numeric)	string (uint32)	The source of the certificate. <ul style="list-style-type: none"> <li>Unknown status (0): The origin of the certificate cannot be determined.</li> <li>Customer-supplied (1): The certificate was uploaded by the end user.</li> <li>System-generated (2): The certificate was generated by the system.</li> </ul>
certificate-default-services	string	Displays any service associated with the certificate by default, or N/A.
certificate-text	string	Displays the certificate content as text.

## ciphers

This basetype is used by `show ciphers`.

**Table 14 ciphers properties**

Name	Type	Description
ciphers	string	Active, user-supplied, and default cipher lists.

# cli-parameters

This basetype is used by show cli-parameters.

**Table 15 cli-parameters properties**

Name	Type	Description
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120 to 43200 seconds (2 to 720 minutes).
output-format	string	<ul style="list-style-type: none"><li>console: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes.</li><li>api: Supports scripting by displaying command output in XML. All objects are displayed at the same level, related by COMP elements.</li><li>api-embed: Alternate form of XML output which displays "child" objects embedded (indented) under "parent" objects.</li><li>ipa: Alternate form of XML output which displays like api-embed format with brief mode enabled.</li><li>json: Standard JavaScript Object Notation (JSON) output.</li><li>wbi: A JSON-like format used internally by the SMC.</li></ul>
output-format-api (output-format-api-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Console (1)</li><li>api (2)</li><li>api-brief (3)</li><li>api-embed (4)</li><li>api-embed-brief (5)</li><li>json (6)</li><li>json-full (7)</li></ul>
brief-mode (brief-mode-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Disabled (0): In XML output, this setting shows all attributes of object properties.</li><li>Enabled (1): In XML output, this setting shows a subset of attributes of object properties. The name and type attributes are always shown.</li></ul>
base	uint8	Alias for storage-size-base.
pager (pager-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Disabled (0): Output is not halted. When displaying output in API format, which is intended for scripting, disable paging.</li><li>Enabled (1): Halts output after each full screen to wait for keyboard input.</li></ul>
locale (locale-numeric)	string (uint32)	Not supported.
storage-size-base	uint8	Base for entry and display of storage-space sizes. <ul style="list-style-type: none"><li>2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.</li><li>10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude.</li></ul> 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	Number of decimal places (1 to 10) for display of storage-space sizes.



**Table 15 cli-parameters properties (continued)**

Name	Type	Description
storage-size-units (storage-size-units-numeric)	string (uint32)	Unit for display of storage-space sizes. <ul style="list-style-type: none"> <li>• Auto (0): Lets the system determine the proper unit for a size.</li> <li>• MB (1): Sizes are shown in megabytes.</li> <li>• GB (2): Sizes are shown in gigabytes.</li> <li>• TB (3): Sizes are shown in terabytes.</li> </ul> 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 0.11709TB is instead shown as 117.1GB.
temperature-scale (temperature-scale-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Fahrenheit (0): Temperatures are shown in degrees Fahrenheit.</li> <li>• Celsius (1): Temperatures are shown in degrees Celsius.</li> </ul>
user-type (user-type-numeric)	string (uint32)	The logged-in user's experience level. <ul style="list-style-type: none"> <li>• Novice (1)</li> <li>• Standard (2)</li> <li>• Advanced (3)</li> <li>• Diagnostic (4)</li> </ul>
username	string	The logged-in user name.
usergroupname	string	The logged-in user group name. Shows the real name for an LDAP user or undefined for a local user.

## code-load-readiness

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

**Table 16 code-load-readiness properties**

Name	Type	Description
overall-health (overall-health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Pass (0): There are no risks to performing firmware upgrade.</li> <li>• Fail (1): At least one condition exists that presents a risk of upgrade failure or loss of availability.</li> </ul>
code-load-readiness-reasons	Embedded; see code-load-readiness-reasons.	

## code-load-readiness-reasons

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

**Table 17 code-load-readiness-reasons properties**

Name	Type	Description
readiness-reason	string	The condition that was detected.
failure-risks (failure-risks-numeric)	string (uint32)	The problems that are likely to result if you do not resolve the conditions before performing a firmware upgrade. The numeric property shows a corresponding numeric value.

## communication-ports

This basetype is used by `show protocols`.

**Table 18** communication-ports properties

Name	Type	Description
ssh-port	uint16	The port number used for SSH.
sftp-port	uint16	The port number used for SFTP.

## conditions

This basetype is used by `show alert-condition-history`.

**Table 19** conditions properties

Name	Type	Description
id	uint32	Alert condition sequence number.
severity (severity-numeric)	string (uint32)	Event severity. <ul style="list-style-type: none"><li>• <b>INFORMATIONAL</b> (0): The system configuration does not match recommendations. No change is required, but for optimal system performance and security, you should resolve the issue.</li><li>• <b>WARNING</b> (1): A problem occurred that may affect system stability or performance but not data integrity. Evaluate the problem and correct it if necessary.</li><li>• <b>CRITICAL</b> (3): A failure occurred that may cause a controller to shut down or could affect data integrity or system stability. Correct the problem <i>immediately</i>.</li><li>• <b>UNKNOWN</b> (4294967295): The system is unable to determine the state of a component. In some configurations, this situation is normal. In other situations, resolving other system issues should resolve this issue as well.</li></ul>
component	string	Component name.
index	uint32	For internal use only.
resolved (resolved-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• <b>No</b> (0): The alert condition is not resolved.</li><li>• <b>Yes</b> (1): The alert condition is resolved.</li></ul>
detected-time (detected-time-numeric)	string (uint32)	The most recent date and time when the alert condition was detected. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
resolved-time (resolved-time-numeric)	string (uint32)	Date and time when the alert condition was resolved. N/A if unresolved. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00. (0) if unresolved.
reason (reason-numeric)	string (uint32)	A message describing the alert condition. The numeric property shows the message ID.
reason-id	uint32	Not used.

## controller-cache-parameters

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

**Table 20 controller-cache-parameters properties**

Name	Type	Description
<code>durable-id</code>	string	<ul style="list-style-type: none"><li><code>cache-params-a</code>: Cache parameters for controller A.</li><li><code>cache-params-b</code>: Cache parameters for controller B.</li></ul>
<code>controller-id</code> ( <code>controller-id-numeric</code> )	string (uint32)	<ul style="list-style-type: none"><li>B (0): Controller B.</li><li>A (1): Controller A.</li></ul>
<code>name</code>	string	<ul style="list-style-type: none"><li>Controller A Cache Parameters</li><li>Controller B Cache Parameters</li></ul>
<code>write-back-status</code> ( <code>write-back-status-numeric</code> )	string (uint32)	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 fan failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. <ul style="list-style-type: none"><li>Enabled (0): Write-back. This is the normal state.</li><li>Disabled (1): Write-through.</li><li>Not up (2): The controller is not up.</li></ul>
<code>memory-card-status</code> ( <code>memory-card-status-numeric</code> )	string (uint32)	<ul style="list-style-type: none"><li>Not Installed (0): The memory card is not installed.</li><li>Installed (1): The memory card is installed.</li><li>Unknown (2): The memory card's status is unknown.</li></ul>
<code>memory-card-health</code> ( <code>memory-card-health-numeric</code> )	string (uint32)	<ul style="list-style-type: none"><li>OK (0)</li><li>Degraded (1)</li><li>Fault (2)</li><li>Unknown (3)</li><li>N/A (4)</li></ul>
<code>cache-flush</code> ( <code>cache-flush-numeric</code> )	string (uint32)	<ul style="list-style-type: none"><li>Disabled (0): Cache flush is disabled.</li><li>Enabled (1): If the controller loses power, it will automatically write cache data to the memory card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.</li></ul>

## controller-statistics

This basetype is used by `show controller-statistics`.

**Table 21 controller-statistics properties**

Name	Type	Description
<code>durable-id</code>	string	<ul style="list-style-type: none"><li><code>controller_A</code></li><li><code>controller_B</code></li></ul>
<code>cpu-load</code>	uint32	Percentage of time the CPU is busy, from 0% to 100%.
<code>power-on-time</code>	uint32	Number of seconds since the controller was restarted.
<code>write-cache-used</code>	uint32	Percentage of write cache in use, from 0% to 100%.

**Table 21 controller-statistics properties (continued)**

Name	Type	Description
bytes-per-second (bytes-per-second-numeric)	string (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. The numeric property shows the unformatted value in blocks.
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 (data-read-numeric)	string (uint64)	Amount of data read since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
data-written (data-written-numeric)	string (uint64)	Amount of data written since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
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 (reset-time-numeric)	string (uint32)	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. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
start-sample-time (start-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when sampling started for the iops and bytes-per-second values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
stop-sample-time (stop-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when sampling stopped for the iops and bytes-per-second values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
total-power-on-hours	string	The total amount of hours the controller has been powered on in its life time.

# controllers

This basetype is used by show configuration and show controllers.

**Table 22 controllers properties**

Name	Type	Description
durable-id	string	<ul style="list-style-type: none"> <li>controller_a</li> <li>controller_b</li> </ul>
controller-id (controller-id-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
url	string	For internal use only.
serial-number	string	<ul style="list-style-type: none"> <li>Serial number.</li> <li>Not Available: The controller module is down or not installed.</li> </ul>
hardware-version	string	Hardware version.
cpld-version	string	Complex Programmable Logic Device (CPLD) firmware version.
mac-address	string	Network port MAC address.
node-wwn	string	Storage system World Wide Node Name (WWNN).
ip-address	string	Network port IP address.
ip-subnet-mask	string	Network port IP subnet mask.
ip-gateway	string	Network port gateway IPv4 address.
ip6-link-local-address	string	The link-local IPv6 address.
ip6-link-local-gateway	string	The network port gateway IPv6 address.
autoconfig (autoconfig-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): Uses static IPv6 addresses set with the add ipv6-address command.</li> <li>Enabled (1): Uses an IPv6 address computed by SLAAC or assigned by a DHCPv6 server, depending on the network configuration. If a DHCPv6 address is available, then that address is used. Otherwise SLAAC is used.</li> </ul>
ip6-auto-address	string	The controller's automatically configured IPv6 address, when applicable.
dhcpv6	string	The IP address assigned by a DHCPv6 server.
slaac-ip	string	The IP address computed by SLAAC.
ip6-auto-address-source (ip6-auto-address-source-numeric)	string (uint32)	The method used to assign or compute the address, when applicable. <ul style="list-style-type: none"> <li>DHCPv6 (0)</li> <li>IPv6 SLAAC (1)</li> </ul>
ip6-auto-gateway	string	The IPv6 address of a gateway system (auto-discovered, not configured).
ip61-address	string	From one to four pairs of manually set IPv6 addresses and network-port gateway IPv6 addresses.
ip61-gateway	string	
ip62-address	string	
ip62-gateway	string	
ip63-address	string	
ip63-gateway	string	
ip64-address	string	
ip64-gateway	string	

**Table 22 controllers properties (continued)**

Name	Type	Description
disks	uint32	Not applicable.
number-of-storage-pools	uint32	Number of 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 (drive-bus-type-numeric)	string (uint32)	Controller interface to disks. <ul style="list-style-type: none"> <li>SAS (8)</li> </ul>
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Operational (0)</li> <li>Down (1)</li> <li>Not installed (2)</li> <li>Unknown (4)</li> </ul>
failed-over (failed-over-numeric)	string (uint32)	Indicates whether the partner controller has failed over to this controller. <ul style="list-style-type: none"> <li>No (0): The partner controller has not failed over to this controller.</li> <li>Yes (1): The partner controller has either failed or been shut down, and its responsibilities have been taken over by this controller. There will be a delay between the time that the value of the status property becomes Down for one controller and the time that the value of the failed-over property becomes Yes for the other controller. This time period is the time that it takes for a controller to take over the responsibilities of its partner.</li> </ul>
fail-over-reason (fail-over-reason-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>If failed-over is No (0), Not applicable (0) appears.</li> <li>If failed-over is Yes (1), a message describes the reason. The numeric property shows the message ID.</li> </ul>
sc-fw	string	Storage Controller firmware version.
vendor	string	Controller manufacturer.
model	string	Controller model.
platform-type (platform-type-numeric)	string (uint32)	Enclosure platform type. The numeric property shows a corresponding numeric value.
multicore (multicore-numeric)	string (uint32)	Shows whether the controller module is using multiple application processing cores. <ul style="list-style-type: none"> <li>Enabled (0): Multiple cores are active.</li> <li>Disabled (1): A single core is active.</li> </ul>
sc-cpu-type	string	Storage Controller processor type.
sc-cpu-speed	uint32	Storage Controller processor speed.
internal-serial-number	string	Internal serial number of the controller.
cache-lock (cache-lock-numeric)	string (uint32)	Shows whether hosts are prevented from using the SCSI MODE SELECT command to change the storage system's write-back cache setting. <ul style="list-style-type: none"> <li>No (0): Hosts are permitted to disable write-back cache.</li> <li>Yes (1): Hosts are prevented from disabling write-back cache.</li> </ul>

**Table 22 controllers properties (continued)**

Name	Type	Description
write-policy (write-policy-numeric)	string (uint32)	The current, system-wide cache policy as determined by auto-write-through (AWT) logic. This value is not settable by users. If an AWT trigger condition (such as a fan failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. <ul style="list-style-type: none"> <li>• write-back (0): This is the normal state.</li> <li>• write-through (1)</li> <li>• Not up (2): The controller is not up.</li> </ul>
description	string	FRU long description.
part-number	string	Part number for the FRU.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date (mfg-date-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when the controller's PCBA was programmed. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
locator-led (locator-led-numeric)	string (uint32)	Shows the state of the locator LED on a controller module. <ul style="list-style-type: none"> <li>• Off (0)</li> <li>• On (1)</li> </ul>
ssd-alt-path-io-count	uint8	The ratio of I/Os that alternate between the primary path and the alternate path to the SSDs. Thus, 2 means every second I/O will go to the alternate path, or 3 means every third I/O will go to the alternate path.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Degraded (1)</li> <li>• Fault (2)</li> <li>• Unknown (3)</li> <li>• N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
position (position-numeric)	string (uint32)	Position of the controller module, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>• Top (2)</li> <li>• Bottom (3)</li> </ul>
rotation (rotation-numeric)	string (uint32)	Rotation of the controller module in the enclosure. <ul style="list-style-type: none"> <li>• 0 Degrees (0)</li> <li>• 90 Degrees (1)</li> <li>• 180 Degrees (2)</li> <li>• 270 Degrees (3)</li> </ul>
phy-isolation (phy-isolation-numeric)	string (uint32)	Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller. <ul style="list-style-type: none"> <li>• Enabled (0): PHY fault isolation is enabled.</li> <li>• Disabled (1): PHY fault isolation is disabled.</li> </ul>

**Table 22 controllers properties (continued)**

Name	Type	Description
redundancy-mode (redundancy-mode-numeric)	string (uint32)	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none"> <li>Active-Active ULP (8): Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.</li> <li>Single Controller (9): The enclosure contains a single controller.</li> <li>Failed Over (10): Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</li> <li>Down (11): Both controllers are not operational.</li> </ul>
redundancy-status (redundancy-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Redundant (2): Both controllers are operational</li> <li>Operational but not redundant (0): In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.</li> <li>Down (4): This controller is not operational.</li> <li>Unknown (5): Status information is not available.</li> </ul>
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	
ip-address	Embedded; see network-parameters.	
port-details	Embedded; see port.	
enclosure-id	Embedded; see expander-ports.	
expander-details	Embedded; see expanders.	

## debug-log-parameters

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

**Table 23 debug-log-parameters properties**

Name	Type	Description
host-dbg (host-dbg-numeric)	string (uint32)	Shows whether host interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
disk (disk-numeric)	string (uint32)	Shows whether disk interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
mem (mem-numeric)	string (uint32)	Shows whether internal memory debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
fo (fo-numeric)	string (uint32)	Shows whether failover and recovery debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
msg (msg-numeric)	string (uint32)	Shows whether inter-controller message debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>



**Table 23 debug-log-parameters properties (continued)**

<b>Name</b>	<b>Type</b>	<b>Description</b>
ioa (ioa-numeric)	string (uint32)	Shows whether standard debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
iob (iob-numeric)	string (uint32)	Shows whether resource-count debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
ioc (ioc-numeric)	string (uint32)	Shows whether upper-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
iod (iod-numeric)	string (uint32)	Shows whether lower-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
misc (misc-numeric)	string (uint32)	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
host2 (host2-numeric)	string (uint32)	Shows whether host/SCSI debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
raid (raid-numeric)	string (uint32)	Shows whether RAID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
cache (cache-numeric)	string (uint32)	Shows whether cache debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
emp (emp-numeric)	string (uint32)	Shows whether Enclosure Management Processor debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
capi (capi-numeric)	string (uint32)	Shows whether Internal Configuration API debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
mui (mui-numeric)	string (uint32)	Shows whether internal service interface debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>

**Table 23 debug-log-parameters properties (continued)**

Name	Type	Description
bkcfg (bkcfg-numeric)	string (uint32)	Shows whether internal configuration debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
awt (awt-numeric)	string (uint32)	Shows whether debug messages for auto-write-through cache triggers are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
res2 (res2-numeric)	string (uint32)	Shows whether internal debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
capi2 (capi2-numeric)	string (uint32)	Shows whether Internal Configuration API tracing messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled. This is the default.</li> <li>On (1): Enabled.</li> </ul>
dms (dms-numeric)	string (uint32)	Not supported.
fruid (fruid-numeric)	string (uint32)	Shows whether FRU ID debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
resmgr (resmgr-numeric)	string (uint32)	Shows whether Reservation Manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
init (init-numeric)	string (uint32)	Shows whether host-port initiator mode debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
ps (ps-numeric)	string (uint32)	Not supported.
cache2 (cache2-numeric)	string (uint32)	Shows whether extra cache debugging messages that may occur frequently enough to fill logs are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
rtm (rtm-numeric)	string (uint32)	Shows whether Remote Target Manager debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
hb (hb-numeric)	string (uint32)	Shows whether inter-controller heartbeat debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>

**Table 23 debug-log-parameters properties (continued)**

Name	Type	Description
autotest (autotest-numeric)	string (uint32)	Shows whether auto-test debug messages are enabled for inclusion in the Storage Controller debug log. <ul style="list-style-type: none"> <li>Off (0): Disabled.</li> <li>On (1): Enabled.</li> </ul>
cs (cs-numeric)	string (uint32)	Not supported.

## disk-groups

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

**Table 24 disk-groups properties**

Name	Type	Description
name	string	The name of the disk group.
url	string	For internal use only.
blocksize	uint32	The size of a block, in bytes.
size (size-numeric)	string (uint64)	The capacity of the disk group, formatted to use the current base, precision, and units. The numeric property shows the unformatted value in blocks.
freespace (freespace-numeric)	string (uint64)	The amount of free space in the disk group, formatted to use the current base, precision, and units. The numeric property shows the unformatted value in blocks.
raw-size (raw-size-numeric)	string (uint64)	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. The numeric property shows the unformatted value in blocks.
overhead (overhead-numeric)	string (uint64)	The amount of disk space in a disk group lost due to overhead. Overhead can be caused from differing disk sizes or from RAID calculations such as mirroring and parity. The numeric property shows the unformatted value in blocks.
storage-type (storage-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Linear (0): The disk group acts as a linear pool.</li> </ul>
pool	string	The name of the pool that contains the disk group.
pools-url	string	For internal use only.
pool-serial-number	string	The serial number of the pool that contains the disk group.
storage-tier (storage-tier-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>N/A (0)</li> <li>Performance (1): The disk group is in the highest storage tier, which uses SSDs (high speed).</li> <li>Standard (2): The disk group is in the storage tier that uses enterprise-class spinning SAS disks (10K/15K RPM).</li> <li>Archive (4): The disk group is in the lowest storage tier, which uses midline spinning SAS disks (&lt;10K RPM, high capacity).</li> <li>Read Cache (8): The disk group uses SSDs, which provide high-speed read cache for a storage pool.</li> </ul>
total-pages	uint32	For a linear disk group, 0.
allocated-pages	uint32	For a linear pool, 0.
available-pages	uint32	For a linear pool, 0.

**Table 24 disk-groups properties (continued)**

Name	Type	Description
pool-percentage	uint8	The percentage of pool capacity that the disk group occupies.
performance-rank	uint8	Disk group performance rank within the pool.
owner (owner-numeric)	string (uint32)	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> <li>• B (0): Controller B.</li> <li>• A (1): Controller A.</li> </ul>
preferred-owner (preferred-owner-numeric)	string (uint32)	Controller that owns the disk group and its volumes during normal operation. <ul style="list-style-type: none"> <li>• B (0): Controller B.</li> <li>• A (1): Controller A.</li> </ul>
raidtype (raidtype-numeric)	string (uint32)	The RAID level of the disk group. <ul style="list-style-type: none"> <li>• RAID0 (0)</li> <li>• RAID1 (1)</li> <li>• ADAPT (2)</li> <li>• RAID5 (5)</li> <li>• NRAID (6)</li> <li>• RAID10 (10)</li> <li>• RAID6 (11)</li> </ul>
diskcount	uint16	Number of disks in the disk group.
interleaved-volume-count	uint16	Number of volumes in a disk group using interleaved volumes.
spear (spear-numeric)	string (uint32)	The SPEAR mode. <ul style="list-style-type: none"> <li>• off (0): SPEAR is disabled.</li> <li>• basic (1): SPEAR is enabled in basic mode.</li> <li>• strict (2): SPEAR is enabled in strict mode.</li> <li>• trust (3): SPEAR is set to trust mode.</li> </ul>
trusted-reads (trusted-reads-numeric)	string (uint32)	Not supported.
sparecount	uint16	For a linear disk group, the number of spares assigned to the disk group.
chunksize	string	<ul style="list-style-type: none"> <li>• For RAID levels except NRAID and RAID 1, the chunk size for the disk group.</li> <li>• For NRAID and RAID 1, not applicable (N/A).</li> </ul>

**Table 24 disk-groups properties (continued)**

Name	Type	Description
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• FTOL (0): Fault tolerant.</li> <li>• FTDN (1): Fault tolerant with a down disk. The disk group is online and fault tolerant, but some of its disks are down.</li> <li>• CRIT (2): Critical. The disk group is online but isn't fault tolerant because some of its disks are down.</li> <li>• OFFL (3): Offline. Either the disk group is using offline initialization, or its disks are down and data may be lost.</li> <li>• QTCR (4): Quarantined critical. The disk group is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID 6 disk group or one disk is inaccessible for other fault-tolerant RAID levels. If the inaccessible disks come online, or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.</li> <li>• QTOF (5): Quarantined offline. The disk group is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID 0 disk group.</li> <li>• QTDN (6): Quarantined with a down disk. The RAID 6 disk group has one inaccessible disk. The disk group is fault tolerant but degraded. If the inaccessible disks come online, or if after 60 seconds from being quarantined the disk group is QTCR or QTDN, the disk group is automatically dequarantined.</li> <li>• STOP (7): The disk group is stopped.</li> <li>• MSNG (8): Missing. The disk group is online and fault tolerant, but some of its disks are missing.</li> <li>• DMGD (9): Damaged. The disk group is online and fault tolerant, but some of its disks are damaged.</li> <li>• UP (250): Up. The disk group is online and does not have fault-tolerant attributes.</li> <li>• UNKN (other): Unknown.</li> </ul>
lun	uint32	Deprecated.
min-drive-size (min-drive-size-numeric)	string (uint64)	Minimum disk size that this disk group can use, formatted to use the current base, precision, and units.  The numeric property shows the unformatted value in blocks.
create-date (create-date-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day><hour>-<minutes>-<seconds> (UTC), when the disk group was created.  The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
cache-read-ahead (cache-read-ahead-numeric)	string (uint64)	Deprecated.
cache-flush-period	uint32	Deprecated.
read-ahead-enabled (read-ahead-enabled-numeric)	string (uint32)	Deprecated.
write-back-enabled (write-back-enabled-numeric)	string (uint32)	Deprecated.
job-running	string	Same as current-job.

**Table 24 disk-groups properties (continued)**

Name	Type	Description
current-job (current-job-numeric)	string (uint32)	Job running on the disk group, if any. <ul style="list-style-type: none"> <li>• Blank (0): No job is running.</li> <li>• INIT (2): The disk group is initializing.</li> <li>• RCON (3): At least one disk in the disk group is being reconstructed.</li> <li>• VRFY (4): The disk group is being verified.</li> <li>• EXPD (5): The disk group is being expanded.</li> <li>• VRSC (6): The disk group is being scrubbed.</li> <li>• DRSC (7): A disk is being scrubbed.</li> <li>• CPYBK (11): The disk group is being used in a copyback operation.</li> <li>• PRERCON (15): At least one disk in the disk group is being preemptively reconstructed.</li> <li>• REAL (16): The ADAPT disk group is being rebalanced.</li> <li>• REFT (17): The ADAPT disk group's fault-tolerant stripes are being rebalanced.</li> <li>• RMAN (18): A disk in the ADAPT disk group is being remanufactured.</li> <li>• QDAR (20): The ADAPT disk group is being recovered.</li> </ul>
current-job-completion	string	<ul style="list-style-type: none"> <li>• 0% to 99%: Percent complete of running job.</li> <li>• Blank: No job is running (job has completed).</li> </ul>
num-array-partitions	uint32	Number of volumes in the disk group.
largest-free-partition-space (largest-free-partition-space-numeric)	string (uint64)	The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units. The numeric property shows the unformatted value in blocks.
num-drives-per-low-level-array	uint8	<ul style="list-style-type: none"> <li>• For a RAID 10 disk group, the number of disks in each subgroup.</li> <li>• For other RAID levels, 1.</li> </ul>
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.
new-partition-lba (new-partition-lba-numeric)	string (uint64)	Maximum number of 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. The numeric property shows the unformatted value in blocks.
array-drive-type (array-drive-type-numeric)	string (uint32)	Deprecated. See disk-description/disk-description-numeric.
disk-description (disk-description-numeric)	string (uint32)	Disk description. <ul style="list-style-type: none"> <li>• SATA (3): SATA disk.</li> <li>• SAS (4): Enterprise SAS spinning disk.</li> <li>• SATA-S (5): Single-ported SATA disk.</li> <li>• SSD SAS (8): SAS solid-state disk.</li> <li>• SAS MDL (11): Midline SAS spinning disk.</li> </ul>
is-job-auto-abortable (is-job-auto-abortable-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• false (0): The current job must be manually aborted before you can delete the disk group.</li> <li>• true (1): The current job will automatically abort if you delete the disk group.</li> </ul>
serial-number	string	Disk group serial number.
blocks	uint64	The number of blocks, whose size is specified by the blocksize property.
disk-dsd-enable-vdisk (disk-dsd-enable-vdisk-numeric)	string (uint32)	Not supported.
disk-dsd-delay-vdisk	uint32	Not supported.

**Table 24 disk-groups properties (continued)**

Name	Type	Description
scrub-duration-goal	uint16	Not supported.
pool-sector-format (pool-sector-format-numeric)	string (uint32)	The sector format of disks in the disk group. <ul style="list-style-type: none"> <li>512n (0): All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>512e (1): All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.</li> <li>4K (2): All disks use 4096-byte native sector size. Each logical block and physical block is 4096 bytes.</li> <li>Mixed (3): The disk group contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different sector size types (512n, 512e).</li> </ul>
stripe-width (stripe-width-numeric)	string (uint32)	Shown by the detail parameter. For an ADAPT disk group, this specifies the stripe width to use. <ul style="list-style-type: none"> <li>Blank (0): The disk group is not configured for ADAPT.</li> <li>8+2 (1): Each stripe contains 8 data chunks and 2 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 12 disks. This option is the default.</li> <li>16+2 (2): Each stripe contains 16 data chunks and 2 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 20 disks. This option has less overhead, but also less redundancy, than the 8+2 option.</li> <li>8+3 (5): Each stripe contains 8 data chunks and 3 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 12 disks. This option provides the best reliability.</li> <li>16+3 (6): Each stripe contains 16 data chunks and 3 parity chunks. Including spare capacity equivalent to the 2 largest disks, the minimum disk-group size is 20 disks. This option provides better reliability than both 8+2 and 16+2 and has less overhead than both 8+2 and 8+3.</li> </ul>
target-spare-capacity (target-spare-capacity-numeric)	string (uint64)	For an ADAPT disk group, the target spare capacity in GiB. Typically twice the capacity of the largest disk in the disk group. The numeric property shows the unformatted value in blocks.
actual-spare-capacity (actual-spare-capacity-numeric)	string (uint64)	For an ADAPT disk group, the currently available spare capacity in GiB. The numeric property shows the unformatted value in blocks.
critical-capacity (critical-capacity-numeric)	string (uint64)	For an ADAPT disk group, the amount of storage space that is not currently protected against disk loss. (Normally all data is protected against loss of two disks.) The numeric property shows the unformatted value in blocks.
degraded-capacity (degraded-capacity-numeric)	string (uint64)	For an ADAPT disk group, the amount of storage space that is protected against loss of a single disk only. (Normally all data is protected against loss of two disks.) The numeric property shows the unformatted value in blocks.
linear-volume-boundary	uint32	The block size by which volumes are aligned in a linear ADAPT disk group. Disk group space is allocated in multiples of this size to such volumes.
metadata-size (metadata-size-numeric)	string (uint64)	The amount of metadata the disk group is currently using. The numeric property shows the unformatted value in blocks.
extended-status	uint64	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.

**Table 24 disk-groups properties (continued)**

Name	Type	Description
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Degraded (1)</li> <li>• Fault (2)</li> <li>• Unknown (3)</li> <li>• N/A (4)</li> </ul>
health-reason (health-reason-numeric)	string (uint32)	If Health is not OK, a message describes the reason for the health state. The numeric property shows the message ID.
health-recommendation (health-recommendation-numeric)	string (uint32)	If Health is not OK, a message describes recommended actions to resolve the issue. The numeric property shows the message ID.
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	

## disk-group-statistics

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

**Table 25 disk-group-statistics properties**

Name	Type	Description
serial-number	string	The serial number of the disk group.
name	string	The name of the disk group.
time-since-reset	uint32	The amount of time, in seconds, since these statistics were last reset, either by a user or by a controller restart.
time-since-sample	uint32	The amount of time, in milliseconds, since this set of statistics was last sampled by the Storage Controller.
number-of-reads	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read (data-read-numeric)	string (uint64)	Amount of data read since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
data-written (data-written-numeric)	string (uint64)	Amount of data written since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
bytes-per-second (bytes-per-second-numeric)	string (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. The numeric property shows the unformatted value in blocks.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.



**Table 25 disk-group-statistics properties (continued)**

Name	Type	Description
avg-write-rsp-time	uint32	Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.
disk-group-statistics-paged	Embedded; see disk-group-statistics-paged	

## disk-hist-statistics

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

**Table 26 disk-hist-statistics properties**

Name	Type	Description
number-of-ios	uint64	Total number of read and write operations since the last sampling time.
number-of-reads	uint64	Number of read operations since the last sampling time.
number-of-writes	uint64	Number of write operations since the last sampling time.
total-data-transferred (total-data-transferred-numeric)	string (uint64)	Total amount of data read and written since the last sampling time. The numeric property shows the unformatted value in blocks.
data-read (data-read-numeric)	string (uint64)	Amount of data read since the last sampling time. The numeric property shows the unformatted value in blocks.
data-written (data-written-numeric)	string (uint64)	Amount of data written since the last sampling time. The numeric property shows the unformatted value in blocks.
total-iops	uint64	Total number of read and write operations per second since the last sampling time.
read-iops	uint64	Number of read operations per second since the last sampling time.
write-iops	uint64	Number of write operations per second since the last sampling time.
total-bytes-per-sec (total-bytes-per-sec-numeric)	string (uint64)	Total data transfer rate, in bytes per second, since the last sampling time. The numeric property shows the unformatted value in blocks.
read-bytes-per-sec (read-bytes-per-sec-numeric)	string (uint64)	Data transfer rate, in bytes per second, for read operations since the last sampling time. The numeric property shows the unformatted value in blocks.
write-bytes-per-sec (write-bytes-per-sec-numeric)	string (uint64)	Data transfer rate, in bytes per second, for write operations last sampling time. The numeric property shows the unformatted value in blocks.
queue-depth	uint64	Average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.
avg-rsp-time	uint64	Average response time, in microseconds, for read and write operations since the last sampling time.
avg-read-rsp-time	uint64	Average response time, in microseconds, for read operations since the last sampling time.
avg-write-rsp-time	uint64	Average response time, in microseconds, for write operations since the last sampling time.
avg-io-size (avg-io-size-numeric)	string (uint64)	Average data size of read and write operations since the last sampling time. The numeric property shows the unformatted value in blocks.

**Table 26 disk-hist-statistics properties (continued)**

Name	Type	Description
avg-read-io-size (avg-read-io-size-numeric)	string (uint64)	Average data size of read operations since the last sampling time. The numeric property shows the unformatted value in blocks.
avg-write-io-size (avg-write-io-size-numeric)	string (uint64)	Average data size of write operations since the last sampling time. The numeric property shows the unformatted value in blocks.
number-of-disk-errors	uint64	Total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.
sample-time (sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when the data sample was taken. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## disk-statistics

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

**Table 27 disk-statistics properties**

Name	Type	Description
durable-id	string	Disk ID in the format <code>disk_&lt;enclosure-number&gt;.&lt;disk-number&gt;</code> .
location	string	The disk location in the format <code>&lt;enclosure-number&gt;.&lt;disk-number&gt;</code> .
serial-number	string	Disk serial number.
power-on-hours	uint32	The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.
bytes-per-second (bytes-per-second-numeric)	string (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. The numeric property shows the unformatted value in blocks.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read (data-read-numeric)	string (uint64)	Amount of data read since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
data-written (data-written-numeric)	string (uint64)	Amount of data written since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
queue-depth	uint32	Number of pending I/O operations currently being serviced.

**Table 27 disk-statistics properties (continued)**

Name	Type	Description
lifetime-data-read (lifetime-data-read-numeric)	string (uint64)	The amount of data read from the disk in its lifetime. The numeric property shows the unformatted value in blocks.
lifetime-data-written (lifetime-data-written-numeric)	string (uint64)	The amount of data written to the disk in its lifetime. The numeric property shows the unformatted value in blocks.
reset-time (reset-time-numeric)	string (uint32)	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. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
start-sample-time (start-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>-<minutes>-<seconds>, when sampling started for the iops and bytes-per-second values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
stop-sample-time (stop-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>-<minutes>-<seconds>, when sampling stopped for the iops and bytes-per-second values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
smart-count-1	uint32	For port 1, the number of SMART events recorded.
smart-count-2	uint32	For port 2, the number of SMART events recorded.
io-timeout-count-1	string	For port 1, the number of timeouts accessing the disk.
io-timeout-count-2	uint32	For port 2, the number of timeouts accessing the disk.
no-response-count-1	uint32	For port 1, the number of times the disk did not respond.
no-response-count-2	uint32	For port 2, the number of times the disk did not respond.
spinup-retry-count-1	uint32	For port 1, the number of attempts by the storage system to spin up the disk.
spinup-retry-count-2	uint32	For port 2, the number of attempts by the storage system to spin up the disk.
number-of-media-errors-1	uint32	For port 1, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-media-errors-2	uint32	For port 2, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-nonmedia-errors-1	uint32	For port 1, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-nonmedia-errors-2	uint32	For port 2, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-block-reassigns-1	uint32	For port 1, the number of times blocks were reassigned to alternate locations.
number-of-block-reassigns-2	uint32	For port 2, the number of times blocks were reassigned to alternate locations.
number-of-bad-blocks-1	uint32	For port 1, the number of bad blocks encountered.
number-of-bad-blocks-2	uint32	For port 2, the number of bad blocks encountered.

## disk-update

This basetype is used by `show disks` with the `updates` parameter.

**Table 28** disk-update properties

Name	Type	Description
location	string	Disk's enclosure ID and slot number.
vendor	string	Disk vendor.
model	string	Disk model.
current-revision	string	Currently installed firmware revision.
new-revision	string	New firmware revision.
build-date	string	Date and time when the firmware was built.
sha256-checksum	string	SHA-256 checksum.
upgrade-requirement (upgrade-requirement- numeric)	string (uint32)	<ul style="list-style-type: none"><li>• Recommended (0)</li><li>• Critical (1)</li><li>• Required (2)</li><li>• Unknown (other)</li></ul>
site-link	string	URL of the website from which the firmware can be installed.
file-link	string	URL of the firmware file.
description	string	Description of the firmware file.

## dns-parameters

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

**Table 29** dns-parameters properties

Name	Type	Description
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• B (0): Controller B.</li><li>• A (1): Controller A.</li></ul>
name-servers	string	Configured name server IP address values.
search-domains	string	Configured domain name values.

## drive-parameters

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

**Table 30** drive-parameters properties

Name	Type	Description
smart (smart-numeric)	string (uint32)	Shows whether SMART (Self-Monitoring Analysis and Reporting Technology) is enabled or disabled for disks. <ul style="list-style-type: none"><li>• Detect-Only (0): Each disk in the system retains its individual SMART setting, as will new disks added to the system.</li><li>• Enabled (1): SMART is enabled for all disks in the system and will be enabled for new disks added to the system.</li><li>• Disabled (2): SMART is disabled for all disks in the system and will be disabled for new disks added to the system.</li></ul>
drive-write-back-cache (drive-write-back-cache-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• Disabled (2): Disk write-back cache is disabled for all disks in the system and will be enabled for new disks added to the system. This value cannot be changed.</li></ul>
drive-timeout-retry-max	uint8	Maximum number of times a timed-out I/O operation can be retried before the operation is failed. This value cannot be changed.
drive-attempt-timeout	uint8	Number of seconds before an I/O operation is aborted and possibly retried. This value cannot be changed.
drive-overall-timeout	uint8	Total time in seconds before an I/O operation is failed regardless of the <code>drive-attempt-timeout</code> and <code>drive-timeout-retry-max</code> settings. This value cannot be changed.
disk-dsd-enable (disk-dsd-enable-numeric)	string (uint32)	Not supported.
disk-dsd-delay	uint16	Not supported.
remanufacture (remanufacture-numeric)	string (uint32)	Shows whether the Autonomous Drive Regeneration (ADR) feature is enabled or disabled. ADR attempts remanufacture of a disk drive that experiences a head failure. ADR is supported only for ADAPT disk groups. <ul style="list-style-type: none"><li>• Disabled (0)</li><li>• Enabled (1)</li></ul>

## drive-summary

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

**Table 31** drive-summary properties

Name	Type	Description
durable-id	string	Disk ID in the format <code>disk_&lt;enclosure-number&gt;.&lt;disk-number&gt;</code> .
serial-number	string	Disk serial number.
disk-hist-statistics	Embedded; see <code>disk-hist-statistics</code> .	

## drives

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

**Table 32** drives properties

Name	Type	Description
durable-id	string	Disk ID in the format <code>disk_&lt;enclosure-ID&gt;.&lt;slot-number&gt;</code> .
enclosure-id	uint32	Enclosure ID.
drawer-id	uint8	Not applicable.
slot	uint32	Disk slot number.
location	string	Disk's enclosure ID and slot number.
url	string	For internal use only.
port	uint32	For internal use only.
scsi-id	uint32	SCSI ID assigned to this disk for the primary channel.
blocksize	uint32	The size of a block, in bytes.
blocks	uint64	The number of blocks, whose size is specified by the <code>blocksize</code> property.
serial-number	string	Disk serial number.
vendor	string	Disk vendor.
model	string	Disk model.
revision	string	Disk firmware revision level.
secondary-channel	uint32	SCSI ID assigned to this disk for the secondary channel.
container-index	uint32	Container index.
member-index	uint32	Index for this disk in the disk group list.
description (description-numeric)	string (uint32)	Disk description. <ul style="list-style-type: none"><li>• SATA (3): SATA disk.</li><li>• SAS (4): Enterprise SAS spinning disk.</li><li>• SATA-S (5): Single-ported SATA disk.</li><li>• SSD SAS (8): SAS solid-state disk.</li><li>• SAS MDL (11): Midline SAS spinning disk.</li></ul>
architecture (architecture-numeric)	string (uint32)	Disk architecture. <ul style="list-style-type: none"><li>• SSD (0)</li><li>• HDD (1)</li></ul>
interface	string	Disk interface: SAS (0).
single-ported (single-ported-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• Disabled (0): The disk has a dual-port connection to the midplane.</li><li>• Enabled (1): The disk has a single-port connection to the midplane.</li></ul>
type (type-numeric)	string (uint32)	Deprecated. See <code>description</code> , <code>architecture</code> , <code>interface</code> , and <code>single-ported</code> .

**Table 32 drives properties (continued)**

Name	Type	Description
usage (usage-numeric)	string (uint32)	Shows the disk's usage. <ul style="list-style-type: none"> <li>• AVAIL (0): Available.</li> <li>• LINEAR POOL (1): The disk is a member of a linear disk group.</li> <li>• DEDICATED SP (2): The disk is a spare assigned to a linear disk group.</li> <li>• GLOBAL SP (3): The disk is a global spare.</li> <li>• LEFTOVR (5): The disk is a leftover.</li> <li>• FAILED (7): The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.</li> <li>• UNUSABLE (8): The disk cannot be used in a disk group. Possible reasons include: <ul style="list-style-type: none"> <li>• The system is secured and the disk is data locked with a different passphrase.</li> <li>• The system is secured/locked (no passphrase available) and the disk is data/locked.</li> <li>• The system is secured and the disk is not FDE capable.</li> <li>• The disk is from an unsupported vendor.</li> </ul> </li> </ul>
job-running (job-running-numeric)	string (uint32)	Job running on the disk, if any. <ul style="list-style-type: none"> <li>• Blank (0): No job is running.</li> <li>• INIT (2): The disk group is being initialized.</li> <li>• RCON (3): The disk is being used in a reconstruct operation.</li> <li>• VRFY (4): The disk group is being verified.</li> <li>• EXPD (5): The disk group is being expanded.</li> <li>• VRSC (6): The disk group is being scrubbed.</li> <li>• DRSC (7): The disk is being scrubbed.</li> <li>• CPYBK (11): The disk group is being used in a copyback operation.</li> <li>• PRERCON (15): The disk is being used in a preemptive reconstruct operation.</li> <li>• RBAL (16): The ADAPT disk group is being rebalanced.</li> <li>• REFT (17): The ADAPT disk group's fault-tolerant stripes are being rebalanced.</li> <li>• RMAN (18): A disk in the ADAPT disk group is being remanufactured.</li> <li>• ERASE (19): The disk is being erased.</li> </ul>
state	string	Deprecated. See usage and job-running.
current-job-completion	string	<ul style="list-style-type: none"> <li>• 0% to 99%: Percent complete of running job.</li> <li>• Blank: No job is running (job has completed).</li> </ul>
firmware-update-status (firmware-update-status-numeric)	string (uint32)	Indicates the update status of drive firmware on each drive after the user has run activate disk-firmware. <ul style="list-style-type: none"> <li>• Unsupported (0): The drive model is not in the user-specified model list, or there is no model list because activate disk-firmware has not been run.</li> <li>• Updated (1): Current drive firmware revision matches the uploaded firmware file version and the disk model is in the user-specified model list.</li> <li>• Not Updated (2): The disk model is in the user-specified model-list but the current firmware does not match the uploaded drive firmware file version.</li> <li>• N/A (3): No drive firmware update file has been uploaded to the controller.</li> </ul>
remanufacture (remanufacture-numeric)	string (uint32)	Shows whether the disk has been remanufactured by the Autonomous Drive Regeneration (ADR) feature. <ul style="list-style-type: none"> <li>• No (0): The disk has not been remanufactured.</li> <li>• Yes (1): The disk has been remanufactured.</li> </ul> ADR is supported only for ADAPT disk groups.
supports-unmap (supports-unmap-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• No (0): The disk does not support the SCSI UNMAP command.</li> <li>• Yes (1): The disk supports the SCSI UNMAP command.</li> </ul>

**Table 32 drives properties (continued)**

Name	Type	Description
blink	uint32	Deprecated. For locator LED status, see <code>locator-led</code> .
locator-led (locator-led-numeric)	string (uint32)	Shows the state of the locator LED on a disk. <ul style="list-style-type: none"> <li>Off (0)</li> <li>On (1)</li> </ul>
speed	uint32	Not used.
smart (smart-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): SMART is disabled for this disk.</li> <li>Enabled (1): SMART is enabled for this disk.</li> </ul>
dual-port	uint32	<ul style="list-style-type: none"> <li>0: Single-ported disk.</li> <li>1: Dual-ported disk.</li> </ul>
error	uint32	Not used.
fc-p1-channel	uint32	Port 1 channel ID.
fc-p1-device-id	uint32	Port 1 device ID.
fc-p1-node-wwn	string	Port 1 WWNN.
fc-p1-port-wwn	string	Port 1 WWPNN.
fc-p1-unit-number	uint32	Port 1 unit number.
fc-p2-channel	uint32	Port 2 channel number.
fc-p2-device-id	uint32	Port 2 device ID.
fc-p2-node-wwn	string	Port 2 WWNN.
fc-p2-port-wwn	string	Port 2 WWPNN.
fc-p2-unit-number	uint32	Port 2 unit number.
drive-down-code	uint8	Numeric code indicating why the disk is down.
owner (owner-numeric)	string (uint32)	Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
index	uint32	For internal use only.
rpn	uint32	The speed of a spinning disk, in thousands of revolutions per minute, as specified by the disk vendor. For an SSD, 0 is shown.
size (size-numeric)	string (uint64)	Disk capacity, formatted to use the current base, precision, and units. The numeric property shows the unformatted value in blocks.
sector-format (sector-format-numeric)	string (uint32)	The disk sector format. <ul style="list-style-type: none"> <li>512n (0): The disk uses 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>512e (1): The disk uses 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.</li> <li>4K (2): All disks use 4096-byte native sector size. Each logical block and physical block is 4096 bytes.</li> </ul>



**Table 32 drives properties (continued)**

Name	Type	Description
transfer-rate (transfer-rate-numeric)	string (uint32)	Disk data transfer rate in Gb/s. It is normal behavior for the rate to vary. <ul style="list-style-type: none"> <li>3.0 (2)</li> <li>6.0 (3)</li> <li>12.0 (4)</li> <li>1.5 (10)</li> </ul> <p>Some 6Gb/s disks might not consistently support a 6Gb/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3Gb/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.</p>
attributes (attributes-numeric)	string (uint32)	Shows which controller a single-ported disk is connected to. <ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> <li>Blank (2): Connected to both controllers (dual-ported).</li> <li>Invalid (3)</li> </ul>
enclosure-wwn	string	Enclosure WWN.
enclosures-url	string	For internal use only.
status	string	Disk status. <ul style="list-style-type: none"> <li>Up: The disk is present and is properly communicating with the expander.</li> <li>Spun Down: The disk is present and has been spun down by the drive spin down feature.</li> <li>Warning: The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in <code>Error</code> status.</li> <li>Error: The disk is present but is not detected by the expander.</li> <li>Unknown: Initial status when the disk is first detected or powered on.</li> <li>Not Present: The disk slot indicates that no disk is present.</li> <li>Unrecoverable: The disk is present but has unrecoverable errors.</li> <li>Unavailable: The disk is present but cannot communicate with the expander.</li> <li>Unsupported: The disk is present but is an unsupported type.</li> </ul>
recon-state (recon-state-numeric)	string (uint32)	The state of the disk (source or destination) if it is involved in a reconstruct operation. <ul style="list-style-type: none"> <li>N/A (0): This disk is not being used in a reconstruct operation.</li> <li>From (1): This disk is being used as the source of a reconstruct operation.</li> <li>To (2): This disk is being used as the target of a reconstruct operation.</li> </ul>
copyback-state (copyback-state-numeric)	string (uint32)	The state of the disk (source or destination) if it is involved in a copyback operation. <ul style="list-style-type: none"> <li>N/A (0): This disk is not being used in a copyback operation.</li> <li>From (1): This disk is being used as the source of a copyback operation.</li> <li>To (2): This disk is being used as the target of a copyback operation.</li> </ul>
virtual-disk-serial	string	If the disk is in a linear disk group, the disk group name. Otherwise, blank.
disk-group	string	If the disk is in a disk group, the disk group name. Otherwise, blank.
storage-pool-name	string	If the disk is in a pool, the pool name. Otherwise, blank.
storage-tier (storage-tier-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>N/A (0): Not applicable.</li> <li>Standard (2): The disk is in the storage tier that uses enterprise-class spinning SAS disks (10K/15K RPM).</li> <li>Archive (4): The disk is in the lowest storage tier, which uses midline spinning SAS disks (&lt;10K RPM, high capacity).</li> </ul>

**Table 32 drives properties (continued)**

Name	Type	Description
ssd-life-left (ssd-life-left-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>100% to 0%: For an SSD, this value shows the percentage of disk life remaining. This value is polled every 5 minutes. When the value decreases to 20%, event 502 is logged with Informational severity. Event 502 is logged again with Warning severity when the value decreases to 5%, 2% or 1%, and 0%. If a disk crosses more than one percentage threshold during a polling period, only the lowest percentage will be reported.</li> <li>N/A (255): The disk is not an SSD.</li> </ul>
led-status (led-status-numeric)	string (uint32)	<p>Disk LED status.</p> <ul style="list-style-type: none"> <li>Online (1): The disk is operating normally.</li> <li>Rebuild (2): The disk's disk group is being reconstructed.</li> <li>Fault (4): The disk has a fault.</li> <li>ID (16): The disk's identification LED is illuminated.</li> <li>Remove (32): The disk is ready to be removed from the enclosure.</li> </ul>
disk-dsd-count	uint32	Not supported.
spun-down	uint32	<p>Shows whether the disk is spun down by the DSD feature.</p> <ul style="list-style-type: none"> <li>0: Not spun down.</li> <li>1: Spun down.</li> </ul>
number-of-ios	uint64	Total number of I/O operations (reads and writes).
total-data-transferred (total-data-transferred-numeric)	string (uint64)	<p>The total number of bytes transferred.</p> <p>The numeric property shows the unformatted value in blocks.</p>
avg-rsp-time	uint64	Average I/O response time in microseconds.
fips-capable (fips-capable-numeric)	string (uint32)	<p>Shows whether the disk can be secured with Federal Information Processing Standards (FIPS).</p> <ul style="list-style-type: none"> <li>No (0)</li> <li>Yes (1)</li> </ul>
fde-state (fde-state-numeric)	string (uint32)	<p>The FDE state of the disk.</p> <ul style="list-style-type: none"> <li>Unknown (0): The FDE state is unknown.</li> <li>Not FDE Capable (1): The disk is not FDE-capable.</li> <li>Not Secured (2): The disk is not secured.</li> <li>Secured, Unlocked (3): The system is secured and the disk is unlocked.</li> <li>Secured, Locked (4): The system is secured and the disk is locked to data access, preventing its use.</li> <li>FDE Protocol Failure (5): A temporary state that can occur while the system is securing the disk.</li> <li>Secured, Unlocked, FIPS (7): The system is secured to the FIPS standard and the disk is unlocked.</li> </ul>
lock-key-id	string	Current lock ID, or 00000000 if not set.
import-lock-key-id	string	Import lock ID, or 00000000 if not set.
fde-config-time (fde-config-time-numeric)	string (uint32)	<p>If the system is secured, the time at which the current lock ID was set in the format &lt;year&gt;-&lt;month&gt;-&lt;day&gt; &lt;hour&gt;:&lt;minutes&gt;:&lt;seconds&gt; (UTC).</p> <p>The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.</p> <p>If not secured, N/A (0).</p>
temperature (temperature-numeric)	string (uint32)	<p>Temperature of the disk.</p> <p>The numeric property shows the unformatted value.</p>

**Table 32 drives properties (continued)**

Name	Type	Description
temperature-status (temperature-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (1): The disk sensor is present and detects no error condition.</li> <li>• Critical (2): The disk sensor detected a critical error condition. The temperature currently exceeds the critical threshold.</li> <li>• Warning (3): The disk sensor detected a non-critical error condition. The temperature is between the warning and critical thresholds.</li> <li>• Unknown (other): The disk sensor is present but status is not available.</li> </ul>
pi-formatted (pi-formatted-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• No (0): Not formatted for PI operation.</li> <li>• Yes (2): Formatted for PI operation.</li> <li>• Unsupported (4): Cannot support PI operation.</li> </ul>
power-on-hours	uint32	The total number of hours that the disk has been powered on since it was manufactured. This value is stored in disk metadata and is updated in 30-minute increments.
extended-status	uint64	<p>A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.</p> <ul style="list-style-type: none"> <li>• 0x00000000: OK</li> <li>• 0x00000001: Single-pathed, A down</li> <li>• 0x00000002: SSD exhausted</li> <li>• 0x00000004: Degraded warning</li> <li>• 0x00000008: Spun down</li> <li>• 0x00000010: Downed by user</li> <li>• 0x00000020: Reconstruction failed</li> <li>• 0x00000040: Leftover, no reason</li> <li>• 0x00000080: Previously missing</li> <li>• 0x00000100: Medium error</li> <li>• 0x00000200: SMART event</li> <li>• 0x00000400: Hardware failure</li> <li>• 0x00000800: Foreign disk unlocked</li> <li>• 0x00001000: Non-FDE disk</li> <li>• 0x00002000: FDE protocol failure</li> <li>• 0x00004000: Using alternate path</li> <li>• 0x00008000: Initialization failed</li> <li>• 0x00010000: Unsupported type</li> <li>• 0x00020000: Protection-information error</li> <li>• 0x00040000: Recovered errors</li> <li>• 0x00080000: Unexpected leftover</li> <li>• 0x00100000: Not auto-secured</li> <li>• 0x00200000: SSD nearly exhausted</li> <li>• 0x00400000: Degraded critical</li> <li>• 0x00800000: Single-pathed, B down</li> <li>• 0x01000000: Foreign disk secured</li> <li>• 0x02000000: Foreign disk secured and locked</li> <li>• 0x04000000: Unexpected usage</li> <li>• 0x08000000: Enclosure fault sensed</li> <li>• 0x10000000: Unsupported block size</li> <li>• 0x20000000: Unsupported vendor</li> <li>• 0x40000000: Timed-out</li> <li>• 0x80000000: Slow critical</li> <li>• 0x100000000: Slow degraded</li> <li>• 0x200000000: Preemptive pending degraded</li> </ul>

**Table 32 drives properties (continued)**

Name	Type	Description
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason (health-reason-numeric)	string (uint32)	If Health is not OK, a message describes the reason for the health state. The numeric property shows the message ID.
health-recommendation (health-recommendation-numeric)	string (uint32)	If Health is not OK, a message describes recommended actions to resolve the issue. The numeric property shows the message ID.
conditions	Embedded; see health-conditions.	

## email-parameters

This basetype is used by show email-parameters.

**Table 33 email-parameters properties**

Name	Type	Description
email-notification (email-notification-numeric)	string (uint32)	Shows whether email (SMTP) notification of events is enabled. <ul style="list-style-type: none"> <li>Disabled (0): Email notification is disabled.</li> <li>Enabled (1): Email notification is enabled.</li> </ul>
email-notification-filter (email-notification-filter-numeric)	string (uint32)	The minimum severity for which the system should send notifications: <ul style="list-style-type: none"> <li>info (0): Sends notifications for all events.</li> <li>resolved (1): Sends notifications for Resolved, Warning, Error, and Critical events.</li> <li>warn (2): Sends notifications for Warning, Error, and Critical events.</li> <li>error (3): Sends notifications for Error and Critical events.</li> <li>crit (4): Sends notifications for Critical events only.</li> <li>none (5): Email notification is disabled.</li> </ul> This parameter does not apply to managed-logs notifications.
email-notify-address-1	string	Up to three email addresses for recipients of event notifications.
email-notify-address-2	string	
email-notify-address-3	string	
email-notify-address-4	string	The email address for the log-collection system used by the log-management feature.
email-security-protocol (email-security-protocol-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>None (0): No authentication is enabled.</li> <li>TLS (1): Transport Layer Security (TLS) authentication is enabled.</li> <li>SSL (2): Secure Sockets Layer (SSL) authentication is enabled.</li> </ul>
email-smtp-port	string	The port on which the configured SMTP server is listening.
email-server	string	The IP address of the SMTP mail server to use for the email messages.
email-domain	string	The domain name that, with the sender name, forms the "from" address for remote notification.

**Table 33 email-parameters properties (continued)**

Name	Type	Description
email-sender	string	The sender name that, with the domain name, forms the "from" address for remote notification.
email-sender-password	string	The sender password. For a configured sender, the password is represented by eight asterisks.
alert-notification (alert-notification-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• none (5): Email notification for alerts is disabled.</li> <li>• all (6): Sends notifications for all alerts.</li> </ul>
event-notification (event-notification-numeric)	string (uint32)	<p>The minimum severity for which the system should send event notifications:</p> <ul style="list-style-type: none"> <li>• crit (4): Sends notifications for Critical events only.</li> <li>• error (3): Sends notifications for Error and Critical events.</li> <li>• warn (2): Sends notifications for Warning, Error, and Critical events.</li> <li>• resolved (1): Sends notifications for Resolved, Warning, Error, and Critical events.</li> <li>• info(0): Sends notifications for all events.</li> <li>• none(5): Disables email notification.</li> </ul> <p>This parameter does not apply to managed-logs notifications.</p>
persistent-alerts (persistent-alerts-numeric)	string (uint32)	Not applicable.
email-include-logs (email-include-logs-numeric)	string (uint32)	<p>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.</p> <ul style="list-style-type: none"> <li>• Disabled (0)</li> <li>• Enabled (1)</li> </ul>

## enclosure-fru

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

**Table 34 enclosure-fru properties**

Name	Type	Description
name	string	<p>FRU name.</p> <ul style="list-style-type: none"> <li>• CHASSIS_MIDPLANE: Chassis and midplane circuit board.</li> <li>• RAID_IOM: Controller module.</li> <li>• BOD_IOM: Expansion module.</li> </ul>
description	string	FRU long description.
part-number	string	FRU part number.
serial-number	string	FRU serial number.
revision	string	FRU hardware revision level.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date (mfg-date-numeric)	string (uint32)	<p>Date and time, in the format &lt;year&gt;-&lt;month&gt;-&lt;day&gt; &lt;hour&gt;:&lt;minutes&gt;:&lt;seconds&gt; (UTC), when a PCBA was programmed or a power supply module was manufactured.</p> <p>The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.</p>
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID (global manufacturing code) of the FRU manufacturer.

**Table 34 enclosure-fru properties (continued)**

Name	Type	Description
fru-location	string	Location of the FRU in the enclosure. <ul style="list-style-type: none"> <li>• MID-PLANE SLOT: Chassis midplane.</li> <li>• LEFT IOM SLOT: Controller module or expansion module A, in the left slot as viewed from the back.</li> <li>• RIGHT IOM SLOT: Controller module or expansion module B, in the right slot as viewed from the back.</li> <li>• LEFT PSU SLOT: Power supply module on the left, as viewed from the back.</li> <li>• RIGHT PSU SLOT: Power supply module on the right, as viewed from the back.</li> <li>• CONTROLLER A: Controller module A.</li> <li>• CONTROLLER B: Controller module B.</li> </ul>
configuration-serialnumber	string	Configuration serial number.
fru-status (fru-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Invalid Data (0): The FRU ID data is invalid. The FRU's EEPROM is improperly programmed.</li> <li>• Fault (1): The FRU's health is Degraded or Fault.</li> <li>• Absent (2): The FRU is not present.</li> <li>• Power OFF (3): The FRU is powered off.</li> <li>• OK (4): The FRU is operating normally.</li> </ul>
original-serialnumber	string	For a power supply module, the original manufacturer serial number. Otherwise, N/A
original-partnumber	string	For a power supply module, the original manufacturer part number. Otherwise, N/A
original-revision	string	For a power supply module, the original manufacturer hardware revision. Otherwise, N/A
enclosure-id	uint32	Enclosure ID.

## enclosure-list

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

**Table 35 enclosure-list properties**

Name	Type	Description
status (status-numeric)	string (uint32)	Disk slot status. <ul style="list-style-type: none"> <li>• Unsupported (0): The disk is present but is an unsupported type.</li> <li>• Up (1): The disk is present and is properly communicating with the expander.</li> <li>• Error (2): The disk is present but is not detected by the expander.</li> <li>• Warning (3): The disk is present but the system is having communication problems with the disk LED processor. For disk and midplane types where this processor also controls power to the disk, power-on failure will result in Error status.</li> <li>• Unrecoverable (4): The disk is present but has unrecoverable errors.</li> <li>• Not Present (5): The disk slot indicates that no disk is present.</li> <li>• Unknown (6): Initial status when the disk is first detected or powered on.</li> <li>• Unavailable (7): The disk is present but cannot communicate with the expander.</li> <li>• Spun Down (20): The disk is present and has been spun down by the drive spin down feature.</li> </ul>
enclosure-id	uint32	Enclosure ID.
slot	uint32	Disk slot number.
vendor	string	Disk vendor.
model	string	Disk model.

**Table 35 enclosure-list properties (continued)**

Name	Type	Description
serial-number	string	Disk serial number.
size (size-numeric)	string (uint64)	Disk capacity, formatted to use the current base, precision, and units. The numeric property shows the unformatted value in blocks.

## enclosures

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

**Table 36 enclosures properties**

Name	Type	Description
durable-id	string	Enclosure ID in the format <code>enclosure_&lt;number&gt;</code> .
enclosure-id	uint8	Enclosure ID.
url	string	For internal use only.
enclosure-wwn	string	Enclosure WWN.
name	string	Enclosure name.
type (type-numeric)	string (uint32)	Internal name for the enclosure type. The numeric property shows a corresponding numeric value.
iom-type (iom-type-numeric)	string (uint32)	I/O module type. The numeric property shows a corresponding numeric value.
platform-type (platform-type-numeric)	string (uint32)	Hardware platform type. The numeric property shows a corresponding numeric value.
board-model (board-model-numeric)	string (uint32)	Board model. The numeric property shows a corresponding numeric value.
location	string	Enclosure location, or blank if not set.
rack-number	uint8	Number of the rack that contains the enclosure.
rack-position	uint8	Position of the enclosure in the rack.
number-of-coolings-elements	uint8	Number of fan units in the enclosure.
number-of-disks	uint8	Number of disk slots (not installed disks) in the enclosure.
number-of-power-supplies	uint8	Number of power supplies in the enclosure.
status (status-numeric)	string (uint32)	Enclosure status. <ul style="list-style-type: none"> <li>• Unsupported (0)</li> <li>• OK (1)</li> <li>• Critical (2)</li> <li>• Warning (3)</li> <li>• Unrecoverable (4)</li> <li>• Not Installed (5)</li> <li>• Unknown (6)</li> <li>• Unavailable (7)</li> </ul>
extended-status	hex32	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.

**Table 36 enclosures properties (continued)**

Name	Type	Description
midplane-serial-number	string	Midplane serial number.
vendor	string	Enclosure vendor.
model	string	Enclosure model.
fru-tlapn	string	FRU top-level assembly part number.
fru-shortname	string	FRU short description.
fru-location	string	FRU location. <ul style="list-style-type: none"> <li>MID-PLANE SLOT: Chassis midplane.</li> </ul>
part-number	string	FRU part number.
mfg-date (mfg-date-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when a PCBA was programmed or a power supply module was manufactured. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
description	string	FRU long description.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
emp-a-rev	string	Not supported.
emp-b-rev	string	Not supported.
gem-version-a	string	GEM firmware component version in controller module A.
gem-version-b	string	GEM firmware component version in controller module B.
rows	uint8	Number of rows of disk slots.
columns	uint8	Number of columns of disk slots.
slots	uint8	Number of disk slots in this enclosure.
locator-led (locator-led-numeric)	string (uint32)	Shows the state of the locator LED on an enclosure. <ul style="list-style-type: none"> <li>Off (0)</li> <li>On (1)</li> </ul>
drive-orientation (drive-orientation-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>vertical (0): Disks are oriented vertically.</li> <li>horizontal (1): Disks are oriented horizontally.</li> </ul>
enclosure-arrangement (enclosure-arrangement-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>vertical (0): Disks are numbered vertically (by column from top to bottom, proceeding rightward).</li> <li>horizontal (1): Disks are numbered horizontally (by row from left to right, proceeding downward).</li> </ul>
emp-a-busid	string	Not supported.
emp-a-targetid	string	Not supported.
emp-b-busid	string	Not supported.
emp-b-targetid	string	Not supported.
emp-a	string	Not supported.
emp-a-ch-id-rev	string	Not supported.
emp-b	string	Not supported.
emp-b-ch-id-rev	string	Not supported.



**Table 36 enclosures properties (continued)**

Name	Type	Description
midplane-type (midplane-type-numeric)	string (uint32)	An abbreviation that describes the enclosure midplane's rack-unit height, maximum number of disks, maximum data rate to disks (Gb/s), and hardware version. The numeric property shows a corresponding numeric value.
midplane-rev	uint8	Midplane revision number.
enclosure-power	string	Enclosure power in watts.
pcie2-capable (pcie2-capable-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>False (0): Enclosure is not capable of using PCI Express version 2.</li> <li>True (1): Enclosure is capable of using PCI Express version 2.</li> </ul>
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue..
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	
controllers	Embedded; see controllers, io-modules.	
power-supplies	Embedded; see power-supplies.	

## event-subscriber

This basetype is used by show event-subscriber.

**Table 37 event-subscriber properties**

Name	Type	Description
destination	string	The subscription destination.
protocol	string	The subscription protocol: Redfish
context	string	The subscription context.
subscription-type	string	The subscription type.
subscription-id	string	The subscriber ID generated by the system when the subscriber is added.
registry-prefix	string	The registry prefix.
resource-type	string	The resource type.
delivery-retry-policy	string	The delivery retry policy.
controller	string	The controller on which the subscriber was added: A or B. This has no effect on which controller issues notifications.

## events

This basetype is used by `show events`.

**Table 38** events properties

Name	Type	Description
time-stamp (time-stamp-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when this event was detected. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
event-code	string	Event code. For event-code descriptions, see the <i>Event Descriptions Reference Guide</i> .
event-id	string	Event ID.
url	string	For internal use only.
model	string	Controller model.
serial-number	string	Controller serial number.
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"><li>B (0): Controller B.</li><li>A (1): Controller A.</li></ul>
severity (severity-numeric)	string (uint32)	Event severity. <ul style="list-style-type: none"><li>INFORMATIONAL (0): A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.</li><li>WARNING (1): A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.</li><li>ERROR (2): A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.</li><li>CRITICAL (3): A failure occurred that may cause a controller to shut down. Correct the problem <i>immediately</i>.</li><li>RESOLVED (4): A condition that caused an event to be logged has been resolved.</li></ul>
message	string	Brief description of the event that occurred. For some events, the message includes data about affected components.
additional-information	string	Shows additional information, if available, about the event.
recommended-action	string	Recommends actions to take, if any, to resolve the issue reported by the event.

## eventsLogs

This basetype is used by `show events` when the `logs` parameter is specified.

**Table 39** eventsLogs properties

Name	Type	Description
event-id	string	Event ID prefaced by A or B to identify the controller that logged the event.
time-stamp (time-stamp-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when this event was detected. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
event-code	string	Event code identifying the type of event to help diagnose problems.

**Table 39 eventsLogs properties (continued)**

Name	Type	Description
severity (severity-numeric)	string (uint32)	Event severity. <ul style="list-style-type: none"> <li>INFORMATIONAL (0): A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.</li> <li>WARNING (1): A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.</li> <li>ERROR (2): A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.</li> <li>CRITICAL (3): A failure occurred that may cause a controller to shut down. Correct the problem <i>immediately</i>.</li> <li>RESOLVED (4): A condition that caused an event to be logged has been resolved.</li> </ul>
message	string	Message giving details about the event.

## expander-ports

This basetype is used by show sas-link-health.

**Table 40 expander-ports properties**

Name	Type	Description
durable-id	string	Expander port ID.
enclosure-id	uint32	Enclosure ID.
controller (controller-id-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
sas-port-type (sas-port-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Expansion Port Egress (3)</li> <li>Expansion Port Ingress (4)</li> </ul>
sas-port-index	uint32	The expander port index. For an IOM with two expansion ports, this value differentiates the two egress ports (0-1) and two ingress ports (0-1) for each path A and B. This value is appended to the port's durable-id value.
name	string	The expansion port name.
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Up (0): The port is cabled and has an I/O link.</li> <li>Warning (1): Not all of the port's PHYs are up.</li> <li>Error (2): The port is reporting an error condition.</li> <li>Not Present (3): The controller module is not installed or is down.</li> <li>Unknown (4): The status is unknown.</li> <li>Disconnected (6): Either no I/O link is detected or the port is not cabled.</li> </ul>
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue..
conditions	Embedded; see health-conditions.	

## expander-versions

This basetype is used by `show versions` when the `frus` parameter is specified.

**Table 41** expander-versions properties

Name	Type	Description
name	string	Expander name.
location	string	Expander location.
enclosure-id	uint32	Enclosure ID.
drawer-id	uint8	Not applicable.
expander-id	uint8	Expander ID.
controller (controller-numeric)	string	<ul style="list-style-type: none"><li>• B (0): Controller B.</li><li>• A (1): Controller A.</li></ul>
fw-revision	string	IOM firmware version, short form.
fw-revision-full	string	IOM firmware version, long form.
vpd-format-version	string	Vital Product Data (VPD) version.
vpd-crc	string	VPD CRC.
cfg-format-version	string	Configuration format version.
cfg-crc	string	CFG CRC.
bootloader-version	string	Boot loader version.
cpld-version	string	Complex Programmable Logic Device (CPLD) firmware version.

## expanders

This basetype is used by `show enclosures`.

**Table 42** expanders properties

Name	Type	Description
durable-id	string	Expander ID.
enclosure-id	uint32	Enclosure ID.
drawer-id	uint8	Not applicable.
dom-id	uint32	For internal use only.
path-id	string	<ul style="list-style-type: none"><li>• A (1): Controller A.</li><li>• B (0): Controller B.</li></ul>
name	string	Expander name.
location	string	Expander location.
status (status-numeric)	string (uint32)	Enclosure status. <ul style="list-style-type: none"><li>• Unsupported (0)</li><li>• OK (1)</li><li>• Critical (2)</li><li>• Warning (3)</li><li>• Unrecoverable (4)</li><li>• Not Installed (5)</li><li>• Unknown (6)</li><li>• Unavailable (7)</li></ul>

**Table 42 expanders properties (continued)**

Name	Type	Description
extended-status	hex32	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.
fw-revision	string	Expander firmware revision.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Degraded (1)</li> <li>• Fault (2)</li> <li>• Unknown (3)</li> <li>• N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	
sas-port-details	Embedded; see expander-ports.	

## fan

This basetype is used by `show fans` and `show power-supplies`.

**Table 43 fan properties**

Name	Type	Description
durable-id	string	Fan ID in the format <code>fan_&lt;enclosure-ID&gt;.&lt;fan-number&gt;</code> .
url	string	For internal use only.
name	string	Fan name.
location	string	Fan location.
status-ses (status-ses-numeric)	string (uint32)	Fan status. <ul style="list-style-type: none"> <li>• Unsupported (0)</li> <li>• OK (1)</li> <li>• Critical (2)</li> <li>• Warning (3)</li> <li>• Unrecoverable (4)</li> <li>• Not Installed (5)</li> <li>• Unknown (6)</li> <li>• Unavailable (7)</li> </ul>
extended-status	hex32	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.
status (status-numeric)	string (uint32)	Fan unit status. <ul style="list-style-type: none"> <li>• Up (0)</li> <li>• Error (1)</li> <li>• Off (2)</li> <li>• Missing (3)</li> </ul>
speed	uint32	Fan speed (revolutions per minute).
position (position-numeric)	string (uint32)	Fan position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>• Left (0)</li> <li>• Right (1)</li> </ul>

**Table 43 fan properties (continued)**

Name	Type	Description
serial-number	string	<ul style="list-style-type: none"> <li>N/A: Not applicable.</li> </ul>
part-number	string	<ul style="list-style-type: none"> <li>N/A: Not applicable.</li> </ul>
fw-revision	string	<ul style="list-style-type: none"> <li>Blank: Not applicable.</li> <li>Firmware revision of a fan FRU.</li> </ul>
hw-revision	string	<ul style="list-style-type: none"> <li>Blank: Not applicable.</li> </ul>
locator-led (locator-led-numeric)	string (uint32)	Shows the state of the locator LED on a fan unit. <ul style="list-style-type: none"> <li>Off (0)</li> <li>On (1)</li> </ul>
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
conditions	Embedded: see health-conditions.	

## fan-module-versions

This basetype is used by `show versions` when the `frus` parameter is specified.

**Table 44 fan-module-versions properties**

Name	Type	Description
name	string	Fan name in the format <code>fan_&lt;enclosure-ID&gt;.&lt;fan-number&gt;</code> .
location	string	Fan location in the format <code>Enclosure &lt;enclosure-ID&gt; - &lt;position&gt;</code> . The position is as viewed from the back of the enclosure.
enclosure-id	uint32	Enclosure ID.
fan-module-id	uint8	Fan module ID.
fw-revision	string	Fan firmware version.
cfg-crc	string	CFG CRC.

## fan-modules

This basetype is used by `show fan-modules`.

**Table 45 fan-modules properties**

Name	Type	Description
durable-id	string	Fan module ID.
enclosure-id	uint32	Enclosure ID.
dom-id	uint32	For internal use only.
name	string	Fan name in the format <code>fan_&lt;enclosure-ID&gt;.&lt;fan-number&gt;</code> .
location	string	Fan location in the format <code>Enclosure &lt;enclosure-ID&gt; - &lt;position&gt;</code> .

**Table 45 fan-modules properties (continued)**

Name	Type	Description
status (status-numeric)	string (uint32)	Enclosure status. <ul style="list-style-type: none"> <li>• Unsupported (0)</li> <li>• OK (1)</li> <li>• Critical (2)</li> <li>• Warning (3)</li> <li>• Unrecoverable (4)</li> <li>• Not Installed (5)</li> <li>• Unknown (6)</li> <li>• Unavailable (7)</li> </ul>
extended-status	hex32	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.
position (position-numeric)	string (uint32)	Fan position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>• Left (0)</li> <li>• Right (1)</li> </ul>
locator-led (locator-led-numeric)	string (uint32)	Shows the state of the locator LED on a fan module. <ul style="list-style-type: none"> <li>• Off (0)</li> <li>• On (1)</li> </ul>
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Degraded (1)</li> <li>• Fault (2)</li> <li>• Unknown (3)</li> <li>• N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	
fan-details	Embedded; see fan.	

## fde-state

This basetype is used by show fde-state.

**Table 46 fde-state properties**

Name	Type	Description
fde-security-status (fde-security-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Unsecured (1): The system is not secured with a passphrase.</li> <li>• Secured (2): The system is secured with a passphrase using FDE.</li> <li>• Secured, Lock Ready (3): The system is secured and lock keys have been cleared. The system will become locked after the next power cycle.</li> <li>• Secured, Locked (4): The system is secured and the disks are locked to data access, preventing their use.</li> <li>• Secured FIPS (6): The system is secured with a passphrase to the FIPS standard.</li> </ul>
lock-key-id	string	Current lock ID.
import-lock-key-id	string	The previous or import lock ID.
fde-config-time (fde-config-time-numeric)	string (uint32)	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). The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## firmware-bundles

This basetype is used by `show firmware-bundles`.

**Table 47** firmware-bundles properties

Name	Type	Description
bundle-version	string	Version name of the firmware bundle.
build-date	string	Build date of the firmware bundle.
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• Unknown (0)</li><li>• Empty (1)</li><li>• Active (2)</li><li>• Available (3)</li><li>• Inactive (4)</li><li>• Default (5)</li><li>• Last (6)</li></ul>
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• OK (0)</li><li>• Degraded (1)</li><li>• Fault (2)</li><li>• Unknown (3)</li><li>• N/A (4)</li></ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.

## firmware-versions

This basetype is used by `show versions` when the `firmware` parameter is specified.

**Table 48** firmware-versions properties

Name	Type	Description
bundle-version	string	Firmware bundle version.
build-date	string	Firmware bundle build date.
bundle-state	string	Firmware bundle status.
sc-fw	string	Storage Controller firmware version.
sc-fu-version	string	Storage Controller ASIC Controller version.
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
gem-version	string	Expander Controller GEM firmware version.
pld-rev	string	Complex Programmable Logic Device (CPLD) firmware version.
ctk-version	string	<ul style="list-style-type: none"><li>• &lt;version&gt;: Customization Toolkit (CTK) version applied to system.</li><li>• No CTK Version: No CTK version has been applied to this system.</li></ul>
mcos-version	string	Management Controller operating system version.



## fru-versions

This basetype is used by `show versions` when the `frus` parameter is specified.

**Table 49 fru-versions properties**

Name	Type	Description
enclosure-id	uint32	The enclosure ID.
midplane-versions	Embedded;	see midplane-versions.
baseplane-versions	Embedded;	see baseplane-versions.
expander-versions	Embedded;	see expander-versions.
fan-module-versions	Embedded;	see fan-module-versions.
psu-versions	Embedded;	see psu-versions.

## health-conditions

This basetype is used by `show controllers`, `show disks`, `show disk-groups`, `show enclosures`, `show expander-status`, `show fan-modules`, `show fans`, `show pools`, `show power-supplies`, `show sas-link-health`.

**Table 50 health-conditions properties**

Name	Type	Description
health-reason (health-reason-numeric)	string (uint32)	A message describing the alert condition. The numeric property shows the message ID.
reason-id	uint32	Not used.
health-recommendation (health-recommendation-numeric)	string (uint32)	A message specifying the recommended action to take to resolve the alert condition. The numeric property shows the message ID.

## host

This basetype is used by `show host-groups`.

**Table 51 host properties**

Name	Type	Description
durable-id	string	Host ID.
name	string	The name of the host.
serial-number	string	The serial number of the host.
member-count	uint32	The number of initiators in the host.
host-group	uint32	If the host is a member of a host group, the serial number of the host group. Otherwise, UNGROUPEDHOSTS.
group-key	string	If the host is a member of a host group, the durable ID of the host group. Otherwise, HGU.
initiator	Embedded;	see initiator.

## host-group

This basetype is used by `show host-groups`.

**Table 52** host-group properties

Name	Type	Description
durable-id	string	Host group ID.
name	string	The name of the host group.
serial-number	string	The serial number of the host group.
url	string	For internal use only.
member-count	uint32	The number of hosts in the host group.
host	Embedded; see <code>host</code> .	

## host-group-view

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

**Table 53** host-group-view properties

Name	Type	Description
durable-id	string	Host group ID.
serial-number	string	The serial number of the host group.
group-name	string	The name of the host group in the format <code>host-group.*.*</code> , where the first <code>*</code> represents all hosts in the group and the second <code>*</code> represents all initiators in those hosts.
ini-view-mappings	Embedded; see <code>host-view-mappings</code> .	
ini-view-initiators	Embedded; see <code>initiator-view</code> .	

## host-port-statistics

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

**Table 54** host-port-statistics properties

Name	Type	Description
durable-id	string	Host port ID in the format <code>hostport_&lt;controller-ID-and-port-number&gt;</code> .
bytes-per-second (bytes-per-second-numeric)	string (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. The numeric property shows the unformatted value in blocks.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	Number of write operations since these statistics were last reset or since the controller was restarted.
data-read (data-read-numeric)	string (uint64)	Amount of data read since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.

**Table 54 host-port-statistics properties (continued)**

Name	Type	Description
data-written (data-written-numeric)	string (uint64)	Amount of data written since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
queue-depth	uint32	The number of pending I/O operations currently being serviced.
avg-rsp-time	uint32	Average response time in microseconds for read and write operations, calculated over the interval since these statistics were last requested or reset.
avg-read-rsp-time	uint32	Average response time in microseconds for read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	uint32	Average response time, in microseconds, for all write operations, calculated over the interval since these statistics were last requested or reset.
reset-time (reset-time-numeric)	string (uint32)	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. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
start-sample-time (start-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when sampling started for the <code>iops</code> and <code>bytes-per-second</code> values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
stop-sample-time (stop-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when sampling stopped for the <code>iops</code> and <code>bytes-per-second</code> values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## host-view-mappings

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

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

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

## initiator

This basetype is used by `show initiators`.

**Table 56 initiator properties**

Name	Type	Description
durable-id	string	Initiator ID.
nickname	string	The nickname of the initiator, or blank.

**Table 56 initiator properties (continued)**

Name	Type	Description
discovered	string	<ul style="list-style-type: none"> <li>• Yes: The initiator was discovered and its entry was automatically created.</li> <li>• No: The initiator was manually created.</li> </ul>
mapped	string	<ul style="list-style-type: none"> <li>• Yes: At least one volume is explicitly mapped to the initiator.</li> <li>• No: No volumes are explicitly mapped to the initiator.</li> </ul>
profile (profile-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Standard (0): Default profile.</li> <li>• HP-UX (1): The host uses Flat Space Addressing.</li> <li>• OpenVMS (2): The initiator does not allow LUN 0 to be assigned to a mapping.</li> </ul>
host-bus-type (host-bus-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• UNKNOWN (0)</li> <li>• FC (6)</li> <li>• SAS (8)</li> </ul>
id	string	<ul style="list-style-type: none"> <li>• For an FC initiator, its WWPN.</li> <li>• For a SAS initiator, its WWPN.</li> </ul>
url	string	For internal use only.
host-id	string	If the initiator is a member of a host, the serial number of the host. Otherwise, NOHOST.
host-key	string	If the initiator is a member of a host, the durable ID of the host. Otherwise, HU.
host-port-bits-a	uint32	For internal use only.
host-port-bits-b	uint32	For internal use only.

## initiator-view

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

**Table 57 initiator-view properties**

Name	Type	Description
id	string	<ul style="list-style-type: none"> <li>• For a SAS initiator, its WWPN.</li> </ul>
hba-nickname	string	The nickname of the initiator.
host-profile (host-profile-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Standard (0): Default profile.</li> <li>• HP-UX (1): The host uses Flat Space Addressing.</li> <li>• OpenVMS (2): The initiator does not allow LUN 0 to be assigned to a mapping.</li> </ul>
host-view-mapping	Embedded	see <code>host-view-mappings</code> .

## inquiry

This basetype is used by `show inquiry`.

**Table 58 inquiry properties**

Name	Type	Description
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
sc-fw	string	Storage Controller firmware version.
sc-loader	string	Storage Controller loader firmware version.
serial-number	string	Controller serial number.

**Table 58 inquiry properties (continued)**

Name	Type	Description
mac-address	string	Controller network port MAC address.
ip-address	string	Controller network port IP address.
ip6-link-local-address	string	The link-local IPv6 address.
ip6-auto-address	string	The automatically configured IPv6 address, when applicable.
dhcpv6	string	The DHCP IPv6 address.
slaac-ip	string	The SLAAC IPv6 address.
ip6-auto-address-source (ip6-auto-address-source-numeric)	string (uint32)	The method used to assign or compute the automatic address. <ul style="list-style-type: none"> <li>DHCPv6 (0)</li> <li>IPv6 SLAAC (1)</li> </ul>
ip61-address	string	First IPv6 address for the controller management port, if set.
ip62-address	string	Second IPv6 address for the controller management port, if set.
ip63-address	string	Third IPv6 address for the controller management port, if set.
ip64-address	string	Fourth IPv6 address for the controller management port, if set.
nvr-am-defaults	string	For internal use only.

## io-modules

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

**Table 59 io-modules properties**

Name	Type	Description
durable-id	string	Expansion module ID.
controller-id (controller-id-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
name	string	FRU name.
description	string	FRU long description.
part-number	string	FRU part number.
serial-number	string	FRU serial number.
revision	string	FRU hardware revision level.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date (mfg-date-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when the controller's PCBA was programmed or a power supply module was manufactured. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.

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

Name	Type	Description
position (position-numeric)	string (uint32)	FRU position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>• Left (0)</li> <li>• Right (1)</li> <li>• Top (2)</li> <li>• Bottom (3)</li> </ul>
rotation (rotation-numeric)	string (uint32)	Rotation of the controller module in the enclosure. <ul style="list-style-type: none"> <li>• 0 Degrees (0)</li> <li>• 90 Degrees (1)</li> <li>• 180 Degrees (2)</li> <li>• 270 Degrees (3)</li> </ul>
configuration-serialnumber	string	Configuration serial number.
phy-isolation (phy-isolation-numeric)	string (uint32)	Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller. <ul style="list-style-type: none"> <li>• Enabled (0): PHY fault isolation is enabled.</li> <li>• Disabled (1): PHY fault isolation is disabled.</li> </ul>
locator-led (locator-led-numeric)	string (uint32)	Shows the state of the locator LED on an expansion module. <ul style="list-style-type: none"> <li>• Off (0)</li> <li>• On (1)</li> </ul>
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Operational (0)</li> <li>• Down (1)</li> <li>• Not installed (2)</li> <li>• Unknown (4)</li> </ul>
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Degraded (1)</li> <li>• Fault (2)</li> <li>• Unknown (3)</li> <li>• N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	
enclosure-id	Embedded; see expander-ports.	
expander-details	Embedded; see expanders.	

## ipv6-addresses

This basetype is used by `show ipv6-addresses`.

**Table 60 ipv6-addresses properties**

Name	Type	Description
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• B (0): Controller B.</li> <li>• A (1): Controller A.</li> </ul>
index	uint8	The controller's index value for the address. For internal use only.

**Table 60** ipv6-addresses properties (continued)

Name	Type	Description
address-label	string	The name assigned to the address, or blank if the address is unnamed.
ipv6-address	string	The IPv6 address with prefix length.

## ipv6-network-parameters

This basetype is used by `show ipv6-network-parameters`.

**Table 61** ipv6-network-parameters properties

Name	Type	Description
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
firewall (firewall-numeric)	string (uint32)	For internal use only.
autoconfig (autoconfig-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
gateway	string	The gateway IP address.
link-local-address	string	The link-local IPv6 address.
autoconfig-ip	string	The auto-configured IPv6 address for the controller.
dhcpv6	string	The DHCP IPv6 address.
slaac-ip	string	The SLAAC IPv6 address.
ip6-address-1	string	First IPv6 address for the controller management port, if set.
ip6-label-1	string	First IPv6 address name, if set.
ip6-address-2	string	Second IPv6 address for the controller management port, if set.
ip6-label-2	string	Second IPv6 address name, if set.
ip6-address-3	string	Third IPv6 address for the controller management port, if set.
ip6-label-3	string	Third IPv6 address name, if set.
ip6-address-4	string	Fourth IPv6 address for the controller management port, if set.
ip6-label-4	string	Fourth IPv6 address name, if set.

## ldap-parameters

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

**Table 62** ldap-parameters properties

Name	Type	Description
ldap-protocol (ldap-protocol-numeric)	string (uint32)	Shows whether LDAP support is enabled or disabled. <ul style="list-style-type: none"> <li>Disabled (0)</li> <li>Enabled (1)</li> </ul>
user-search-base	string	Attributes that define where to start searching for users in the LDAP directory tree.
ldap-server	string	The IP address or domain name of the primary LDAP server.
ldap-port	uint32	The port number to use for communication with the primary LDAP server. If not set, shows 636.
alternate-ldap-server	string	The address of the alternate LDAP server.
alternate-ldap-port	uint32	The port number to use for communication with the alternate LDAP server. If not set, shows 636.

## log-header-table

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

**Table 63** log-header-table properties

Name	Type	Description
log-contact	string	Contact person's name, if specified in the SMC <b>Collect Logs</b> panel.
log-email	string	Contact's email address, if specified in the SMC <b>Collect Logs</b> panel.
log-phone	string	Contact's phone number, if specified in the SMC <b>Collect Logs</b> panel.
log-comments	string	Comments describing the problem and specifying the date and time when the problem occurred, if specified in the SMC <b>Collect Logs</b> panel.
log-content	uint32	For internal use only.
log-timestamp (log-timestamp- numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when log content was saved to the file. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## logon-user-detail

This basetype is used by `whoami`.

**Table 64** logon-user-detail properties

Name	Type	Description
logon-user	string	The user name.
logon-user-type	string	<ul style="list-style-type: none"><li>Local: The user's credentials reside in the storage system.</li><li>LDAP: The user's credentials reside in an Active Directory LDAP server.</li></ul>
logon-usergroup	string	The group name for an LDAP user, or N/A for a local user.

## mgmt-hostnames

This basetype is used by `show dns-management-hostname`.

**Table 65** mgmt-hostnames properties

Name	Type	Description
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"><li>B (0): Controller B.</li><li>A (1): Controller A.</li></ul>
mgmt-hostname	string	The controller's management host name.
domain-name	string	The controller's FQDN if available.
default-hostname (default-hostname- numeric)	string (uint32)	<ul style="list-style-type: none"><li>Disabled (0)</li><li>Enabled (1)</li></ul>



## midplane-versions

This basetype is used by show versions when the frus parameter is specified.

**Table 66 midplane-versions properties**

Name	Type	Description
vpd-format-version	string	Vital Product Data (VPD) version.
vpd-crc	string	VPD CRC.
cfg-mismatch-version	string	Configuration mismatch version.
cpld-version	string	Complex Programmable Logic Device (CPLD) firmware version.
fru-descriptor	string	FRU descriptor.
part-number	string	Midplane part number.
midplane-serial-number	string	Midplane serial number.

## network-parameters

This basetype is used by show network-parameters.

**Table 67 network-parameters properties**

Name	Type	Description
durable-id	string	Controller network port ID in the format mgmtport_<controller-ID>.
active-version	uint32	The configured network port IP version. <ul style="list-style-type: none"><li>• 4: IPv4</li><li>• 6: IPv6</li></ul>
ip-address	string	Controller network port IP address.
gateway	string	Controller network port gateway IP address.
subnet-mask	string	Controller network port IP subnet mask.
mac-address	string	Controller network port MAC address.
addressing-mode (addressing-mode-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• DHCP (0): DHCP is used to set network parameters.</li><li>• Manual (1): Network settings are set manually (statically).</li></ul>
link-speed (link-speed-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• 10mbps (0): The network port link speed is set to 10Mb/s.</li><li>• 100mbps (1): The network port link speed is set to 100Mb/s.</li><li>• 1000mbps (2): The network port link speed is set to 1000Mb/s.</li></ul>
duplex-mode (duplex-mode-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• full (0): The network port duplex mode is set to full duplex.</li><li>• half (1): The network port duplex mode is set to half duplex.</li><li>• Undefined (2): For a system operating in Single Controller mode, this controller module is not present.</li></ul>
auto-negotiation (auto-negotiation-numeric)	string (uint32)	Not supported.

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

Name	Type	Description
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
ping-broadcast (ping-broadcast-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The system will not respond to a broadcast ping.</li> <li>Enabled (1): The system will respond to a broadcast ping.</li> </ul>

## ntp-status

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

**Table 68 ntp-status properties**

Name	Type	Description
ntp-status	string	Shows whether use of Network Time Protocol (NTP) is enabled. <ul style="list-style-type: none"> <li>activated: NTP is enabled.</li> <li>deactivated: NTP is disabled.</li> </ul>
ntp-server-address	string	<ul style="list-style-type: none"> <li>The current NTP server IP address if NTP is enabled.</li> <li>The last-set NTP server IP address if NTP was enabled and has been disabled.</li> <li>0.0.0.0 if the NTP server IP address has not been set.</li> </ul>
ntp-contact-time	string	<ul style="list-style-type: none"> <li>Date and time, in the format &lt;year&gt;-&lt;month&gt;-&lt;day&gt; &lt;hour&gt;:&lt;minutes&gt;:&lt;seconds&gt; (UTC), of the last message received from the NTP server.</li> <li>none: No contact.</li> </ul>

## out-of-sync-disks

This basetype is used by `trust`.

**Table 69 out-of-sync-disks properties**

Name	Type	Description
location	string	The enclosure ID and slot number of the disk.
serial-number	string	The serial number of the disk.
type	string	<ul style="list-style-type: none"> <li>SATA: SATA disk.</li> <li>SAS: Enterprise SAS spinning disk.</li> <li>SATA-S: Single-ported SATA disk.</li> <li>SSD SAS: SAS solid-state disk.</li> <li>SAS MDL: Midline SAS spinning disk.</li> </ul>

**Table 69 out-of-sync-disks properties (continued)**

Name	Type	Description
state	string	<ul style="list-style-type: none"> <li>• <b>AVAIL:</b> Available</li> <li>• <b>FAILED:</b> The disk is unusable and must be replaced. Reasons for this status include: excessive media errors, SMART error, disk hardware failure, or unsupported disk.</li> <li>• <b>GLOBAL SP:</b> Global spare</li> <li>• <b>LEFTOVR:</b> Leftover</li> <li>• <b>LINEAR POOL:</b> Used in a linear disk group</li> </ul>
recon-target	string	<ul style="list-style-type: none"> <li>• <b>True:</b> The disk contains partially reconstructed data.</li> <li>• <b>False:</b> The disk does not contain partially reconstructed data.</li> </ul>
drive-sync	string	<ul style="list-style-type: none"> <li>• <b>True:</b> The disk data is out of sync with other disks in the disk group.</li> <li>• <b>False:</b> The disk data is in sync with other disks in the disk group.</li> </ul>
age	uint8	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.

## pools

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

**Table 70 pools properties**

Name	Type	Description
name	string	The name of the pool.
serial-number	string	The serial number of the pool.
url	string	Pool URL.
storage-type (storage-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• <b>Linear (0):</b> The disk group acts as a linear pool.</li> </ul>
blocksize	uint32	The size of a block, in bytes.
total-size (total-size-numeric)	string (uint64)	The total capacity of the pool. The numeric property shows the unformatted value in blocks.
total-avail (total-avail-numeric)	string (uint64)	The available capacity in the pool. The numeric property shows the unformatted value in blocks.
snap-size (snap-size-numeric)	string (uint64)	Not applicable.
allocated-pages	uint32	For a pool, the number of 4MB pages that are currently in use. For a linear pool, 0.
available-pages	uint32	For a pool, the number of 4MB pages that are still available to be allocated. For a linear pool, 0.
overcommit (overcommit-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• <b>Disabled (0):</b> The capacity allocated to volumes when they are created cannot exceed the physical capacity of the pool.</li> <li>• <b>Enabled (1):</b> The pool uses thin provisioning, which means that more capacity can be allocated to volumes than physically exists in the pool.</li> <li>• <b>N/A (2):</b> Not applicable (linear pool).</li> </ul>
over-committed (over-committed-numeric)	string (uint32)	Not applicable.
disk-groups	uint16	The number of disk groups in the pool.

**Table 70** pools properties (continued)

Name	Type	Description
volumes	uint16	The number of volumes in the pool.
page-size (page-size-numeric)	string (uint64)	The page size, formatted to use the current base, precision, and units. The numeric property shows the unformatted value in blocks.
low-threshold	string	The low threshold for page allocation as a percentage of pool capacity.
middle-threshold	string	The middle threshold for page allocation as a percentage of pool capacity.
high-threshold	string	The high threshold for page allocation as a percentage of pool capacity. The threshold value is automatically calculated as the available capacity of the pool minus 400GiB — or if that result is below the mid threshold, then mid threshold capacity plus 1%.
utility-running (utility-running-numeric)	string (uint32)	Job running on the disk group, if any. <ul style="list-style-type: none"> <li>Blank (0): No job is running.</li> <li>INIT (2): The disk group is initializing.</li> <li>RCON (3): At least one disk in the disk group is being reconstructed.</li> <li>VERFY (4): The disk group is being verified.</li> <li>EXPD (5): The disk group is being expanded.</li> <li>VRSC (6): The disk group is being scrubbed.</li> <li>DRSC (7): A disk is being scrubbed.</li> <li>CPYBK (11): The disk group is being used in a copyback operation.</li> <li>PRERCON (15): At least one disk in the disk group is being preemptively reconstructed.</li> <li>RBAL (16): The ADAPT disk group is being rebalanced.</li> <li>REFT (17): The ADAPT disk group's fault-tolerant stripes are being rebalanced.</li> <li>RMAN (18): A disk in the ADAPT disk group is being remanufactured.</li> </ul>
preferred-owner (preferred-owner-numeric)	string (uint32)	Controller that owns the disk group and its volumes during normal operation. <ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
owner (owner-numeric)	string (uint32)	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
rebalance (rebalance-numeric)	string (uint32)	For internal use only.
migration (migration-numeric)	string (uint32)	For internal use only.
zero-scan (zero-scan-numeric)	string (uint32)	For internal use only.
idle-page-check (idle-page-check-numeric)	string (uint32)	For internal use only.
read-flash-cache (read-flash-cache-numeric)	string (uint32)	For internal use only.
metadata-vol-size (metadata-vol-size-numeric)	string (uint64)	The size of the pool's metadata volume, formatted to use the current base, precision, and units. This needs to be taken into consideration to account for all pages in the pool that are used. The numeric property shows the unformatted value in blocks.
total-rfc-size (total-rfc-size-numeric)	string (uint64)	The total size in blocks of the read cache in the pool. The numeric property shows the unformatted value in blocks.

**Table 70 pools properties (continued)**

Name	Type	Description
available-rlc-size (available-rlc-size-numeric)	string (uint64)	The unused read-cache space in blocks that is available for use by the pool. The numeric property shows the unformatted value in blocks.
reserved-size (reserved-size-numeric)	string (uint64)	The total number of pages that are reserved for volumes in the pool. The numeric property shows the unformatted value in blocks.
reserved-unalloc-size (reserved-unalloc-size-numeric)	string (uint64)	The total number of pages that are reserved, but not yet allocated, for volumes in the pool. The numeric property shows the unformatted value in blocks.
pool-sector-format (pool-sector-format-numeric)	string (uint32)	The sector format of disks in the disk group. <ul style="list-style-type: none"> <li>512n (0): All disks use 512-byte native sector size. Each logical block and physical block is 512 bytes.</li> <li>512e (1): All disks use 512-byte emulated sector size. Each logical block is 512 bytes and each physical block is 4096 bytes. Eight logical blocks will be stored sequentially in each physical block. Logical blocks may or may not be aligned with physical block boundaries.</li> <li>4K (2): All disks use 4096-byte native sector size. Each logical block and physical block is 4096 bytes.</li> <li>Mixed (3): The disk group contains a mix of 512n and 512e disks. This is supported, but for consistent and predictable performance, do not mix disks of different sector size types (512n, 512e).</li> </ul>
metadata-allocated (metadata-allocated-numeric)	string (uint64)	Pool metadata currently in use. The numeric property shows the unformatted value in blocks.
metadata-available (metadata-available-numeric)	string (uint64)	Pool metadata available capacity. The numeric property shows the unformatted value in blocks.
metadata-total-size (metadata-total-size-numeric)	string (uint64)	Disk group metadata total size. The numeric property shows the unformatted value in blocks.
extended-status	uint64	A bitmap that represents all alert conditions active on the component. If no conditions are active, 0.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason (health-reason-numeric)	string (uint32)	If Health is not OK, a message describes the reason for the health state. The numeric property shows the message ID.
health-recommendation (health-recommendation-numeric)	string (uint32)	If Health is not OK, a message describes recommended actions to resolve the issue. The numeric property shows the message ID.
conditions	Embedded; see health-conditions.	
disk-groups	Embedded; see disk-groups.	
tiers	Embedded; see tiers.	
unhealthy-component	Embedded; see unhealthy-component.	

# port

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

**Table 71 port properties**

Name	Type	Description
durable-id	string	Controller host port ID in the format <code>hostport_&lt;controller-ID-and-port-number&gt;</code> .
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• B (0): Controller B.</li><li>• A (1): Controller A.</li></ul>
port	string	Controller ID and port number.
url	string	For internal use only.
port-type (port-type-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• UNKNOWN (0)</li><li>• SAS (8): Serial Attached SCSI.</li></ul>
media	string	<ul style="list-style-type: none"><li>• SAS: Serial Attached SCSI.</li></ul>
target-id	string	<ul style="list-style-type: none"><li>• For a SAS port, its WWPN.</li></ul>
status (status-numeric)	string (uint32)	Port status. <ul style="list-style-type: none"><li>• Up (0): The port is cabled and has an I/O link.</li><li>• Warning (1): Not all of the port's PHYs are up.</li><li>• Error (2): The port is reporting an error condition.</li><li>• Not Present (3): The controller module is not installed or is down.</li><li>• Disconnected (6): Either no I/O link is detected or the port is not cabled.</li></ul>
actual-speed (actual-speed-numeric)	string (uint32)	Actual link speed in Mb/s or Gb/s. <ul style="list-style-type: none"><li>• 1Gb (0)</li><li>• 4Gb (2)</li><li>• 6Gb (6)</li><li>• 8Gb (7)</li><li>• 10Mb (8)</li><li>• 100Mb (9)</li><li>• 12Gb (11)</li><li>• 16Gb (12)</li><li>• Blank (255): Port is disconnected.</li></ul>
configured-speed (configured-speed-numeric)	string (uint32)	Configured host-port link speed in Gb/s. <ul style="list-style-type: none"><li>• 4Gb (2)</li><li>• Auto (3)</li><li>• 8Gb (7)</li><li>• 12Gb (11)</li><li>• 16Gb (12)</li></ul>
fan-out	uint8	Not supported.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• OK (0)</li><li>• Degraded (1)</li><li>• Fault (2)</li><li>• Unknown (3)</li><li>• N/A (4)</li></ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
port-details		Embedded; see, <code>sas-port</code> .

## power-supplies

This basetype is used by show power-supplies.

**Table 72 power-supplies properties**

Name	Type	Description
durable-id	string	Power supply ID in the format <code>psu_&lt;enclosure-ID&gt;.&lt;power-supply-number&gt;</code> .
url	string	For internal use only.
enclosures-url	string	For internal use only.
enclosure-id	uint32	Enclosure ID.
dom-id	uint32	For internal use only.
serial-number	string	N/A: Not applicable.
part-number	string	N/A: Not applicable.
description	string	FRU long description.
name	string	Power supply identifier and location.
fw-revision	string	<ul style="list-style-type: none"> <li>Blank: Not applicable.</li> <li>Firmware revision of the power supply.</li> </ul>
revision	string	FRU hardware revision level.
model	string	Power supply model.
vendor	string	Power supply vendor.
location	string	Power supply location, as viewed from the back of the enclosure.
position (position-numeric)	string (uint32)	FRU position, as viewed from the back of the enclosure. <ul style="list-style-type: none"> <li>Left (0)</li> <li>Right (1)</li> <li>Top (2)</li> <li>Bottom (3)</li> </ul>
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date (mfg-date-numeric)	string (uint32)	Date and time, in the format <code>&lt;year&gt;-&lt;month&gt;-&lt;day&gt; &lt;hour&gt;:&lt;minutes&gt;:&lt;seconds&gt;</code> (UTC), when the power supply module was manufactured. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
configuration-serialnumber	string	Configuration serial number.
dc12v	uint32	Deprecated.
dc5v		
dc33v		
dc12i		
dc5i		
dctemp		

**Table 72 power-supplies properties (continued)**

Name	Type	Description
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state..
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue..
status (status-numeric)	string (uint32)	Power supply status. <ul style="list-style-type: none"> <li>Up (0)</li> <li>Warning (1)</li> <li>Error (2)</li> <li>Not Present (3)</li> <li>Unknown (4)</li> </ul>
conditions	Embedded; see health-conditions.	
unhealthy-component	Embedded; see unhealthy-component.	
fan-details	Embedded; see fan.	

## product-info

This basetype is used by `show inquiry`.

**Table 73 product-info properties**

Name	Type	Description
vendor-name	string	Vendor name.
product-id	string	Product model identifier.
scsi-vendor-id	string	Vendor name returned by the SCSI <code>INQUIRY</code> command.
scsi-product-id	string	Product name returned by the SCSI <code>INQUIRY</code> command.

## provisioning

This basetype is used by `show provisioning`.

**Table 74 provisioning properties**

Name	Type	Description
volume	string	<ul style="list-style-type: none"> <li>Volume name.</li> <li>Blank if the pool does not have a volume.</li> </ul>
volume-serial	string	Volume serial number.
wwn	string	<ul style="list-style-type: none"> <li>Volume World Wide Name.</li> <li>Blank if the pool does not have a volume.</li> </ul>
controller (controller-numeric)	string (uint32)	Owning controller of the pool. <ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
disk-display	string	Shorthand list of the disks within a pool.



**Table 74 provisioning properties (continued)**

Name	Type	Description
disk-display-full	string	List or range of the disks in the pool specified by the virtual-disk property.
virtual-disk	string	Name of the pool.
virtual-disk-serial	string	Serial number of the pool.
health (health-numeric)	string (uint32)	Health of the associated pool. <ul style="list-style-type: none"> <li>• OK (0)</li> <li>• Degraded (1)</li> <li>• Fault (2)</li> <li>• Unknown (3)</li> <li>• N/A (4)</li> </ul>
mapped	string	<ul style="list-style-type: none"> <li>• Yes: The volume is mapped.</li> <li>• No: The volume is not mapped.</li> </ul>
lun-view	Embedded; see volume-view-mappings.	

## proxy-server

This basetype is used by `show proxy-server`.

**Table 75 proxy-server properties**

Name	Type	Description
proxy-state (proxy-state-numeric)	string (uint32)	The proxy state, either Enabled or Disabled.
host	string	The proxy server address.
port	string	Proxy server port numbers, if set.
user	string	The username to access the proxy server, if set.
password	string	The password to access the proxy server, even if not set; shown encrypted.

## psu-versions

This basetype is used by `show versions` when the `frus` parameter is specified.

**Table 76 psu-versions properties**

Name	Type	Description
name	string	Power supply unit (PSU) name in the format PSU <enclosure-ID>, <position>.
fw-revision	string	PSU firmware version.
dsp-version	string	PSU Digital Signal Processor (DSP) firmware version.
vpd-format-version	string	Vital Product Data (VPD) version.
vpd-crc	string	VPD CRC.
fru-descriptor	string	FRU descriptor.
part-number	string	PSU part number.
psu-serial-number	string	PSU serial number.

## redfish-persistent-data

This basetype is used by show redfish-persistent-data.

**Table 77 redfish-persistent-data properties**

Name	Type	Description
composition-service (composition-service-numeric)	string (uint32)	Shows whether the composition service is Enabled or Disabled.
systems-log-service (systems-log-service-numeric)	string (uint32)	Shows whether the systems log service is Enabled or Disabled.
task-service (task-service-numeric)	string (uint32)	Shows whether the task service is Enabled or Disabled.
update-service (update-service-numeric)	string (uint32)	Shows whether the update service is Enabled or Disabled.
update-monitor-task-a (update-monitor-task-a-numeric)	string (uint32)	Shows whether the update monitor task for controller A is Enabled or Disabled.
update-monitor-task-a-start-time (update-monitor-task-a-start-time-numeric)	string (uint32)	Shows the update monitor start time setting for controller A. If the start time is not set, the value is blank.
update-monitor-task-b (update-monitor-task-b-numeric)	string (uint32)	Shows whether the update monitor task for controller B is Enabled or Disabled.
update-monitor-task-b-start-time (update-monitor-task-b-start-time-numeric)	string (uint32)	Shows the update monitor start time setting for controller B. If the start time is not set, the value is blank.

## redundancy

This basetype is used by show redundancy-mode.

**Table 78 redundancy properties**

Name	Type	Description
redundancy-mode (redundancy-mode-numeric)	string (uint32)	The system's operating mode, also called the cache redundancy mode. <ul style="list-style-type: none"><li>Active-Active ULP (8): Both controllers are active using ULP (Unified LUN Presentation). Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.</li><li>Single Controller (9): The enclosure contains a single controller.</li><li>Failed Over (10): Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.</li><li>Down (11): Both controllers are not operational.</li></ul>
redundancy-status (redundancy-status-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Operational but not redundant (0): In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.</li><li>Redundant (2): Both controllers are operational.</li><li>Down (4): This controller is not operational.</li><li>Unknown (5): Status information is not available.</li></ul>

**Table 78 redundancy properties (continued)**

Name	Type	Description
controller-a-status (controller-a-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Operational (0): The controller is operational.</li> <li>Down (1): The controller is installed but not operational.</li> <li>Not installed (2): The controller is not installed.</li> <li>Unknown (4)</li> </ul>
controller-a-serial-number	string	<ul style="list-style-type: none"> <li>Controller module serial number.</li> <li>Not Available: The controller is down or not installed.</li> </ul>
controller-b-status (controller-b-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Operational (0): The controller is operational.</li> <li>Down (1): The controller is installed but not operational.</li> <li>Not installed (2): The controller is not installed.</li> <li>Unknown (4)</li> </ul>
controller-b-serial-number	string	<ul style="list-style-type: none"> <li>Controller module serial number.</li> <li>Not Available: The controller is down or not installed.</li> </ul>
other-MC-status (other-MC-status-numeric)	string (uint32)	<p>The operational status of the Management Controller in the partner controller. This is not factored into system health.</p> <ul style="list-style-type: none"> <li>Unknown (0): The operational status of the partner Management Controller cannot be determined.</li> <li>Not Communicating (1): The partner Management Controller is not ready to communicate.</li> <li>Not Operational (2): The local Management Controller has established communication with the partner Management Controller, but the partner is not responding because it is not currently in active-active or failed-over state.</li> <li>Operational (3): The partner Management Controller is responding normally.</li> </ul>
system-ready (system-ready-numeric)	string (uint32)	<p>Shows whether the system is ready for running a script.</p> <ul style="list-style-type: none"> <li>Ready (0): The system is ready.</li> <li>Not Ready (1): The system is not ready.</li> </ul>
local-ready (local-ready-numeric)	string (uint32)	<p>Shows the local controller's contribution towards system-ready.</p> <ul style="list-style-type: none"> <li>Ready (0): The local controller's contribution is ready.</li> <li>Storage Controller is Not Ready (1): The Storage Controller's contribution is not ready.</li> <li>Management Controller is Not Ready (2): The Management Controller's contribution is not ready.</li> <li>Activity is currently in progress (3): A partner firmware update, firmware installation, or log retrieval is in progress. Wait for that operation to complete and try again.</li> </ul>
local-reason	string	The explanation for the local-ready value.
other-ready (other-ready-numeric)	string (uint32)	<p>Shows the partner controller's contribution towards system-ready.</p> <ul style="list-style-type: none"> <li>Ready (0): The partner controller's contribution is ready.</li> <li>Storage Controller is Not Ready (1): The Storage Controller's contribution is not ready.</li> <li>Management Controller is Not Ready (2): The Management Controller's contribution is not ready.</li> <li>Activity is currently in progress (3): A partner firmware update, firmware installation, or log retrieval is in progress. Wait for that operation to complete and try again.</li> </ul>
other-reason	string	The explanation for the other-ready value.

## remote-system

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

**Table 79 remote-system properties**

Name	Type	Description
id	string	Remote system ID.
system-name	string	<ul style="list-style-type: none"><li>The name of the remote system.</li><li>Uninitialized Name: The default value.</li></ul>
system-contact	string	<ul style="list-style-type: none"><li>The name of the person who administers the remote system.</li><li>Uninitialized Contact: The default value.</li></ul>
system-location	string	<ul style="list-style-type: none"><li>The location of the remote system.</li><li>Uninitialized Location: The default value.</li></ul>
system-information	string	<ul style="list-style-type: none"><li>A brief description of the remote system.</li><li>Uninitialized Info: The default value.</li></ul>
vendor-name	string	The vendor name of the remote system.
product-id	string	The product model identifier of the remote system.
product-brand	string	The brand name of the remote system.
ip-address-a	string	<ul style="list-style-type: none"><li>The IP address of the network port in controller A in the remote system.</li><li>Not Present</li></ul>
ip-address-b	string	<ul style="list-style-type: none"><li>The IP address of the network port in controller B in the remote system.</li><li>Not Present</li></ul>
username	string	The name of a user that is configured in the remote system. This must be a user with the manage role to remotely configure or provision that system.
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Uninitialized (0): This system hasn't communicated with the remote system.</li><li>Ready (1): This system has contacted the remote system and it is ready to use.</li><li>Connected(2): This system is transferring data to the remote system.</li><li>Not Connected (4): The system is not connected to the remote system.</li></ul>
last-connected	string	Date and time, in the format <year><month><day> <hour><minutes><seconds> (UTC), when successful communication was last established between the Management Controller in the local system and the Management Controller in the remote system. This value does not indicate when connection status was last determined, and will not be updated if the remote Management Controller is not accessible or if the connection status is Not Connected.
interfaces (interfaces-numeric)	string (uint32)	<ul style="list-style-type: none"><li>SAS (2)</li></ul>
storage-model (storage-model-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Linear (0)</li></ul>
isvalid-ip-a (isvalid-ip-a-numeric)	string (uint32)	<ul style="list-style-type: none"><li>False (0): The IP address is not valid for controller module A in the remote system.</li><li>True (1): The IP address is valid for controller module A in the remote system.</li></ul>
isvalid-ip-b (isvalid-ip-b-numeric)	string (uint32)	<ul style="list-style-type: none"><li>False (0): The IP address is not valid for controller module B in the remote system.</li><li>True (1): The IP address is valid for controller module B in the remote system.</li></ul>

## sas-host-phy-statistics

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

**Table 80 sas-host-phy-statistics properties**

Name	Type	Description
port	string	The controller ID and port number.
phy	uint32	The PHY's logical location within a group, based on the PHY type. Logical IDs are 0 to 3 for host port PHYs. Each SAS host will have multiple PHYs.
disparity-errors	hex32	The number of doublewords containing running disparity errors that have been received by the PHY, not including those received during Link Reset sequences. A running disparity error occurs when positive and negative values in a signal do not alternate.
lost-dwords	hex32	The number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.
invalid-dwords	hex32	The number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.
reset-error-counter	hex32	The number of times the PHY Reset sequence has failed.

## sas-port

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

**Table 81 sas-port properties**

Name	Type	Description
configured-topology (configured-topology-numeric)	string (uint32)	Direct (0)
width	uint8	Number of PHY lanes in the SAS port.
sas-lanes-expected	uint8	Expected number of PHY lanes in the SAS port.
sas-active-lanes	uint8	Number of active lanes in the SAS port. If the port is connected and fewer lanes are active than are expected, the port status will change to <code>Warning</code> , the health will change to <code>Degraded</code> , and event 354 will be logged.
sas-disabled-lanes	uint8	Number of disabled lanes in the SAS port.

## sas-status-controller-a

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

**Table 82 sas-status-controller-a properties**

Name	Type	Description
enclosure-id	uint32	Enclosure ID.
drawer-id	uint8	Not applicable.
baseplane-id	uint8	Baseplane ID.
expander-id	uint8	Expander ID.
controller (controller-numeric)	string (uint32)	<ul style="list-style-type: none"><li>B (0): Controller B.</li><li>A (1): Controller A.</li></ul>
wide-port-index	uint32	The wide-port index.

**Table 82 sas-status-controller-a properties (continued)**

Name	Type	Description
phy-index	uint32	The PHY index.
wide-port-role (wide-port-role-numeric)	string (uint32)	The wide-port role. <ul style="list-style-type: none"> <li>• Unknown (0)</li> <li>• Drive (1)</li> <li>• Expansion Egress (4)</li> <li>• Expansion Ingress (5)</li> <li>• SC Primary (6)</li> <li>• SC Alternate (7)</li> <li>• Inter Expander (8)</li> <li>• Unused (9)</li> </ul>
wide-port-num	uint32	The wide-port number.
type	string	The PHY type. <ul style="list-style-type: none"> <li>• Drive: Drive slot PHY.</li> <li>• SC-P: Storage Controller primary PHY.</li> <li>• SC-A: Storage Controller alternate PHY.</li> </ul>
status (status-numeric)	string (uint32)	PHY status. <ul style="list-style-type: none"> <li>• Unavailable (0): No status information is available.</li> <li>• Enabled – Healthy (1): The PHY is enabled and healthy.</li> <li>• Enabled – Degraded (2): The PHY is enabled but degraded.</li> <li>• Disabled (3): The PHY has been disabled by a user or by the system.</li> </ul>
elem-status (elem-status-numeric)	string (uint32)	The SES status that corresponds to the PHY status. <ul style="list-style-type: none"> <li>• Error (0, 4): Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data.</li> <li>• OK (1): Element is installed and no error conditions are known.</li> <li>• Disabled (2): Critical condition is detected.</li> <li>• Non-critical (3): Non-critical condition is detected.</li> <li>• Not Used (5): Element is not installed in enclosure.</li> <li>• Unknown (6): Element is installed with no known errors, but the element has not been turned on or set into operation.</li> <li>• Unknown (7): Sensor has failed or element status is not available. Appears only if an I/O module indicates it has fewer PHYs than the reporting I/O module, in which case all additional PHYs are reported as unknown.</li> </ul>
elem-disabled (elem-disabled-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Disabled (0): PHY is disabled.</li> <li>• Enabled (1): PHY is enabled.</li> </ul>

**Table 82 sas-status-controller-a properties (continued)**

Name	Type	Description
elem-reason (elem-reason-numeric)	string (uint32)	More information about the status value. <ul style="list-style-type: none"> <li>Blank (0): elem-status is OK.</li> <li>Error count interrupts (3): PHY disabled because of error-count interrupts.</li> <li>PHY control (5): PHY disabled by a SES control page as a result of action by a Storage Controller or user.</li> <li>Not ready (6): PHY is enabled but not ready. Appears for SC PHYs when the partner I/O module is not installed. Appears for Drive, SC, or Ingress PHYs when a connection problem exists such as a broken connector.</li> <li>Firmware reboot (7): PHY disabled because of a firmware reboot.</li> <li>Disk removed (8): PHY disabled because drive slot is empty.</li> <li>Unused – disabled by default (9): PHY is disabled by default because it is not used.</li> <li>Excessive PHY changes (10) : PHY is disabled because of excessive PHY change counts.</li> <li>Did not initialize (11): PHY is enabled but not ready because it did not pass COMINIT.</li> </ul>
change-counter	hex32	Number of times the PHY originated a BROADCAST (CHANGE). A BROADCAST (CHANGE) is sent if doubleword synchronization is lost or at the end of a Link Reset sequence.
code-violations	hex32	Number of times the PHY received an unrecognized or unexpected signal.
disparity-errors	hex32	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.
crc-errors	hex32	In a sequence of SAS transfers (frames), the data is protected by a cyclic redundancy check (CRC) value. The <code>crc-errors</code> value specifies the number of times the computed CRC does not match the CRC stored in the frame, which indicates that the frame might have been corrupted in transit.
conn-crc-errors	hex32	Number of times the lane between two expanders experienced a communication error.
lost-dwords	hex32	Number of times the PHY has lost doubleword synchronization and restarted the Link Reset sequence.
invalid-dwords	hex32	Number of invalid doublewords that have been received by the PHY, not including those received during Link Reset sequences.
reset-error-counter	hex32	Number of times the expander performed a reset of error counters.
flag-bits	hex32	PHY status flag bits, for internal use.

## schedules

This basetype is used by `show schedules`.

**Table 83 schedules properties**

Name	Type	Description
name	string	Schedule name.
schedule-specification	string	Schedule settings for running the associated task.

**Table 83** schedules properties (continued)

Name	Type	Description
status	string	Schedule status. <ul style="list-style-type: none"> <li>Uninitialized: The schedule is not yet ready to run.</li> <li>Ready: The schedule is ready to run at the next scheduled time.</li> <li>Suspended: The schedule had an error and is holding in its current state.</li> <li>Expired: The schedule has exceeded a constraint and will not run again.</li> <li>Invalid: The schedule is invalid.</li> <li>Deleted: The task has been deleted.</li> </ul>
next-time (next-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when the schedule will next run, or N/A if the schedule has expired. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
last-initiated (last-initiated-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when the schedule was last run, or N/A if the schedule has not yet run. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
task-to-run	string	Name of the task that the schedule runs.
error-message	string	<ul style="list-style-type: none"> <li>If an error occurred while running the schedule, the error message.</li> <li>Blank if no error occurred.</li> </ul>
task	Embedded; see tasks.	

## security-communications-protocols

This basetype is used by show protocols.

**Table 84** security-communications-protocols properties

Name	Type	Description
wbi-http (wbi-http-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The standard SMC web server is disabled.</li> <li>Enabled (1): The standard SMC web server is enabled.</li> </ul>
wbi-https (wbi-https-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The secure SMC web server is disabled.</li> <li>Enabled (1): The secure SMC web server is enabled.</li> </ul>
cli-telnet (cli-telnet-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The standard CLI is disabled.</li> <li>Enabled (1): The standard CLI is enabled.</li> </ul>
cli-ssh (cli-ssh-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The secure shell CLI is disabled.</li> <li>Enabled (1): The secure shell CLI is enabled.</li> </ul>
smis (smis-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The secure SMI-S interface is disabled.</li> </ul>
usmis (usmis-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The insecure SMI-S interface is disabled.</li> </ul>
slp (slp-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The SLP interface is disabled.</li> <li>Enabled (1): The SLP interface is enabled.</li> </ul>
ftp (ftp-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The FTP interface is disabled.</li> <li>Enabled (1): The FTP interface is enabled.</li> </ul>
sftp (sftp-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The SFTP interface is disabled.</li> <li>Enabled (1): The SFTP interface is enabled.</li> </ul>



**Table 84 security-communications-protocols properties (continued)**

Name	Type	Description
snmp (snmp-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The SNMP interface is disabled. All SNMP requests to the MIB are disabled and SNMP traps are disabled.</li> <li>Enabled (1): The SNMP interface is enabled.</li> </ul>
debug-interface (debug-interface-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): The Telnet debug port is disabled.</li> <li>Enabled (1): The Telnet debug port is enabled.</li> </ul>
activity-progress (activity-progress-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Disabled (0): Access to the activity progress interface via HTTP port 8081 is disabled.</li> </ul>

## SENSORS

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

**Table 85 sensors properties**

Name	Type	Description
durable-id	string	Sensor ID.
enclosure-id	uint32	Enclosure ID.
drawer-id (drawer-id-numeric)	string (uint8)	Not applicable.
controller-id (controller-id-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> <li>both (2): Both controllers.</li> <li>N/A (3)</li> </ul>
sensor-name	string	Sensor name and location.
value	string	<ul style="list-style-type: none"> <li>For a sensor, its value.</li> <li>For overall unit status, one of the status values below.</li> </ul>
status (status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Unsupported (0): Status detection is not implemented.</li> <li>OK (1): The sensor is present and detects no error condition.</li> <li>Critical (2): The sensor detected a critical error condition. Temperature, voltage, or current exceeds the critical threshold.</li> <li>Warning (3): The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds.</li> <li>Unrecoverable (4): The enclosure management processor (EMP) cannot communicate with the sensor.</li> <li>Not Installed (5): The sensor is not present.</li> <li>Unknown (6): The sensor is present but status is not available.</li> <li>Unavailable (7): The sensor is present with no known errors, but has not been turned on or set into operation because it is initializing. This typically occurs during controller startup.</li> </ul>

**Table 85 sensors properties (continued)**

Name	Type	Description
container (container-numeric)	string (uint32)	Hardware component that contains the sensor. <ul style="list-style-type: none"> <li>• enclosures (14)</li> <li>• midplane (15)</li> <li>• controllers (16)</li> <li>• iom (17)</li> <li>• power-supplies (18)</li> <li>• fan (19)</li> <li>• drawer (28)</li> <li>• baseplane (41)</li> </ul>
sensor-type (sensor-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Temperature (0)</li> <li>• Current (1)</li> <li>• Voltage (2)</li> <li>• Charge Capacity (3)</li> <li>• Capacitance (4)</li> <li>• Resistance (5)</li> <li>• Unknown Type (6)</li> </ul>

## sessions

This basetype is used by `show sessions`.

**Table 86 sessions properties**

Name	Type	Description
sessionId	string	The session ID.
username	string	The name of the user for which session information is shown.
interface	string	Shows whether the session is using the CLI or the SMC.
locale (locale-numeric)	string (uint32)	Not supported.
host	string	For a CLI session, the connected system's IP address and port number.
state	string	<ul style="list-style-type: none"> <li>• Active</li> <li>• Expired</li> </ul>
timeout	uint32	The time in seconds that the session can be idle before it automatically ends.
timeout-counter	uint32	The time in seconds remaining before the session automatically ends.
idle-time	uint32	The time in seconds that the session has been idle.
first-access (first-access-numeric)	string (uint32)	The date and time when the session started. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
last-access (last-access-numeric)	string (uint32)	The date and time when the session was last accessed. It updates to the current time when a command is issued. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## show-other-MC-status

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

**Table 87** show-other-MC-status properties

Name	Type	Description
other-MC	string	Other MC Status
other-MC-status (other-MC-status- numeric)	string (uint32)	The operational status of the Management Controller in the partner controller. This is not factored into system health. <ul style="list-style-type: none"><li>Unknown (1496): The operational status of the partner Management Controller cannot be determined.</li><li>Not Communicating (1524): The partner Management Controller is not ready to communicate.</li><li>Not Operational (3231): The local Management Controller has established communication with the partner Management Controller, but the partner is not responding because it's not currently in active-active or failed-over state.</li><li>Operational (4749): The partner Management Controller is responding normally.</li></ul>

## shutdown-status

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

**Table 88** shutdown-status properties

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

## snmp-parameters

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

**Table 89** snmp-parameters properties

Name	Type	Description
snmp-enabled (snmp-enabled-numeric)	string (uint32)	Shows whether the Simple Network Management Protocol (SNMP) interface is enabled or disabled. <ul style="list-style-type: none"><li>Disabled (0): SNMP is disabled.</li><li>Enabled (1): SNMP is enabled.</li></ul>
snmp-filter (snmp-filter-numeric)	string (uint32)	Minimum level of events to include for SNMP traps. <ul style="list-style-type: none"><li>info (0): Sends notifications for all events.</li><li>resolved (1): Sends notifications for Resolved, Warning, Error, and Critical events.</li><li>warn (2): Sends notifications for Warning, Error, and Critical events.</li><li>error (3): Sends notifications for Error and Critical events.</li><li>crit (4): Sends notifications for Critical events only.</li><li>none (5): No events are sent as traps and traps are disabled.</li></ul>
snmp-trap-host-1	string	Trap host IP address.

**Table 89 snmp-parameters properties (continued)**

Name	Type	Description
snmp-trap-host-2	string	Trap host IP address.
snmp-trap-host-3	string	Trap host IP address.
snmp-read-community	string	The community string for read-only access. The value is obscured for users having only the monitor role and is shown in clear text for users having the standard or manage role.
snmp-write-community	string	The community string for write access. The value is obscured for users having only the monitor role and is shown in clear text for users having the standard or manage role.
alert-notification (alert-notification-numeric)	string (uint32)	Shows whether the system will send SNMP notifications for alerts. <ul style="list-style-type: none"> <li>• none (5): The system will not send SNMP notifications for alerts.</li> <li>• all (6): The system will send SNMP notifications for alerts.</li> </ul>
persistent-alerts (persistent-alerts-numeric)	string (uint32)	Not supported.

## 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 90 status properties**

Name	Type	Description
response-type (response-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Success (0): The command succeeded.</li> <li>• Error (1): The command failed.</li> <li>• Info (2): The command returned an informational message.</li> <li>• Warning (3): The command returned a warning message.</li> </ul>
response	string	A message stating what the command accomplished, why the command failed, or information about the command's progress.
return-code	sint32	<ul style="list-style-type: none"> <li>• 0: The command completed.</li> <li>• -nnnnn: The command failed.</li> </ul>
component-id	string	Not used.
time-stamp (time-stamp-numeric)	string (uint32)	Date and time, in the format <code>&lt;year&gt;-&lt;month&gt;-&lt;day&gt; &lt;hour&gt;:&lt;minutes&gt;:&lt;seconds&gt;</code> (UTC), when the command was issued. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## storage-configurations

This basetype is used by `show storage-configurations`.

**Table 91 storage-configurations properties**

Name	Type	Description
id	uint8	The number for the configuration.
number-of-disk-groups	uint8	The number of disk groups created with this configuration.
stripe-width (stripe-width-numeric)	string uint32	Shows the ADAPT stripe width used with this configuration. <ul style="list-style-type: none"> <li>• 16+2 (2): Each stripe contains 16 data chunks and 2 parity chunks.</li> <li>• 16+3 (6): Each stripe contains 16 data chunks and 3 parity chunks.</li> </ul>

**Table 91 storage-configurations properties (continued)**

Name	Type	Description
interleaved (interleaved-numeric)	string uint32	Indicates whether interleaved volumes are used with this configuration. <ul style="list-style-type: none"> <li>No (0): The configuration does not use interleaved volumes.</li> <li>Yes (1): The configuration uses interleaved volumes.</li> </ul>
min-spare-capacity (min-spare-capacity-numeric)	string uint64	The minimum spare capacity established for this configuration. This value applies to each disk group. The total spare capacity reserved by the system is larger for configurations that create more disk groups.  The numeric property shows the unformatted value in blocks.
max-raw-capacity (max-raw-capacity-numeric)	string uint64	The maximum storage capacity available with this configuration.  The numeric property shows the unformatted value in blocks.

## syslog-parameters

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

**Table 92 syslog-parameters properties**

Name	Type	Description
syslog-host	string	The IP address of the remote syslog server to use for the notifications.
syslog-notification-level (syslog-notification-level-numeric)	string (uint32)	Shows the minimum severity for which the system sends notifications: <ul style="list-style-type: none"> <li>info (0): Sends notifications for all events.</li> <li>resolved (1): Sends notifications for Resolved, Warning, Error, and Critical events.</li> <li>warn (2): Sends notifications for Warning, Error, and Critical events.</li> <li>error (3): Sends notifications for Error and Critical events.</li> <li>crit (4): Sends notifications for Critical events only.</li> <li>none (5): Disables syslog notification and clears the settings.</li> </ul>
syslog-host-port	uint32	The port on which the remote syslog facility is expected to listen for notifications.
alert-notification (alert-notification-numeric)	string (uint32)	Shows whether the system will send SNMP notifications for alerts. <ul style="list-style-type: none"> <li>none (5) : The system will not send SNMP notifications for alerts.</li> <li>all (6): The system will send SNMP notifications for alerts.</li> </ul>
persistent-alerts (persistent-alerts-numeric)	string (uint32)	Not supported.

## system

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

**Table 93 system properties**

Name	Type	Description
system-name	string	The name of the storage system.
system-contact	string	The name of the person who administers the system.
system-location	string	The location of the system.
system-information	string	A brief description of what the system is used for or how it is configured.
midplane-serial-number	string	The serial number of the controller enclosure midplane.

**Table 93 system properties (continued)**

Name	Type	Description
url	string	For internal use only.
vendor-name	string	The vendor name.
product-id	string	The product model identifier.
product-brand	string	The product brand name.
scsi-vendor-id	string	The vendor name returned by the SCSI INQUIRY command.
scsi-product-id	string	The product identifier returned by the SCSI INQUIRY command.
enclosure-count	uint32	The number of enclosures in the system.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>OK (0)</li> <li>Degraded (1)</li> <li>Fault (2)</li> <li>Unknown (3)</li> <li>N/A (4)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
other-MC-status (other-MC-status-numeric)	string (uint32)	<p>The operational status of the Management Controller in the partner controller. This is not factored into system health.</p> <ul style="list-style-type: none"> <li>Unknown (1496): The operational status of the partner Management Controller cannot be determined.</li> <li>Not Communicating (1524): The partner Management Controller is not ready to communicate.</li> <li>Not Operational (3231): The local Management Controller has established communication with the partner Management Controller, but the partner is not responding because it's not currently in active-active or failed-over state.</li> <li>Operational (4749): The partner Management Controller is responding normally.</li> </ul>
pfuStatus (pfuStatus-numeric)	string (uint32)	<p>Shows whether partner firmware update is running on the system, or is idle.</p> <ul style="list-style-type: none"> <li>Idle (0)</li> <li>Running (1)</li> </ul>
security-system-management (security-system-management-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>FDE (2, 3, 4, 6): The system is secured using Full Disk Encryption.</li> <li>Not in use (1): FDE is supported but not enabled.</li> <li>N/A (0): FDE is not supported.</li> </ul>
supported-locales	string	Not supported.
current-node-wwn	string	Storage system node World Wide Name (WWNN).
fde-security-status (fde-security-status-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Unsecured (1): The system has not been secured with a passphrase.</li> <li>Secured (2): The system has been secured with a passphrase using FDE.</li> <li>Secured, Lock Ready (3): The system has been secured and lock keys have been cleared. The system will become locked after the next power cycle.</li> <li>Secured, Locked (4): The system is secured and the disks are locked to data access, preventing their use.</li> <li>Secured, FIPS (6): The system has been secured with a passphrase using FIPS.</li> </ul>
platform-type (platform-type-numeric)	string (uint32)	<p>Platform type.</p> <p>The numeric property shows a corresponding numeric value.</p>
platform-brand (platform-brand-numeric)	string (uint32)	<p>Active platform brand of the Management Controller firmware.</p> <p>The numeric property shows a corresponding numeric value.</p>

**Table 93 system properties (continued)**

Name	Type	Description
configuration-selector	hex8	For internal use only.
redundancy-mode	Embedded; see redundancy.	
unhealthy-component	Embedded; see unhealthy-component.	

## system-parameters-table

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

**Table 94 system-parameters-table properties**

Name	Type	Description
ulp-enabled	string	Shows <code>true</code> to indicate that the system is using Unified LUN Presentation, which can expose all LUNs through all host ports on both controllers. The interconnect information is managed in the controller firmware. ULP appears to the host as an active-active storage system where the host can choose any available path to access a LUN regardless of disk group ownership. When ULP is in use, the system's operating/cache-redundancy mode is shown as Active-Active ULP. ULP uses the T10 Technical Committee of INCITS Asymmetric Logical Unit Access (ALUA) extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.
profiles-enabled	string	<ul style="list-style-type: none"> <li><code>true</code>: Host profiles are enabled.</li> <li><code>false</code>: Host profiles are disabled.</li> </ul>
max-ports	uint32	Number of host-interface ports in the controller enclosure.
max-drives	uint32	Number of disks that the system supports.
max-volumes	uint32	Number of volumes that the system supports.
max-vdisks	uint32	Number of linear disk groups that the system supports.
max-luns	uint32	Number of LUNs that the system supports.
max-owned-arrays-per-controller	uint32	Number of linear disk groups that each controller supports.
max-storage-pools-per-controller	uint32	Not supported.
max-components-per-storage-pool	uint32	Not supported.
max-storage-pool-size (max-storage-pool-size-numeric)	string (uint64)	The maximum size of a pool. The numeric property shows the unformatted value in blocks.
max-capi-arrays	uint32	Same as <code>max-vdisks</code> .
max-chunk-size	uint32	Maximum chunk size for disk groups.
min-chunk-size	uint32	Minimum chunk size for disk groups.
physical-position-offset	uint32	Starting index for physical components (enclosures, disks, etc.) in the storage system.
backoff-percentage	uint32	Percentage of disk capacity that is reserved to compensate for minor capacity differences between disk drives so they can be used interchangeably. This is not settable by users.
vdisk-metadata-size-perdisk-blocks	uint32	Amount of space reserved on a disk for disk-group metadata, in blocks.

**Table 94 system-parameters-table properties (continued)**

Name	Type	Description
vdisk-metadata-size-blocks	uint32	Amount of disk-group metadata, in blocks, stored on each disk.
max-host-groups	uint32	The number of host groups that the system supports.
max-hosts-per-host-group	uint32	The maximum number of hosts that a host group can contain.
max-hosts	uint32	The maximum number of hosts for the system.
max-initiators-per-host	uint32	The maximum number of initiators that a host can contain.
max-initiator	uint32	Deprecated; use max-initiators-per-host.
max-initiators	uint32	The maximum number of initiators for the system.
max-volume-groups-per-controller	uint32	Not supported.
max-volumes-per-volume-group	uint32	Not supported.
max-replication-sets	uint32	Not supported.
max-enclosures	uint32	Number of enclosures that the system supports.
local-controller (local-controller-numeric)	string (uint32)	The ID of the controller you are accessing. <ul style="list-style-type: none"> <li>• B (0): Controller B.</li> <li>• A (1): Controller A.</li> </ul>
serial-number	string	Last six digits of the midplane serial number.
external-targetid-control (external-targetid-control-numeric)	string (uint32)	Not used.
lan-heartbeat (lan-heartbeat-numeric)	string (uint32)	Not used.
ip-address-mode (ip-address-mode-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• CAPI_TWO_IP_ADDRESSES_MODE (0): Dual controller system has a unique IP address for each controller.</li> <li>• CAPI_ONE_IP_ADDRESS_MODE (1): Dual controller system has the same IP address for both controllers, only one active at a time.</li> </ul>
debug-flags	uint32	For use by service personnel.
enclosure-flags	uint32	For internal use only.
num-global-spare	uint32	Number of global-spare disks defined in the storage system.
dynamic-spare-rescan-rate	uint32	Interval at which the system is scanned for disks automatically designated as spares, if the dynamic spares feature is enabled.
performance-tuning-flags (performance-tuning-flags-numeric)	string (uint32)	For internal use only.
max-task-retention-count	uint32	Not applicable.
max-fc-speed (max-fc-speed-numeric)	string (uint32)	Maximum FC host-port speed. The numeric property shows a corresponding numeric value.



**Table 94 system-parameters-table properties (continued)**

Name	Type	Description
max-iscsi-speed (max-iscsi-speed-numeric)	string (uint32)	Maximum iSCSI host-port speed. The numeric property shows a corresponding numeric value.
max-peers-allowed	uint32	Not supported.
peers-in-use-count	uint32	Not supported.
max-ar-vols-allowed	uint32	Not supported.
ar-sets-in-use-count	uint32	Not supported.
virtual-replication-configured (virtual-replication-configured-numeric)	string (uint32)	Not supported.
max-adapt-drives-per-disk-group	uint32	The maximum number of disks that an ADAPT disk group can contain.
min-adapt-drives-per-disk-group	uint32	The minimum number of disks that an ADAPT disk group can contain.
max-adapt-disk-groups-per-system	uint32	The maximum number of ADAPT disk groups that the system supports.
max-adapt-disk-groups-per-controller	uint32	The maximum number of ADAPT disk groups that each controller supports.
max-adapt-drives-per-expansion	uint32	The maximum number of disks by which an ADAPT disk group can be expanded.

## tasks

This basetype is used by `show tasks`.

**Table 95 tasks properties**

Name	Type	Description
name	string	Task name.
type	string	Type of operation this task performs. <ul style="list-style-type: none"> <li>StartScrub</li> <li>StopScrub</li> </ul>
status	string	Task status. <ul style="list-style-type: none"> <li>Uninitialized: The task is not yet ready to run.</li> <li>Ready: The task is ready to run.</li> <li>Active: The task is running.</li> <li>Error: The task has an error.</li> <li>Deleted: The task is expired but this state is not yet synchronized to the partner controller.</li> </ul>
state	string	Current step of the task.
error-message	string	<ul style="list-style-type: none"> <li>If an error occurred while processing the task, the error message.</li> <li>Blank if no error has occurred.</li> </ul>
associated-vdisk-serial	string	Not applicable.

## time-settings-table

This basetype is used by `show controller-date`.

**Table 96** time-settings-table properties

Name	Type	Description
date-time (date-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), reported by the controller being accessed. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
time-zone-offset	string	The system's time zone as an offset in hours and minutes from UTC. This is shown only if NTP is enabled.
ntp-state	string	Shows whether Network Time Protocol (NTP) is in use. <ul style="list-style-type: none"><li>• Enabled: NTP is enabled.</li><li>• Disabled: NTP is disabled.</li></ul>
ntp-address	string	NTP server IP address, or 0.0.0.0 if not set.

## timezones

This basetype is used by `show timezones`.

**Table 97** timezones properties

Name	Type	Description
timezone	string	The timezone name (area/location).

## unhealthy-component

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

**Table 98** unhealthy-component properties

Name	Type	Description
component-type (component-type-numeric)	string (uint32)	Component type. <ul style="list-style-type: none"><li>• super-cap (0): Supercapacitor pack</li><li>• MC (1): Management Controller</li><li>• port (2): Host port</li><li>• controller (3): Controller module</li><li>• expansion module (4)</li><li>• PSU (5): Power supply unit</li><li>• disk (6)</li><li>• enclosure (7)</li><li>• disk group (8)</li><li>• fan (9)</li><li>• memory card (10)</li><li>• sensor (11)</li><li>• disk slot (12)</li><li>• network port (13)</li><li>• SAS port (14)</li><li>• volume (17)</li><li>• volume (19): Source volume</li><li>• host (21)</li><li>• volume map (22)</li><li>• system (23)</li><li>• unknown (24)</li><li>• fan module (26)</li><li>• expander (27)</li><li>• baseplane (28)</li></ul>
component-id	string	Component identifier.
basetype	string	Component basetype.
primary-key	string	Durable ID of the component.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"><li>• OK (0)</li><li>• Degraded (1)</li><li>• Fault (2)</li><li>• Unknown (3)</li><li>• N/A (4)</li></ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.

## unwritable-cache

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

**Table 99** unwritable-cache properties

Name	Type	Description
<code>unwritable-a-percentage</code>	<code>uint8</code>	The percentage of cache space occupied by unwritable data in controller A.
<code>unwritable-b-percentage</code>	<code>uint8</code>	The percentage of cache space occupied by unwritable data in controller B.

## update-status-process-step

This basetype is used by `show firmware-update-status`.

**Table 100** update-status-process-step properties

Name	Type	Description
<code>process-step</code> ( <code>process-step-numeric</code> )	<code>string</code> ( <code>uint32</code> )	Current step in the firmware update process. <ul style="list-style-type: none"><li>• N/A (0)</li><li>• Check Bundle Integrity (1)</li><li>• Health Check (2)</li><li>• Transfer to Partner (3)</li><li>• Partner Prep Codeload (4)</li><li>• Partner reboot (5)</li><li>• Partner update controller (6)</li><li>• Partner update expander (7)</li><li>• Partner update CPLD (8)</li><li>• Local update controller (9)</li><li>• Local update expander (10)</li><li>• Local update CPLD (11)</li><li>• Local reboot (12)</li><li>• Cleanup (13)</li><li>• Upload (14)</li><li>• GetMCLocalLogs (15)</li></ul>
<code>status</code> ( <code>status-numeric</code> )	<code>string</code> ( <code>uint32</code> )	Status of the process step. <ul style="list-style-type: none"><li>• Pending (0)</li><li>• OK (1)</li><li>• In-Progress (2)</li><li>• Error (3)</li><li>• N/A (4)</li></ul>
<code>message</code> ( <code>message-numeric</code> )	<code>string</code> ( <code>uint32</code> )	Message describing the status of the process step. <ul style="list-style-type: none"><li>• Pending (0)</li><li>• Success (1)</li><li>• In-Progress (2)</li><li>• Error (3)</li><li>• Timed Out Confirming Versions (4)</li><li>• N/A (5)</li></ul>

## update-status-summary

This basetype is used by `show firmware-update-status`.

**Table 101** update-status-summary properties

Name	Type	Description
controller-id (controller-id-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>
activity (activity-numeric)	string (uint32)	Type of update activity. <ul style="list-style-type: none"> <li>N/A (0)</li> <li>System update (1)</li> <li>Controller update (2)</li> <li>Partner firmware update (3)</li> <li>Firmware upload (4)</li> </ul>
start-time	string	Time when the update started.
completion-time	string	Time when the update completed.
estimated-time-to-completion	string	Estimated time to complete an in-progress update.
percentage-completed	string	Percentage complete of an in-progress update.
completion-status (completion-status-numeric)	string (uint32)	Activity status. <ul style="list-style-type: none"> <li>Success (0)</li> <li>In-Progress (1)</li> <li>Fail (2)</li> </ul>
bundle-version	string	Firmware bundle version.
update-status-process-step	Embedded; see <code>update-status-process-step</code> .	

## usergroups

This basetype is used by `show user-groups`.

**Table 102** usergroups properties

Name	Type	Description
usergroupname	string	The user group name.
roles	string	<ul style="list-style-type: none"> <li>monitor: User group can view but not change system settings.</li> <li>standard: User group can view and change system settings except: configuring local users; configuring LDAP; performing write operations through FTP or SFTP; performing file uploads from the SMC; using the <code>restore defaults</code> command.</li> <li>manage: User group can view and change system settings.</li> <li>diagnostic: For use by or with direction from technical support.</li> </ul>
usergroup-type	string	The user group type: LDAP.
usergroup-locale	string	Not supported.
interface-access-WBI	string	<ul style="list-style-type: none"> <li>x: User group can use the web-browser interface (the SMC).</li> <li>Blank: User group cannot access this interface.</li> </ul>
interface-access-CLI	string	<ul style="list-style-type: none"> <li>x: User group can use the command-line interface.</li> <li>Blank: User group cannot access this interface.</li> </ul>

**Table 102 usergroups properties (continued)**

Name	Type	Description
interface-access-FTP	string	<ul style="list-style-type: none"> <li>• x: User group can use the SFTP interface.</li> <li>• Blank: User group cannot access this interface.</li> </ul>
interface-access-SMIS	string	Not supported.
storage-size-base	uint8	<p>The base for entry and display of storage-space sizes:</p> <ul style="list-style-type: none"> <li>• 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.</li> <li>• 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude.</li> </ul> <p>Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.</p>
storage-size-precision	uint8	The number of decimal places (1 to 10) for display of storage-space sizes.
storage-size-units	string	<p>The unit for display of storage-space sizes.</p> <ul style="list-style-type: none"> <li>• Auto: Lets the system determine the proper unit for a size.</li> <li>• MB: Megabytes.</li> <li>• GB: Gigabytes.</li> <li>• TB: Terabytes.</li> </ul> <p>Based on the precision setting, if the selected unit is too large to meaningfully display a size, the system uses a smaller unit for that size. For example, if units is set to TB, precision is set to 1, and base is set to 10, the size 0.11709TB is instead shown as 117.1GB.</p>
temperature-scale	string	<ul style="list-style-type: none"> <li>• Fahrenheit: Temperatures are shown in degrees Fahrenheit.</li> <li>• Celsius: Temperatures are shown in degrees Celsius.</li> </ul>
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120 to 43200 seconds (2 to 720 minutes).

## USERS

This basetype is used by `show users`.

**Table 103 users properties**

Name	Type	Description
username	string	User name.
roles	string	<ul style="list-style-type: none"> <li>• monitor: User group can view but not change system settings.</li> <li>• standard: User group can view and change system settings except: configuring local users; configuring LDAP; performing write operations through SFTP/FTP; performing file uploads from the SMC; using the <code>restore defaults</code> command.</li> <li>• manage: User group can view and change system settings.</li> <li>• diagnostic: For use by or with direction from technical support.</li> </ul>
user-type (user-type-numeric)	string (uint32)	<p>The user's level of technical expertise. This parameter does not affect access to commands.</p> <ul style="list-style-type: none"> <li>• Novice (1)</li> <li>• Standard (2)</li> <li>• Advanced (3)</li> <li>• Diagnostic (4)</li> </ul>
user-locale (user-locale-numeric)	string (uint32)	Not supported.
interface-access-WBI	string	<ul style="list-style-type: none"> <li>• x: User group can use the web-browser interface (the SMC).</li> <li>• Blank: User group cannot access this interface.</li> </ul>

**Table 103 users properties (continued)**

Name	Type	Description
interface-access-CLI	string	<ul style="list-style-type: none"> <li>• x: User group can use the command-line interface.</li> <li>• Blank: User group cannot access this interface.</li> </ul>
interface-access-FTP	string	<ul style="list-style-type: none"> <li>• x: User group can use the SFTP/FTP interface.</li> <li>• Blank: User group cannot access this interface.</li> </ul>
interface-access-SMIS	string	Not supported.
interface-access-SNMP	string	<ul style="list-style-type: none"> <li>• x: The user group can access the SNMPv3 interface.</li> <li>• Blank: User cannot access this interface.</li> </ul>
storage-size-base	uint8	<p>The base for entry and display of storage-space sizes:</p> <ul style="list-style-type: none"> <li>• 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.</li> <li>• 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude.</li> </ul> <p>Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.</p>
storage-size-precision	uint8	The number of decimal places (1 to 10) for display of storage-space sizes.
storage-size-units (storage-size-units-numeric)	string (uint32)	<p>The unit for display of storage-space sizes.</p> <ul style="list-style-type: none"> <li>• auto (0): Lets the system determine the proper unit for a size.</li> <li>• MB (1): Megabytes.</li> <li>• GB (2): Gigabytes.</li> <li>• TB (3): Terabytes.</li> </ul> <p>Based on the precision setting, if the selected unit is too large to meaningfully display a size, the system uses a smaller unit for that size. For example, if units is set to TB, precision is set to 1, and base is set to 10, the size 0.11709TB is instead shown as 117.1GB.</p>
temperature-scale	string	<ul style="list-style-type: none"> <li>• Fahrenheit: Temperatures are shown in degrees Fahrenheit.</li> <li>• Celsius: Temperatures are shown in degrees Celsius.</li> </ul>
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120 to 43200 seconds (2 to 720 minutes).
authentication-type	string	<p>For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.</p> <ul style="list-style-type: none"> <li>• none: No authentication.</li> <li>• MD5: MD5 authentication.</li> <li>• SHA: SHA-1 authentication.</li> </ul>
privacy-type	string	<p>For an SNMPv3 user, this specifies whether to use a security encryption protocol.</p> <ul style="list-style-type: none"> <li>• none: No encryption.</li> <li>• DES: Data Encryption Standard.</li> <li>• AES: Advanced Encryption Standard.</li> </ul>
password	string	User password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password.
default-password-changed (default-password-changed-numeric)	string (uint32)	<p>Shows whether the default password for the user has been changed.</p> <ul style="list-style-type: none"> <li>• False (0)</li> <li>• True (1)</li> </ul>
privacy-password	string	Encryption password for an SNMPv3 user whose privacy type is set to DES or AES.
trap-destination	string	For an SNMPv3 user whose <code>interface-access-SNMP</code> property is enabled, this specifies the IP address of the host that will receive SNMP traps.
trap-port	string	The SNMP trap destination port of the host for an SNMPv3 user that can receive trap notifications.

## versions

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

**Table 104** versions properties

Name	Type	Description
sc-cpu-type	string	Storage Controller processor type.
bundle-version	string	Firmware bundle version.
bundle-status (bundle-status-numeric)	string (uint32)	Firmware bundle status. The numeric property shows a corresponding numeric value.
bundle-version-only	string	Firmware bundle version only.
bundle-base-version	string	Firmware bundle base version.
build-date	string	Firmware bundle build date.
sc-fw	string	Storage Controller firmware version.
sc-baselevel	string	Storage Controller firmware base level.
sc-memory	string	Storage Controller memory-controller FPGA firmware version.
sc-fu-version	string	Storage Controller ASIC Controller version.
sc-loader	string	Storage Controller loader firmware version.
capi-version	string	Configuration API (CAPI) version.
mc-fw	string	Management Controller firmware version.
mc-loader	string	Management Controller loader firmware version.
mc-base-fw	string	Management Controller firmware base level.
fw-default-platform-brand (fw-default-platform-brand-numeric)	string (uint32)	Default platform brand of the Management Controller firmware. The numeric property shows a corresponding numeric value.
ec-fw	string	N/A: Not applicable.
pld-rev	string	Complex Programmable Logic Device (CPLD) firmware version.
pm-cpld-version	string	Not supported.
prm-version	string	CPLD Power Reset Manager (PRM) version.
hw-rev	string	Controller hardware version.
him-rev	string	Host interface module revision.
him-model	string	Host interface module model.
backplane-type	uint8	Backplane type.
host-channel_revision	uint8	Host interface hardware (chip) version.
disk-channel_revision	uint8	Disk interface hardware (chip) version.
mrc-version	string	Memory Reference Code (MRC) version for Storage Controller boot flash.
ctk-version	string	<ul style="list-style-type: none"> <li>&lt;version&gt;: Customization Toolkit (CTK) version applied to system.</li> <li>No CTK Version: No CTK version has been applied to this system.</li> </ul>
mcos-version	string	Management Controller operating system version.
gem-version	string	Expander Controller GEM firmware package version.
pubs-version	string	CLI help version.
translation-version	string	CLI help translation version.



## volume-names

This basetype is used by show volume-names.

**Table 105 volume-names properties**

Name	Type	Description
volume-name	string	Volume name.
serial-number	string	Volume serial number.
volume	string	For internal use only.

## volume-reservations

This basetype is used by show volume-reservations.

**Table 106 volume-reservations properties**

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.
reservation-active (reservation-active-numeric)	string (uint32)	<ul style="list-style-type: none"><li>Free (0): The volume is not reserved.</li><li>Reserved (1): The volume has been reserved by a host.</li></ul>
pgr-generation	uint32	The generation of the volume reservation, shown as a hexadecimal value.
host-id	string	<ul style="list-style-type: none"><li>For a SAS initiator, its WWPN.</li></ul>
port	string	The controller host-port identifiers.
reserve-key	string	The reservation key, shown as a hexadecimal value.
reserve-scope (reserve-scope-numeric)	string (uint32)	The reservation scope: Logical Unit (0).
reserve-type (reserve-type-numeric)	string (uint32)	The reservation type. <ul style="list-style-type: none"><li>Undefined (0): The volume has no persistent reservations.</li><li>Write Exclusive (1): Write commands are only allowed for a single reservation holder.</li><li>Exclusive Access (3): Certain access (read, write) commands are only allowed for a single reservation holder.</li><li>Write Exclusive - Registrants Only (5): Write commands are only allowed for registered hosts. There is a single reservation holder.</li><li>Exclusive Access - Registrants Only (6): Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.</li><li>Write Exclusive - All Registrants (7): Write commands are only allowed for registered hosts. There is a single reservation holder.</li><li>Exclusive Access - All Registrants (8): Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.</li></ul>

## volume-statistics

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

**Table 107** volume-statistics properties

Name	Type	Description
volume-name	string	The name of the volume.
serial-number	string	The serial number of the volume.
bytes-per-second (bytes-per-second-numeric)	string (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. The numeric property shows the unformatted value in blocks.
iops	uint32	Input/output operations per second, calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
number-of-reads	uint64	The number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint64	The number of write operations since these statistics were last reset or since the controller was restarted.
data-read (data-read-numeric)	string (uint64)	Amount of data read since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
data-written (data-written-numeric)	string (uint64)	Amount of data written since these statistics were last reset or since the controller was restarted. The numeric property shows the unformatted value in blocks.
allocated-pages	uint32	Not supported.
percent-tier-ssd	uint16	Not supported.
percent-tier-sas	uint16	Not supported.
percent-tier-sata	uint16	Not supported.
percent-allocated-rfc	uint16	Not supported.
pages-alloc-per-minute	uint32	Not supported.
pages-dealloc-per-minute	uint32	Not supported.
shared-pages	uint32	Not supported.
write-cache-hits	uint64	For the controller that owns the volume, the number of times the block written to is found in cache.
write-cache-misses	uint64	For the controller that owns the volume, the number of times the block written to is not found in cache.
read-cache-hits	uint64	For the controller that owns the volume, the number of times the block to be read is found in cache.
read-cache-misses	uint64	For the controller that owns the volume, the number of times the block to be read is not found in cache.
small-destages	uint64	The number of times flush from cache to disk is not a full stripe.
full-stripe-write-destages	uint64	The number of times flush from cache to disk is a full stripe.
read-ahead-operations	uint64	The number of read pre-fetch or anticipatory-read operations.
write-cache-space	uint16	The cache size used on behalf of this volume.

**Table 107 volume-statistics properties (continued)**

Name	Type	Description
write-cache-percent	uint32	The percentage of cache used on behalf of this volume.
reset-time (reset-time-numeric)	string (uint32)	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. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
start-sample-time (start-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when sampling started for the iops and bytes-per-second values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
stop-sample-time (stop-sample-time-numeric)	string (uint32)	Date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds>, when sampling stopped for the iops and bytes-per-second values. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.

## volume-view

This basetype is used by `show maps`.

**Table 108 volume-view properties**

Name	Type	Description
durable-id	string	Volume ID in the format 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 a Management Controller restart.
url	string	For internal use only.
volume-serial	string	The serial number of the volume.
volume-name	string	Volume name.
volumes-url	string	For internal use only.
volume-view-mappings	Embedded; see <code>volume-view-mappings</code> .	

## volume-view-mappings

This basetype is used by `show maps`.

**Table 109 volume-view-mappings properties**

Name	Type	Description
durable-id	string	Mapping ID.
parent-id	string	For a mapping between a volume and an initiator, the volume ID.
mapped-id	string	The ID of the mapping target, such as an initiator.
ports	string	<ul style="list-style-type: none"> <li>The controller host ports to which the mapping applies.</li> <li>Blank if not mapped or mapped as <code>no-access</code>.</li> </ul>
lun	string	<ul style="list-style-type: none"> <li>The LUN that identifies the volume to a host.</li> <li>Blank if not mapped or mapped as <code>no-access</code>.</li> </ul>
access (access-numeric)	string (uint32)	Type of host access to the volume. <ul style="list-style-type: none"> <li><code>not-mapped (0)</code>: Not mapped.</li> <li><code>no-access (1)</code>: No access (masked).</li> <li><code>read-only (2)</code>: Read only.</li> <li><code>read-write (3)</code>: Read and write.</li> </ul>

**Table 109 volume-view-mappings properties (continued)**

Name	Type	Description
identifier	string	<ul style="list-style-type: none"> <li>For a SAS initiator, its WWPN.</li> </ul>
initiators-url	string	For internal use only.
nickname	string	<ul style="list-style-type: none"> <li>For a host, its name in the format <code>host-name.*</code>, where the <code>*</code> represents all initiators in the host.</li> <li>For a host group, its name in the format <code>host-group.*.*</code>, where the first <code>*</code> represents all hosts in the host group and the second <code>*</code> represents all initiators in those hosts.</li> <li>For an initiator, its nickname.</li> <li>Blank if not set or for all other initiators.</li> </ul>
host-profile (host-profile-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Standard (0): Default profile.</li> <li>HP-UX (1): The host uses Flat Space Addressing.</li> <li>OpenVMS (2): The host does not allow LUN 0 to be assigned to a mapping.</li> </ul>

## volumes

This basetype is used by `show volumes`.

**Table 110 volumes properties**

Name	Type	Description
durable-id	string	Volume ID in the format <code>V&lt;#&gt;</code> , where <code>&lt;#&gt;</code> 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 a Management Controller restart.
url	string	For internal use only.
virtual-disk-name	string	The name of the pool that contains the volume.
storage-pool-name	string	The name of the pool that contains the volume.
storage-pools-url	string	Pool URL.
volume-name	string	Volume name.
size (size-numeric)	string (uint64)	<p>Volume capacity, formatted to use the current base, precision, and units.</p> <p>The numeric property shows the unformatted value in blocks.</p>
total-size (total-size-numeric)	string (uint64)	<p>The total size of the volume.</p> <p>The numeric property shows the unformatted value in blocks.</p>
allocated-size (allocated-size-numeric)	string (uint64)	<p>The total size of a linear volume.</p> <p>The numeric property shows the unformatted value in blocks.</p>
storage-type (storage-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>Linear (0): The volume is in a linear pool.</li> </ul>
volume-usage-type (volume-usage-type-numeric)	string (uint32)	Not supported.
preferred-owner (preferred-owner-numeric)	string (uint32)	<p>Controller that owns the volume during normal operation.</p> <ul style="list-style-type: none"> <li>B (0): Controller B.</li> <li>A (1): Controller A.</li> </ul>

**Table 110 volumes properties (continued)**

Name	Type	Description
owner (owner-numeric)	string (uint32)	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. <ul style="list-style-type: none"> <li>• B (0): Controller B.</li> <li>• A (1): Controller A.</li> </ul>
serial-number	string	Volume serial number.
write-policy (write-policy-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• write-through (0): Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.</li> <li>• write-back (1): 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.</li> </ul>
cache-optimization (cache-optimization-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• standard (0): This controller cache mode of operation is optimized for sequential and random I/O and is the optimization of choice for most workloads. In this mode, the cache is kept coherent with the partner controller. This mode gives you high performance and high redundancy.</li> <li>• standard-atomic-write (3): This controller cache mode includes the standard mode features but also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.</li> <li>• cache-hit-atomic-write (5): This controller cache mode of operation is optimized for workloads that are localized—that is, a substantial percentage of all accesses are hits in the controller's cache. In this mode, the cache is kept coherent with the partner controller. This mode also guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, the controller cache contains either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.</li> </ul>
read-ahead-size (read-ahead-size-numeric)	string (uint32)	The volume's read-ahead cache setting. <ul style="list-style-type: none"> <li>• Maximum (-2147483648)</li> <li>• Stripe (-2): 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 512KB, even though they are not striped.</li> <li>• Adaptive (-1): Adaptive read-ahead is enabled, which allows the controller to dynamically calculate the optimum read-ahead size for the current workload.</li> <li>• Disabled (0): Read-ahead is disabled.</li> <li>• 512 KB (524288)</li> <li>• 1 MB (1048576)</li> <li>• 2 MB (2097152)</li> <li>• 4 MB (4194304)</li> <li>• 8 MB (8388608)</li> <li>• 16 MB (16777216)</li> <li>• 32 MB (33554432)</li> </ul>
volume-type (volume-type-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• standard (0): Standard volume.</li> </ul>
volume-class (volume-class-numeric)	string (uint32)	standard (0): Standard volume.

**Table 110 volumes properties (continued)**

Name	Type	Description
tier-affinity (tier-affinity-numeric)	string (uint32)	Not supported.
snapshot	string	Shows whether the volume is a snapshot.
snapshot-retention-priority (snapshot-retention-priority-numeric)	string (uint32)	Not supported.
volume-qualifier (volume-qualifier-numeric)	string (uint32)	N/A (0): Not applicable.
blocksize	uint32	The size of a block, in bytes.
blocks	uint64	The number of blocks, whose size is specified by the blocksize property.
capabilities	string	For internal use only.
volume-parent	string	Not supported.
snap-pool	string	Not applicable.
replication-set	string	Not applicable.
attributes	string	Shows whether the volume's disks are single pathed.
virtual-disk-serial	string	Disk group serial number.
creation-date-time (creation-date-time-numeric)	string (uint32)	The date and time, in the format <year>-<month>-<day> <hour>:<minutes>:<seconds> (UTC), when the volume was created. The numeric property shows the value as seconds elapsed since January 1, 1970 00:00.
volume-description	string	<ul style="list-style-type: none"> <li>For HP-UX, a text value (set in-band by a host application) that identifies the volume.</li> <li>For OpenVMS, a numeric value (set with the create volume or set volume command) that identifies the volume to an OpenVMS host.</li> <li>Blank by default.</li> </ul>
wwn	string	World Wide Name of the volume.
progress (progress-numeric)	string (uint32)	Not supported.
container-name	string	Name of the pool that contains the volume.
container-serial	string	Serial number of the pool that contains the volume.
allowed-storage-tiers (allowed-storage-tiers-numeric)	string (uint32)	Not supported.
threshold-percent-of-pool	string	For internal use only.
reserved-size-in-pages	uint32	For internal use only.
allocate-reserved-pages-first (allocate-reserved-pages-first-numeric)	string (uint32)	For internal use only.

**Table 110 volumes properties (continued)**

Name	Type	Description
zero-init-page-on-allocation (zero-init-page-on-allocation-numeric)	string (uint32)	For internal use only.
large-virtual-extents (large-virtual-extents-numeric)	string (uint32)	Shows whether the system will try to allocate pages in a sequentially optimized way to reduce I/O latency and improve performance. <ul style="list-style-type: none"> <li>• Disabled (0)</li> <li>• Enabled (1)</li> </ul>
raidtype (raidtype-numeric)	string (uint32)	The RAID level of the disk group. <ul style="list-style-type: none"> <li>• RAID0 (0)</li> <li>• RAID1 (1)</li> <li>• ADAPT (2)</li> <li>• RAID5 (5)</li> <li>• NRAID (6)</li> <li>• RAID10 (10)</li> <li>• RAID6 (11)</li> </ul>
pi-format (pi-format-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• T0 (0): Host PI (Type 0) is disabled for the volume.</li> <li>• T1 (1): Host PI (Type 1) is enabled for the volume.</li> </ul>
cs-replication-role	string	<ul style="list-style-type: none"> <li>• Blank: Not applicable.</li> </ul>
cs-copy-dest (cs-copy-dest-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Off (0): Not applicable.</li> </ul>
cs-copy-src (cs-copy-src-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Off (0): Not applicable.</li> </ul>
cs-primary (cs-primary-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Off (0): Not applicable.</li> </ul>
cs-secondary (cs-secondary-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• Off (0): Not applicable.</li> </ul>
metadata-in-use (metadata-in-use-numeric)	string (uint64)	Amount of pool metadata currently being used by the volume. The numeric property shows the unformatted value in blocks.
health (health-numeric)	string (uint32)	<ul style="list-style-type: none"> <li>• OK (0)</li> </ul>
health-reason	string	If Health is not OK, a message describes the reason for the health state.
health-recommendation	string	If Health is not OK, a message describes recommended actions to resolve the issue.
volume-group	string	If the volume is in a volume group, the name of the group. Otherwise, UNGROUPEDVOLUMES.
group-key	string	If the volume is in a volume group, the durable ID of the volume group. Otherwise, VGU.

# A Settings changed by restoring defaults

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

**Table 111 System information settings**

Setting	Value
System name	Uninitialized Name
System contact	Uninitialized Contact
System location	Uninitialized Location
System information	Uninitialized Info

**Table 112 Management protocols settings**

Setting	Value
CLI/Telnet	Disabled
CLI/SSH	Enabled
SLP	Enabled
FTP	Disabled
SFTP	Enabled
SNMP	Disabled
WBI/HTTP	Disabled
WBI/HTTPS	Enabled
Debug	Disabled
Ciphers setting	Default cipher strings

**Table 113 User settings**

Setting	Value
Users	Users are preserved.

**Table 114 Miscellaneous settings (1)**

Setting	Value
CLI session timeout	Preserved
Tasks and schedules	Preserved
Management Controller debug logs	Preserved
Management Controller event logs	Preserved
Storage Controller debug logs	Preserved
Storage Controller event logs	Preserved
Time/date and NTP settings	Preserved
Network IP settings	Preserved
IPv6 network settings	Preserved
DNS management hostname	Preserved
DNS name servers	Preserved
DNS search domains	Preserved



**Table 115 SNMP settings**

Setting	Value
SNMP trap notification level	None
SNMP trap host IPs	0.0.0.0
SNMP read community	public
SNMP write community	private

**Table 116 SMTP settings**

Setting	Value
Email notification	Disabled
Email notify filter	None
Email addresses	None
Email server	None
Email domain	None
Email sender	None
Log destination	None
Include logs	Disabled
Event notification	None
Alert notification	Enabled
Proxy setting	Cleared

**Table 117 LDAP settings**

Setting	Value
LDAP parameters	Cleared
LDAP settings	Disabled (server IP defaulted to 0.0.0.0)
User groups	Preserved
Audit log	Preserved

**Table 118 Syslog settings**

Setting	Value
Syslog parameters	Cleared
Syslog settings	Disabled (host IP defaulted to 0.0.0.0)

**Table 119 Miscellaneous settings (2)**

Setting	Value
SSL/SSH certificates	Preserved
Disk group metadata	Preserved

**Table 120 Advanced settings**

Setting	Value
Disk group background scrub	Enabled
Partner firmware upgrade	Enabled

**Table 120 Advanced settings (continued)**

Setting	Value
Utility priority	High
SMART	Enabled
Dynamic spare configuration	Enabled
Enclosure polling rate	5 seconds
Host control of caching	Disabled
Sync cache mode	Immediate
Missing LUN response	Illegal Request
Controller failure	Disabled
Supercap failure	Enabled
Power supply failure	Disabled
Fan failure	Disabled
Temperature exceeded	Disabled
Partner notify	Disabled
Auto write back	Enabled
Managed logs	Disabled
Auto stall recovery	Enabled (for failover/failback, not I/O)
Restart on CAPI fail	Enabled
Slot affinity	Disabled
Remanufacture	Enabled
Disk protection information	Disabled
Slow disk detection	Enabled
Scrub schedule	Disabled

**Table 121 FDE settings**

Setting	Value
FDE settings	Preserved

**Table 122 Enclosure settings**

Setting	Value
Name	Cleared
Location	Cleared
Rack number	0
Rack position	0

**Table 123 Host settings**

Setting	Value
Host and initiator nicknames and profiles	Preserved
Host groups	Preserved

**Table 124 Volume settings**

<b>Setting</b>	<b>Value</b>
Volume identifying information	Preserved

**Table 125 Miscellaneous settings (3)**

<b>Setting</b>	<b>Value</b>
CLI parameters	Configured users remain unchanged.
Debug log parameters	Each parameter is reset to its default as documented for the <code>set debug-log-parameters</code> CLI command.
Volume cache settings	Preserved
Expander PHY settings	Controller module root expander PHY settings are cleared
Hedged reads	Enabled (wait time up to 1.5s)

## B API commands

This appendix describes CLI commands that must be run in API mode, not console mode.

### add certificate

#### Description

Verifies a security certificate is in X.509 format and uploads it into the storage system's file system.

Added certificates are not immediately active. After uploading a certificate, to activate it run the `activate certificate` command.

---

**!** **IMPORTANT** This command is only available via the HTTPS API; it is not available via the SSH CLI. For information about using the API, see ["Using a script to access the CLI" on page 13](#).

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#### Request attributes

<b>Minimum role</b>	manage
<b>Request method</b>	POST
<b>Path</b>	/api/addcertificate
<b>Authentication</b>	Required and managed via <code>sessionKey</code> header
<b>Content-Type</b>	multipart/form-data

#### Parameters

Key	Value	Content type	Description
cert	<path>	text/plain	Path to the PEM-encoded SSL certificate file to upload.
cert-name	<name>	text/plain	Optional. A name for the certificate. Input rules: <ul style="list-style-type: none"><li>The value is case sensitive.</li><li>The value can have a maximum of 32 bytes.</li><li>The value must be alphanumeric. No special characters are allowed except: . - _</li></ul> If this parameter is omitted, a name is autogenerated in the format <code>CERT_&lt;controller-ID&gt;_&lt;yyrmmddhhmmss&gt;</code> .
controller	a b	text/plain	Optional. The controller for which the certificate is being added. If this parameter is omitted, the value is considered to be the controller being accessed.
identity	<username>	text/plain	Optional. The username registered with a WPA authentication server.

#### Examples

Using cURL, add a user SSL certificate to controller A.

```
curl --location --request POST 'https://10.235.221.117/api/addcertificate' \  
--header 'sessionKey: d93697c89fe75d94c3c2c7180eb5050e' \  
--form 'cert="-----BEGIN CERTIFICATE-----  
MIIFRDCCAyygAwIBAgICEBcwDQYJKoZIhvcNAQELBQAwVDELMakGA1UEBhMCSU4x  
DDAKBgNVBAGMA01BSDEQMA4GA1UECgwHc2VhZ2F0ZTEEMMAoGA1UECwwDZWZMRcw  
...  
fY6RYf40TV5Ztg+SgYTq+FwfyrTI5TO9kPBkGPWjkpE3xR8E76FqLsnOnr1DcKJo  
Txf4/t/ulT9Iisi3qiiJKW/APkZvbki28WjfvotHa3yhFutb80XDsugNH2vZn8l
```

```
WtZVDMSSg7U=
-----END CERTIFICATE-----
";type=text/plain' \
--form 'cert-name="rgwsd";type=text/plain' \
";type=text/plain' \
--form 'identity="idt";type=text/plain' \
--form 'controller="a";type=text/plain'
```

Using cURL, add a trust SSL certificate to controller A.

```
curl --location --request POST 'https://10.235.221.117/api/addcertificate' \
--header 'sessionKey: d93697c89fe75d94c3c2c7180eb5050e' \
--form 'cert="-----BEGIN CERTIFICATE-----
MIIFRDCCAyygAwIBAgICEBcwDQYJKoZIhvcNAQELBQAwVDELMAkGA1UEBhMCSU4x
DDAKBgNVBAGMA01BSDEQMA4GA1UECgwHc2VhZ2F0ZTEMMMAoGA1UECwwDZWZMRcw
...
fY6RYf40TV5Ztg+SgYTq+FwfyrtI5TO9kPBkGPWjqpE3xR8E76FqLsnOnr1DcKJo
Txf4/t/ulT9Iisi3qiiJKW/APkZvbkI28WjfvotHa3yhFutb80XDsugNH2vZn8l
WtZVDMSSg7U=
-----END CERTIFICATE-----
";type=text/plain' \
--form 'cert-name="trustcert";type=text/plain' \
--form 'identity="idt";type=text/plain' \
--form 'controller="a";type=text/plain'
```

#### See also

- activate certificate
- create certificate-signing-request
- remove certificate
- show certificates

# Glossary

**4U106**

An enclosure that is four rack units in height and can contain 106 disks.

**ADAPT**

A RAID-based data protection level that maximizes flexibility, provides built in spare capacity, and allows for very fast rebuilds, large storage pools, and simplified expansion.

**ADR**

Autonomous Drive Regeneration (ADR). HDD technology that detects and removes a bad head and its corresponding media surface, and returns the disk to service minus the capacity of the bad surface. ADR is also known as remanufacture.

**AES**

Advanced Encryption Standard.

**array**

Synonym for storage system.

**ASC/ASCQ**

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

**atomic write**

A write-optimization mode for volume cache that guarantees if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host system and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

**auto-write-through**

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

**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.

**AWT**

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

**canister**

Synonym for IOM.

**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.

**chassis**

The sheet metal housing of an enclosure.

**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.

**CMA**

Cable management arm (CMA).

**compatible disk**

A disk that can be used to replace a failed member disk of a disk group because it has at least the same capacity as, and is of the same type (enterprise SAS, for example) as, the disk that failed.

**controller A (or B)**

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

**controller enclosure**

An enclosure that can contain 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; host, expansion, network, and service ports; and midplane connectivity.

**CPLD**

Complex programmable logic device.

**CRC**

Cyclic Redundancy Check.

**CRU**

Customer-replaceable unit. See customer FRU.

**CSV**

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

**customer FRU**

A product module that can be ordered as a SKU and replaced in an enclosure by customers or by qualified service personnel, without having to send the enclosure to a repair facility.

**DAS**

Direct Attached Storage. A dedicated storage device that connects directly to a host without the use of a switch.

**dedicated spare**

A disk that is reserved for use by a specific linear disk group to replace a failed disk.

**DES**

Data Encryption Standard.

**DHCP**

Dynamic Host Configuration Protocol. A network configuration protocol for hosts on IP networks.

**disk group**

A group of disks that is configured to use a specific RAID level and that provides storage capacity. The number of disks that a disk group can contain is determined by its RAID level.

**DNS**

Domain Name System.

**DSP**

Digital signal processor.

**dual-port disk**

A disk that is connected to both controllers so it has two data paths, achieving fault tolerance.

**dynamic spare**

An available compatible disk that is automatically assigned, if the dynamic spares option is enabled, to replace a failed disk in a disk group with a fault-tolerant RAID level.

**E2E PI**

End-to-end protection information (E2E PI). A feature that consists of two discrete processes: host PI and disk PI. Host PI primarily verifies the integrity of data sent from the host server during transport by checking protection field information attached to the data. It also adds protection fields to data requested by the host server, so the host server can perform the process in reverse. Disk PI adds new protection fields to data sent from the host server so that it can check the integrity of the stored data when retrieved. Host and disk PI are separately enabled and operate independently. You can enable one, both, or neither of these processes. See also PI.

**EC**

Expander Controller (EC). A processor (located in the SAS expander in each IOM) that controls the SAS expander and provides SES functionality. See also EMP.

**EEPROM**

Electrically erasable programmable ROM.

**eMMC**

Electro-magnetic memory card. Also referred to as memory card, non-volatile memory.

**EMP**

Enclosure management processor (EMP). An Expander Controller subsystem that provides SES data such as temperature, power supply and fan status, and the presence or absence of disks.

**enclosure**

A physical storage device that contains I/O modules, disks, and other FRUs.

**enclosure management processor**

Enclosure management processor (EMP). An Expander Controller subsystem that provides SES data such as temperature, power supply and fan status, and the presence or absence of disks.

**End-to-End Protection Information**

End-to-end protection information (E2E PI). A feature that consists of two discrete processes: host PI and disk PI. Host PI primarily verifies the integrity of data sent from the host server during transport by checking protection field information attached to the data. It also adds protection fields to data requested by the host server, so the host server can perform the process in reverse. Disk PI adds new protection fields to data sent from the host server so that it can check the integrity of the stored data when retrieved. Host and disk PI are separately enabled and operate independently. You can enable one, both, or neither of these processes. See also PI.

**ESD**

Electrostatic discharge.

**Expander Controller**

Expander Controller (EC). A processor (located in the SAS expander in each IOM) that controls the SAS expander and provides SES functionality. See also EMP.

**failback**

Synonym for recovery.

**failover**

In an active-active configuration, failover is the act of temporarily transferring ownership of controller resources from an offline controller to its partner controller, which remains operational. The resources include pools, volumes, cache data, host ID information, and LUNs and WWNs. See also recovery.



**FDE**

Full Disk Encryption (FDE). A feature that secures all the user data on a storage system. See also lock key, passphrase, repurpose, SED.

**FPGA**

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

**FQDN**

Fully qualified domain name.

**FRU**

Field-replaceable unit. See service FRU.

**Full Disk Encryption**

Full Disk Encryption (FDE). A feature that secures all the user data on a storage system. See also lock key, passphrase, repurpose, SED.

**GEM**

Generic Enclosure Management. The firmware responsible for managing enclosure electronics and environmental parameters. GEM is used by the Expander Controller.

**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.

**HBA**

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

**HDD**

Hard disk drive.

**hedged read**

A method to reduce latency for read requests by using RAID parity information to reconstruct requested data.

**host**

A user-defined object that represents a server to which the storage system is attached, and is used to define a mapping relationship to storage.

**host group**

A user-defined set of hosts for ease of management, such as for volume-attachment operations.

**host port**

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

**I/O Manager**

An SNMP MIB term for a controller module.

**I/O module**

Input/output module (I/O module, IOM). An IOM is a controller module.

**initiator**

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.

**interleaved volume**

A method of disk storage with ADAPT disk groups that puts sequential information into nonsequential disk sectors, which results in faster read times.

**IOM**

Input/output module (I/O module, IOM). An IOM is a controller module.

**IOPS**

I/O operations per second.

**ISE**

Instant Secure Erase. A feature designed to protect data on hard disk drives by instantly resetting the drive back to factory settings and changing the encryption key so that any data remaining on the drive is cryptographically erased. This means all data on the drive is permanently and instantly unreadable, as needed.

**JSON**

JavaScript Object Notation providing a human readable representation of data that is also easily handled by computer applications.

**LBA**

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

**LDAP**

Local directory access protocol.

**LDAPS**

LDAP over SSL.

**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 store 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.

**lock key**

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

**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**

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

**map**

Settings that specify whether a volume is presented as a storage device to a host, and how the host can access the volume. Mapping settings include an access type and a LUN that identifies the volume to the host.

**MC**

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

**metadata**

Data in the first sectors of a disk that stores disk-, disk-group-, and volume-specific information including disk group membership or spare identification, disk group ownership, volumes 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.

**midplane**

The printed circuit board to which components connect in the middle of an enclosure.

**mount**

To enable access to a volume from a host OS. Synonyms for this action include present and map.

**network port**

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

**NRAID**

Non-RAID, nonstriped mapping to a single disk.

**NTP**

Network time protocol.

**OData**

The Open Data protocol is a set of common RESTful conventions providing interoperability between APIs.

**OID**

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

**onboarding**

A wizard-based process in the Storage Management Console that, after preboarding is complete, leads you through configuring and provisioning a new system.

**orphan data**

See unwritable cache data.

**partner firmware update**

Partner firmware update (PFU). The automatic update of the partner controller when the user updates firmware on one controller.

**passphrase**

A user-created password that allows users to manage lock keys in an FDE-capable system. See also FDE, lock key.

**PCB**

Printed circuit board.

**PCBA**

Printed circuit board assembly.

**PDU**

Power distribution unit. The rack power-distribution source to which a PSU connects.

**PFU**

Partner firmware update (PFU). The automatic update of the partner controller when the user updates firmware on one controller.

**PGR**

Persistent group reservations.

**PHY**

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

**PI**

Protection Information. An 8-byte protection field for each 512-byte sector of data that consists of a Guard, Reference, and Application tag. See also E2E PI.

**POST**

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

**preboarding**

A wizard-based process in the Storage Management Console that leads you through preparing a new system for use. Preboarding is followed by onboarding.

**provisioning**

The process of creating storage volumes, mapping them to initiators or hosts, and configuring data-protection options.

**PSU**

Power supply unit FRU.

**RAID head**

Synonym for controller enclosure.

**RBOD**

"RAID bunch of disks." See controller enclosure.

**recovery**

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

**Redfish**

RESTful API and Data model to manage network devices and services maintained by the DMTF organization.

**remanufacture**

Autonomous Drive Regeneration (ADR). HDD technology that detects and removes a bad head and its corresponding media surface, and returns the disk to service minus the capacity of the bad surface. ADR is also known as remanufacture.

**repurpose**

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

**RESTful**

An architectural pattern to API design that provides inherent use of HTTP primitives operating on a data model.

**SAS**

Serial Attached SCSI (Small Computer System Interface).

**SC**

Storage Controller. A processor (located in a controller module) that is responsible for RAID controller functions. The SC is also referred to as the RAID controller. See also EC, MC.

**SED**

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

**SEEPROM**

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

**service FRU**

A product module that can be replaced in an enclosure by qualified service personnel only, without having to send the enclosure to a repair facility.

**SES**

SCSI Enclosure Services. The protocol that allows the initiator to communicate with the enclosure using SCSI commands.

**SFF**

Small form factor.

**SFTP**

SSH File Transfer Protocol. A secure secondary interface for tasks such as installing firmware updates, downloading logs, and installing security certificates and keys. All data sent between the client and server will be encrypted.

**SHA**

Secure Hash Algorithm.

**shelf**

Synonym for enclosure.

**shipkit**

The package containing an enclosure, accessories, and related materials that a customer receives.

**SLAAC**

Stateless address autoconfiguration.

**SLP**

Service Location Protocol. Enables computers and other devices to find services in a local area network without prior configuration.

**SMART**

Self-Monitoring Analysis and Reporting Technology. A monitoring system for disk drives that monitors reliability indicators for the purpose of anticipating disk failures and reporting those potential failures.

**SMC**

Storage Management Console is the web-browser interface (WBI), the web application that is embedded in each controller module and is the primary management interface for the storage system.

**SPEAR**

Stripe Parity Error Assessment on Read. A data-protection feature for disk groups that ensures data integrity by verifying consistency of the stripe with each read access.

**SSD**

Solid-state drive.

**SSH**

Secure Shell. A network protocol for secure data communication.

**SSL**

Secure Sockets Layer. A cryptographic protocol that provides security over the internet.

**Storage Controller**

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, MC.

**Storage Management Console**

Storage Management Console is the web-browser interface (WBI), the web application that is embedded in each controller module and is the primary management interface for the storage system.

**storage system**

A controller enclosure. Product documentation and interfaces use the terms storage system and system interchangeably.

**Swordfish**

Extends the Redfish API to manage storage equipment and storage services. Maintained by the SNIA organization.

**syslog**

A protocol for sending event messages across an IP network to a logging server. This feature supports User Datagram Protocol (UDP) but not Transmission Control Protocol (TCP).

**TCP**

Transmission Control Protocol.

**tray**

Synonym for enclosure.

**UDP**

User Datagram Protocol.

**ULP**

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

**unmount**

To remove access to a volume from a host OS. Synonyms include unrepresent 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.

**UTF-8**

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

**volume**

A logical representation of a fixed-size, contiguous span of storage that is presented to host systems for the purpose of storing data.

**VPD**

Vital Product Data. Data held on an EEPROM in an enclosure or FRU that is used by GEM to identify and control the component.

**WBI**

Storage Management Console is the web-browser interface (WBI), the web application that is embedded in each controller module and is the primary management interface for the storage system.

**WWN**

World Wide Name. A globally unique 64-bit number that identifies a device used in storage technology.

**WWNN**

World Wide Node Name. A globally unique 64-bit number that identifies a device.

**WWPN**

World Wide Port Name. A globally unique 64-bit number that identifies a port.

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