AssuredSAN 4000 Series
CLI Reference Guide

Adobe PostScript

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About this guide

This guide provides information about managing an AssuredSAN™ 4000 Series storage system by using its CLI.

Intended audience

This guide is intended for storage system administrators.

Prerequisites

Prerequisites for using this product include knowledge of:

- Network administration
- Storage system configuration
- SAN management and DAS
- FC, SAS, and Ethernet protocols

Related documentation

Table 1   Related Documentation

For information about	See
Enhancements, known issues, and late-breaking information not included in product documentation	AssuredSAN 4000 Series Release Notes
Overview of product shipkit contents and setup tasks	Getting Started*
Regulatory compliance and safety and disposal information	AssuredSAN Product Regulatory Compliance and Safety*
Using a rackmount bracket kit to install an enclosure into a rack	AssuredSAN Rackmount Bracket Kit Installation* or AssuredSAN 2-Post Rackmount Bracket Kit Installation*
Product hardware setup and related troubleshooting	AssuredSAN 4000 Series Setup Guide
Using the web interface to configure and manage the product	AssuredSAN 4000 Series RAIDar User Guide
Event codes and recommended actions Identifying and installing or replacing FRUs	AssuredSAN 4000 Series Service Guide

* Printed document included in product shipkit.

For additional information, see Dot Hill's Customer Resource Center (CRC) web site: http://crc.dothill.com.

Document conventions and symbols

Table 2 Document conventions

Convention	Element
Blue text	Cross-reference links and e-mail addresses
Blue, underlined text	Web site addresses
Bold font	• Key names • Text typed into a GUI element, such as into a box • GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
Italics font	Text emphasis
`Monospace font`	• File and directory names • System output • Code • Text typed at the command-line
`Monospace, italic font`	• Code variables • Command-line variables
`Monospace, bold font`	Emphasis of file and directory names, system output, code, and text typed at the command line

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

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

📝 **NOTE:** Provides additional information.

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

1 Using the CLI

This chapter introduces the AssuredSAN 4000 Series CLI.

Accessing the CLI

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

- By using Telnet, an SSH application, or a terminal emulator on a management host that is remotely connected through a LAN to a controller module's network port. See the *AssuredSAN 4000 Series Setup Guide* for information about setting management port IP addresses using the CLI.
- By using a terminal emulator on a management host that is directly connected to a controller module's serial CLI port.

> **NOTE:** Using HyperTerminal on a Microsoft Windows host with the CLI:
> - On a host connected to a controller module's mini-USB CLI port, incorrect command syntax in a HyperTerminal session can cause the CLI to hang. To avoid this problem, use correct syntax, use a different terminal emulator, or connect to the CLI using Telnet rather than the mini-USB cable.
> - Close the HyperTerminal session before shutting down the controller or restarting its MC; otherwise the host's processor cycles may rise unacceptably.

Table 3 Default usernames and passwords

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

CLI output formats

The CLI has two output formats:

- Console format, which is the human-to-computer interface.
- XML API format, which is the computer-to-computer interface.

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

XML API format enables any external application to interact with the storage system. The XML format is constructed to permit new fields to be added without impacting existing clients if they follow standard XML parsing conventions. The XML format also contains alternate fields for values which may be localized, such as a state value. These values are guaranteed not to change with different languages and can be used for scripting.

Scripting is not supported using console format because labels, field sizes, and order of fields may change in future firmware releases. To properly script CLI commands use XML API format, which is expected to remain consistent from release to release; field names will be consistent and new functionality will be added as new fields. These types of changes in XML output will not impact a conventional XML parsing engine.

You can change the CLI output format by using the set cli-parameters command; see "Example" on page 96.

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.

The following example shows interactively starting a Telnet session, logging into the CLI, executing a command to show disk settings (parameters), and exiting the CLI:

```
$: telnet 172.22.5.55
172.22.5.55 login: monitor
Password: ********

product
System Name: Test
System Location: Lab
Version: version
# show disk-parameters
Disk Parameters
-------------
SMART: Enabled
Drive Write Back Cache: Disabled
Timeout Retry Maximum: 3
Attempt Timeout: 8
Overall Timeout: 105
Drive Spin Down Non-Vdisk Enable: Disabled
Drive Spin Down Non-Vdisk Delay: 0

Success: Command completed successfully. (2012-01-18 15:00:13)

# exit
```

Using a script to access the CLI

The following example shows how to construct a Perl script to communicate with the CLI via Telnet. cLogin is called at the start of the script to log a user into the CLI. The script uses the command-line parameters specified as the IP address, username, and password. After the user has been logged in, other commands can be sent to the CLI.

```
use Net::Telnet;
sub cLogin {
    $telnet->open($_[0]);
    $telnet->waitfor(/(login|username)[: ]*$/i);
    $telnet->print("$_[1]");
    $telnet->waitfor(/password[: ]*$/i);
    $telnet->print("$_[2]");
    # either got a login or a prompt
    @ok = $telnet->waitfor(/(#|login:*) /i);
    if ($debug_commands == 1) { print "-"; print @ok; print "-\n"; }
    if ($ok[1] =~ m/login/gi)
    {
        return 0;
    }
    else
    {
        return 1;
    }
}
$ipAddr = $ARGV[0];
$username = $ARGV[1];
$password = $ARGV[2];
$telnet = new Net::Telnet ( Timeout=>10,
```

```
        Errmode=>'die',
        Prompt => '/\# $/i');
        if ( !cLogin($ipAddr, $username, $password) == 1 )
        {
            print("Error: $username user failed to log in. Exiting.\n");
            $telnet->close;
            exit(0);
        }
```

For scripting support, the following command can be used to access the XML API and to disable the
paging mode that pauses for each full screen of command output.

```
        $telnet->cmd("set cli-parameters api-embed pager disabled");
```

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

```
        @sV = $telnet->cmd("show configuration");
        for ($i=0; $i<scalar(@sV); $i++)
        {
            print ("@sV[ $i ]");
        }
```

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

```
        use LWP::UserAgent;
        use Digest::MD5 qw(md5_hex);
        use XML::LibXML;

        # generate MD5 hash using default username/password
        my $md5_data = "manage_!manage";
        my $md5_hash = md5_hex( $md5_data );
        print "$md5_hash\n";

        # create the URL and send an http GET request

        $ua = LWP::UserAgent->new;
        $url = 'http://10.0.0.2/api/login/' . $md5_hash;

        print ("Sending to $url\n");
        $req = HTTP::Request->new(GET => $url);

        $res = $ua->request($req);

        # Parse the XML content using LibXML to obtain the session key

        print $res->content;

        my $parser = XML::LibXML->new();
        my $doc = $parser->parse_string( $res->content );

        my $root = $doc->getDocumentElement;
        my @objects = $root->getElementsByTagName('OBJECT');
        my @props = $objects[0]->getElementsByTagName('PROPERTY');

        my $sessionKey;

        foreach my $prop ( @props ) {
            my $name = $prop->getAttribute('name');
```

```
        print "Property = " . $name . "\n";

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

    print "Session Key = $sessionKey\n";

    # Run a sample command to obtain the disks in the system.

    $url = 'http://10.0.0.2/api/show/disks';
    $req = HTTP::Request->new(GET => $url);
    $req->header('sessionKey' => $sessionKey );
    $req->header('dataType' => 'ipa' );

    $res = $ua->request($req);

    $url2 = 'http://10.0.0.2/api/exit';
    $req2 = HTTP::Request->new(GET => $url3);
    $req2->header('sessionKey' => $sessionKey );
    $req2->header('dataType' => 'api' );

    $res2 = $ua->request($req2);

    print $res->content;
```

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

Using the XML API

The MC provides access for monitoring and management via the Telnet and SSH protocols for CLI 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 XML parser should use the DTD version that corresponds to the firmware level to ensure that the XML is validated. The DTD provides the structure of all content returned by the CLI when XML API format is enabled. By obtaining the latest DTD for validation, the parser will be forward compatible. To obtain the DTD, see Dot Hill's Customer Resource Center (CRC) website: crc.dothill.com.

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

Table 4 XML API elements

Element	Description and attributes
RESPONSE	The RESPONSE element is the top-level element, which contains all data output for the CLI command that was issued. The response includes: • A number of OBJECT elements, which varies by command. • A status object that provides a message and return code. A return code of 0 indicates that the command succeeded. Any other return code is an error code. There is only one RESPONSE element per issued command.
OBJECT	In general, an OBJECT element describes a storage-system component such as a disk or a volume. An object has these attributes: • basetype. This attribute allows output in brief mode to be correlated with metadata to reduce the overhead of each command, as described in XML API optimization. This is also a good field to use to detect the type of the object (e.g., a disk, a volume, etc.). • name. The name of the object. • oid. The unique identifier for the object in the scope of the response. The OBJECT element can contain PROPERTY elements.
PROPERTY	A PROPERTY element provides detail about the attributes of an OBJECT. A property has these attributes: • name. The unique name for the property within the object. • key. Indicates whether this property is a key value to identify this object. • type. The type of data represented by the element data. • size. Typically the maximum size of the output. Usually only important if the console output is displayed in rows. • draw. Whether to show or hide this data in console format. • sort. The type of sorting that can be applied to this property. • display-name. The label for this data to show in user interfaces.
COMP	A COMP (composition) element associates nested objects, such as a task object within a schedule object. A composition element has these attributes: • P. The OID of the part component. • G. The OID of the group component. An alternative to using COMP elements is described in XML API optimization.
ASC	The ASC (association) element provides a simple association description between two objects in the response. • A. First object. • B. Second object.

Scripting guidelines

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

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

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

The following example shows the XML API status object:

```
<OBJECT basetype="status" name="status" oid="1">
    <PROPERTY name="response-type" type="string" size="12" draw="false"
sort="nosort" display-name="Response Type">Success</PROPERTY>
    <PROPERTY name="response-type-numeric" type="uint32" size="12" draw="false"
sort="nosort" display-name="Response Type">0</PROPERTY>
    <PROPERTY name="response" type="string" size="180" draw="true" sort="nosort"
display-name="Response">Command completed successfully.</PROPERTY>
    <PROPERTY name="return-code" type="sint32" size="15" draw="false"
sort="nosort" display-name="Return Code">0</PROPERTY>
    <PROPERTY name="component-id" type="string" size="80" draw="false"
sort="nosort" display-name="Component ID"></PROPERTY>
    <PROPERTY name="time-stamp" type="string" size="25" draw="false"
sort="datetime" display-name="Time">2010-08-10 11:32:29</PROPERTY>
    <PROPERTY name="time-stamp-numeric" type="uint32" size="25" draw="false"
sort="datetime" display-name="Time">1281439949</PROPERTY>
</OBJECT>
```

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

XML API examples

The following example shows the same command, formatted for use with the CLI or for use with the HTTP interface, and its XML API output.

- CLI format: `create vdisk level r5 disks 2.6,2.7,2.8 vd-1`
- HTTP interface format: `create/vdisk/level/r5/disks/2.6,2.7,2.8/vd-1`

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE VERSION="L100">
<OBJECT basetype="status" name="status" oid="1">
    <PROPERTY name="response-type" type="string" size="12" draw="false"
sort="nosort" display-name="Response Type">Success</PROPERTY>
    <PROPERTY name="response-type-numeric" type="uint32" size="12" draw="false"
sort="nosort" display-name="Response Type">0</PROPERTY>
    <PROPERTY name="response" type="string" size="180" draw="true" sort="nosort"
display-name="Response">Command completed successfully. (vd-1) - The vdisk was
created.</PROPERTY>
    <PROPERTY name="return-code" type="sint32" size="15" draw="false"
sort="nosort" display-name="Return Code">0</PROPERTY>
    <PROPERTY name="component-id" type="string" size="80" draw="false"
sort="nosort" display-name="Component ID">vd-1</PROPERTY>
    <PROPERTY name="time-stamp" type="string" size="25" draw="false"
sort="datetime" display-name="Time">2010-08-10 12:07:18</PROPERTY>
    <PROPERTY name="time-stamp-numeric" type="uint32" size="25" draw="false"
sort="datetime" display-name="Time">1281442038</PROPERTY>
</OBJECT>
</RESPONSE>
```

XML API optimization

The following are two ways to optimize XML API performance:

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

In the following example, in which `api-embed` mode and `brief` mode are enabled, embedded objects contain media-specific detail for ports:

```
# show ports
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE VERSION="L100">
  <OBJECT basetype="port" name="name" oid="1" format="rows">
    <PROPERTY name="durable-id">hostport_A0</PROPERTY>
    <PROPERTY name="controller" key="true">A</PROPERTY>
    <PROPERTY name="controller-numeric" key="true">1</PROPERTY>
    <PROPERTY name="port" key="true">A0</PROPERTY>
    <PROPERTY name="port-type" type="string">FC</PROPERTY>
    <PROPERTY name="port-type-numeric" type="string">6</PROPERTY>
    <PROPERTY name="media">FC(-)</PROPERTY>
    <PROPERTY name="target-id">target-ID</PROPERTY>
    <PROPERTY name="status">Disconnected</PROPERTY>
    <PROPERTY name="status-numeric">6</PROPERTY>
    <PROPERTY name="actual-speed"></PROPERTY>
    <PROPERTY name="actual-speed-numeric">255</PROPERTY>
    <PROPERTY name="configured-speed">Auto</PROPERTY>
    <PROPERTY name="configured-speed-numeric">3</PROPERTY>
    <PROPERTY name="health">N/A</PROPERTY>
    <PROPERTY name="health-numeric">4</PROPERTY>
    <PROPERTY name="health-reason">There is no host connection to this host
port.</PROPERTY>
    <PROPERTY name="health-recommendation">- If this host port is intentionally
unused, no action is required. Otherwise, use an appropriate interface cable to
connect this host port to a switch or host. If a cable is connected, check the
cable and the switch or host for problems.</PROPERTY>
    <OBJECT basetype="fc-port" name="port-details" oid="2" format="rows">
      <PROPERTY name="configured-topology">Loop</PROPERTY>
      <PROPERTY name="primary-loop-id">0</PROPERTY>
    </OBJECT>
  </OBJECT>
  <OBJECT basetype="port" name="name" oid="3" format="rows">
    <PROPERTY name="durable-id">hostport_A1</PROPERTY>
    ...
  </OBJECT>
  <OBJECT basetype="status" name="status" oid="5">
    <PROPERTY name="response-type">Success</PROPERTY>
    <PROPERTY name="response-type-numeric">0</PROPERTY>
    <PROPERTY name="response">Command completed successfully.</PROPERTY>
    <PROPERTY name="return-code">0</PROPERTY>
    <PROPERTY name="component-id"></PROPERTY>
    <PROPERTY name="time-stamp">2012-01-27 12:11:10</PROPERTY>
    <PROPERTY name="time-stamp-numeric">1281442270</PROPERTY>
  </OBJECT>
</RESPONSE>
```

Command syntax

Command names and parameters

Command and parameter names are not case sensitive.

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

Parameter values separated by '|' characters are options. Enter only one of the values. These values are not case sensitive.

Parameter values in italics are variables. Substitute text that is appropriate for the task you want to perform. Variable values such names of users and volumes are case sensitive and have a maximum length in bytes. ASCII characters are 1 byte; most Latin (Western European) characters with diacritics are 2 bytes; most Asian characters are 3 bytes.

Unless otherwise specified, a parameter value can include printable UTF-8 characters except angle brackets (<>), backslash (\), comma (,), and double quotes ("). A parameter value that includes a space must be enclosed in double quotes.

Parameters can be entered in any order. However, if the value of a parameter with no keyword is the same as the keyword of an optional parameter, the optional parameter must precede the value. For example, to create a vdisk named `spare`, the `spare` parameter must precede the name value **`spare`**:

```
create vdisk level raid5 disks 1.10-12 spare 1.7 spare
```

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: `0.4`
- A hyphenated range of disks. Example: `0.4-7`
- A comma-separated list of individual disks, ranges, or both (with no spaces). Example: `0.4,0.6-9`
- A RAID10 or RAID50 vdisk, with disks in sub-vdisks separated by colons (with no spaces). RAID50 example: `0.1-3:0.4-6:0.7-9:0.10-12.`

Vdisks

You can specify:

- A vdisk by its name or serial number. A unique serial number is automatically assigned when a vdisk is created, and does not change for the life of the vdisk.
- A list of vdisk names or serial numbers separated by commas (with no spaces). Not all commands support lists. List example: `vd1,"My vdisk"`

Volumes

You can specify:

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

Ports

Controller host ports are specified by controller ID and port number, and are not case sensitive. Controller IDs are A for the upper controller and B for the lower controller. Port IDs increment from 0 in each controller module. You can specify:

- A port ID. Example: `A1`
- A hyphenated range of IDs. Do not mix controller IDs in a range. Example: `b0-b1`
- A comma-separated list of IDs, ranges, or both (with no spaces). Example: `A1,b0-b1`

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 redisplays the string so you can complete it.

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

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

Table 5   Keyboard shortcuts for command completion, editing, and history

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

Viewing help

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

```
help
```

To view help for a command and then return to the command prompt, enter:

```
help command-name
```

To view the information shown in Command syntax above, enter:

```
help syntax
```

To view the information shown in this topic and in Command completion, editing, and history above, enter:

```
help help
```

Size representations

Parameters such as names of users and volumes have a maximum length in bytes. ASCII characters are 1 byte; most Latin (Western European) characters with diacritics are 2 bytes; most Asian characters are 3 bytes.

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

In the CLI, the base for entry and display of storage-space sizes can be set per user or per session; see create user and set cli-parameters. When entering storage-space sizes only, either base-2 or base-10 units can be specified.

Table 6   Size representations in base 2 and base 10

Base 2		Base 10	
Unit	Size in bytes	Unit	Size in bytes
KiB (kibibyte)	1,024	KB (kilobyte)	1,000
MiB (mebibyte)	$1,024^2$	MB (megabyte)	$1,000^2$
GiB (gibibyte)	$1,024^3$	GB (gigabyte)	$1,000^3$
TiB (tebibyte)	$1,024^4$	TB (terabyte)	$1,000^4$

Table 6 Size representations in base 2 and base 10

Base 2		Base 10	
Unit	Size in bytes	Unit	Size in bytes
PiB (pebibyte)	$1,024^5$	PB (petabyte)	$1,000^5$
EiB (exbibyte)	$1,024^6$	EB (exabyte)	$1,000^6$

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

Table 7 Decimal (radix) point character by locale

Language	Character	Examples
English, Chinese, Japanese, Korean	Period (.)	146.81 GB 3.0 Gbit/s
Dutch, French, German, Italian, Spanish	Comma (,)	146,81 GB 3,0 Gbit/s

Event log

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

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

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

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

2 Categorical list of commands

This chapter helps you find a command within a category of functionally related commands. A command might appear in more than one category.

Table 8 Commands by category

Category	Commands	
CLI and users	create user	set password
	delete user	set prompt
	exit	set user
	help (see Viewing help)	show cli-parameters
	set cli-parameters	show users
Disks, vdisks, and spares	abort scrub	scrub vdisk
	abort verify	set expander-fault-isolation
	clear disk-metadata	set led
	create vdisk	set spares
	delete global-spare	set vdisk
	delete vdisk-spare	show disks
	delete vdisk-spare	show vdisks
	dequarantine	trust
	expand vdisk	verify vdisk
	rescan	
Volumes, hosts, and mapping	create host	show cache-parameters
	create volume	show host-maps
	create volume-set	show hosts
	delete host	show ports
	delete volumes	show unwritable-cache
	expand volume	show volume-maps
	map volume	show volume-names
	release volume	show volume-reservations
	set cache-parameters	show volumes
	set host-name	unmap volume
	set volume	
Scheduled tasks	create schedule	show schedule-details
	create task	show schedules
	delete schedule	show task-details
	delete task	show tasks
	set schedule	
Event notification	set email-parameters	show events
	set snmp-parameters	show snmp-parameters
	show email-parameters	test

Table 8 Commands by category (continued)

Category	Commands	
System configuration and utilities	clear cache	show controllers
	reset host-link	show disk-parameters
	ping	show enclosures
	restart	show expander-status
	set advanced-settings	show fans
	set auto-write-through-trigger	show frus
	set awt	show host-parameters
	set controller-date	show inquiry
	set disk-parameters	show job-parameters
	set enclosure	show network-parameters
	set expander-fault-isolation	show ntp-status
	set expander-phy	show ports
	set host-parameters	show power-supplies
	set job-parameters	show protocols
	set led	show redundancy-mode
	set network-parameters	show sas-link-health
	set ntp-parameters	show sensor-status
	set protocols	show shutdown-status
	set system	show system
	show advanced-settings	show system-parameters
	show auto-write-through-trigger	show versions
	show awt	shutdown
	show configuration	versions
	show controller-date	
Service utilities	clear events	set expander-fault-isolation
	clear expander-status	set expander-phy
	restore defaults	show debug-log-parameters
	set debug-log-parameters	show expander-status
API specific	meta	show refresh-counters
Statistics	reset all-statistics	reset volume-statistics
	reset controller-statistics	show controller-statistics
	reset disk-error-statistics	show disk-statistics
	reset disk-statistics	show host-port-statistics
	reset host-port-statistics	show vdisk-statistics
	reset vdisk-statistics	show volume-statistics

The following legacy commands have either been replaced by newer commands or removed.

Table 9 Replaced or removed commands

Old command	New command
clear disk metadata	clear disk-metadata
create host-name	create host

Table 9 Replaced or removed commands (continued)

Old command	New command
create host-wwn-name	create host
delete host-wwn-name	delete host
reset host-channel-link	reset host-link
set drive-parameters	set disk-parameters
set global-spare	set spares
set host-port-interconnects	None
set host-wwn-name	set host-name
set output-format	set cli-parameters
set vdisk-spare	set spares
show channels	show ports
show drive-parameters	show disk-parameters
show enclosure-status	show enclosures, show frus, show sensor-status
show host-port-interconnects	None
show host-wwn-names	show hosts
show lun-maps	show volume-maps
show output-format	show cli-parameters
show port-wwn	show ports

3 Alphabetical list of commands

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

Description The command's purpose and notes about its usage

Syntax The command's syntax

Parameters Descriptions of the command's parameters

Output Descriptions of fields shown in console format

Example One or more examples of the command's usage in console format

Basetypes References to descriptions of basetype properties shown in XML API format

See also References to commands that are used with the command

abort scrub

Description   Aborts the `scrub vdisk` operation for specified vdisks.

Syntax   `abort scrub vdisk` *`vdisks`*

Parameters   `vdisk` *`vdisks`*
Names or serial numbers of the vdisks to stop scrubbing. For vdisk syntax, see "Command syntax" on page 19.

Example   Abort scrubbing vdisk `vd1`:

```
# abort scrub vdisk vd1
Info: Scrub was aborted on vdisk vd1. (vd1)
Success: Command completed successfully. (2012-01-20 15:42:08)
```

See also
- scrub vdisk
- show vdisks

abort verify

Description Aborts the `verify vdisk` operation for specified vdisks.

Syntax `abort verify vdisk` *`vdisks`*

Parameters `vdisk` *`vdisks`*
Names or serial numbers of the vdisks to stop verifying. For vdisk syntax, see "Command syntax" on page 19.

Example Abort verifying vdisk `vd1`:

```
# abort verify vdisk vd1
Info: The verify was aborted on vdisk vd1. (vd1) (2012-01-20 15:40:31)
Success: Command completed successfully. (2012-01-20 15:40:31)
```

See also
- show vdisks
- verify vdisk

clear cache

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

You can clear unwritable cache data for one or more volumes.

When there are several volumes' worth of unwritable data, running the `clear cache` command will clear only the first volume's unwritable data. Therefore, it might become necessary to run the `clear cache` command multiple times to remove all cache data. Use the following process to ensure all cache data has been cleared.

1. Run the `show unwritable-cache` command to view the percent of unwritable cache in each controller.
2. Run the `clear cache` command.
3. Run the `show unwritable-cache` command to view the percent of unwritable cache in each controller. If the value is not 0, repeat steps 1–3 until the value is 0.

Syntax `clear cache [volume` *volume*`]`

Parameters `volume` *volume*
Optional. Name or serial number of the volume whose cache data should be cleared. For volume syntax, see "Command syntax" on page 19. If this parameter is omitted, the command clears any unneeded orphaned data for volumes that are no longer online or that no longer exist.

Example Clear unwritable cache data for volume `V1` from both controllers:

```
# clear cache volume V1
Success: Command completed successfully - If unwritable cache data existed, it
has been cleared. (2012-01-18 14:21:11)
```

See also • show unwritable-cache

clear disk-metadata

Description Clears metadata from leftover disks.

⚠ **CAUTION:**

- Only use this command when all vdisks are online and leftover disks exist. Improper use of this command may result in data loss.
- Do not use this command when a vdisk is offline and one or more leftover disks exist.

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

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

- Vdisk 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 vdisk, causing the vdisk's health to become `Degraded` or `Fault`, depending on the RAID level.
- The disk's Fault LED is illuminated amber.

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

Syntax `clear disk-metadata` *`disks`*

Parameters *`disks`*
IDs of the leftover disks to clear metadata from. For disk syntax, see "Command syntax" on page 19.

Example Show disk usage:

```
# show disks
Location ... How Used ...
----------------------...
1.1      ... LEFTOVR  ...
1.2      ... VDISK    ...
...
Success: Command completed successfully. (2012-01-18 10:35:39)
```

Clear metadata from a leftover disk:

```
# clear disk-metadata 1.1
Info: Updating disk list...
Info: Disk disk_1.1 metadata was cleared. (2012-01-18 10:35:39)
Success: Command completed successfully. - Metadata was cleared. (2012-01-18
10:35:39)
```

Try to clear metadata from a disk that is not leftover:

```
# clear disk-metadata 1.2
Error: The specified disk is not a leftover disk. (1.2) - Metadata was not
cleared for one or more disks. (2012-01-18 10:32:59)
```

clear events

⚠ **CAUTION:** For use by or with direction from a service technician.

Description Clears the event log for controller A, B, or both.

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

Parameters `a|b|both`
Optional. The controller event log to clear. If this parameter is omitted, both event logs are cleared.

Example Clear the event log for controller A:

```
# clear events a
Success: Command completed successfully. - The event log was successfully
cleared. (2012-01-18 10:40:13)
```

See also • show events

clear expander-status

> △ **CAUTION:** For use by or with direction from a service technician.

Description Clears the counters and status for SAS expander lanes. 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.

Syntax `clear expander-status [enclosure ID]`

Parameters enclosure *ID*
Optional. The enclosure number.

Example Clear the expander status for the first enclosure:

```
# clear expander-status enclosure 0
Success: Command completed successfully. - Expander status was cleared.
(2012-01-18 14:18:53)
```

See also • show expander-status

create host

Description Creates a host entry with an associated nickname. Use this to create an entry for a host that is not automatically discovered or to create a nickname for an automatically discovered host. When mapping volumes to hosts the nickname can make a host easy to recognize.

Syntax
```
create host
    id ID
    nickname
```

Parameters id *ID*
For FC and SAS, the host node's 16-hex-digit WWPN. The value can include a colon between each byte but the colons will be discarded. A host ID cannot have more than one entry in the system.

nickname
A nickname for the host node. The name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 15 bytes. A name that includes a space must be enclosed in double quotes.

Example Create an entry named `Host1` for an FC host whose WWPN is 207000C0FF001122:

```
# create host id 207000C0FF001122 Host1
Success: Command completed successfully. - The new host was created. (2012-01-18
15:53:10)
```

Create an entry for an FC host by pasting a WWPN that includes colons:

```
# create host id 20:70:00:c0:ff:d7:4c:07 Host2
Success: Command completed successfully. - The new host was created. (2012-01-18
15:53:20)
```

See also
- delete host
- set host-name
- show hosts

create host-wwn-name

Obsolete command. See "create host" on page 35.

create schedule

Description Schedules a task to run automatically.

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
  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 task to run. The name is case sensitive.

schedule-name
A name for the new schedule. The name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 32 bytes. A name that includes a space must be enclosed in double quotes.

Example Create schedule Sched1 that runs Task1 for the first time on March 1, 2012; runs daily between midnight and 1:00 AM; and runs for the last time in the morning of January 1, 2013:

```
# create schedule schedule-specification "start 2012-03-01 00:01, every 1 days,
between 12:00 AM and 1:00 AM, expires 2013-01-01 1:00 AM" task-name Task1 Sched1
Success: Command completed successfully. (Sched1) - The schedule was created.
(2012-01-20 15:48:01)
```

Create schedule Sched2 that runs Task2 for the first time on March 1, 2012, and on the first weekday of each month, with no expiration:

```
# create schedule schedule-specification "start 2012-03-01 00:01 only first
weekday of month" task-name Task2 Sched2
Success: Command completed successfully. (Sched2) - The schedule was created.
(2012-01-20 15:46:16)
```

Try to create Sched3 with a start time outside the "between" range:

```
# create schedule schedule-specification "start 2012-01-14 4:15 PM between 12:00
AM and 12:00 PM" task-name Task3 Sched3
Error: create schedule: (Sched3) - The specified start time must be within the
range specified with the 'between' parameter. (2012-01-20 15:46:08)
```

See also
- delete schedule
- set schedule
- show schedule-details
- show schedules
- show task-details
- show tasks

create task

Description Creates a task that can be scheduled. You can create a task to enable or disable DSD.

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

```
create task type EnableDSD name
```

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

```
create task type DisableDSD name
```

Parameters `type EnableDSD|DisableDSD`
The task type:

- `EnableDSD`: Enables spin down for all vdisks. You can use this to enable or resume spin down during hours of infrequent activity.
- `DisableDSD`: Disables spin down for all vdisks. You can use this to disable or suspend spin down during hours of frequent activity.

`name`
A name for the new task. The name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 32 bytes. A name that includes a space must be enclosed in double quotes.

Example Create a task named `taskDSDresume` to enable or resume spin down:

```
# create task type EnableDSD taskDSDresume
Success: Command completed successfully. (taskDSDresume) - The task was created.
(2012-01-19 15:47:04)
```

Create a task named `taskDSDsuspend` to disable or suspend spin down:

```
# create task type DisableDSD taskDSDsuspend
Success: Command completed successfully. (taskDSDsuspend) - The task was
created. (2012-01-19 15:47:15)
```

See also
- create schedule
- delete task
- show task-details
- show tasks
- show volumes

create user

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

Syntax
```
create user
      [authentication-type MD5|SHA|none]
      [base 2|10]
      [interfaces interfaces]
      [roles monitor|manage|admin|diagnostic]
      [locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja
      |Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t]
      [password password]
      [precision #]
      [privacy-password encryption-password]
      [privacy-type DES|AES|none]
      [storage-size-base 2|10]
      [storage-size-precision #]
      [storage-size-units auto|MB|GB|TB]
      [temperature-scale celsius|c|fahrenheit|f]
      [timeout #]
      [trap-host IP-address]
      [type novice|standard|advanced|diagnostic]
      [units auto|MB|GB|TB]
      [level]
      name
```

Parameters authentication-type MD5|SHA|none
Optional. For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password.

- MD5: MD5 authentication.
- SHA: SHA 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.
- 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.

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

- cli: CLI.
- wbi: WBI (RAIDar).
- ftp: FTP interface.
- smis: SMI-S interface.
- snmpuser: Allows an SNMPv3 user to view the SNMP MIB.
- snmptarget: Allows an SNMPv3 user to receive SNMP trap notifications. This option requires the trap-host parameter.
- none: No interfaces.

`roles monitor|manage|admin|diagnostic`
Optional. Specifies the user's roles as one or more of the following values:

- `monitor`: User can view but not change system settings.
- `manage`: User can view and change system settings.
- `admin`: User can view and change system settings and access certain commands unavailable to `monitor` and `manage` users.
- `diagnostic`: User can view and change system settings and access certain commands unavailable to `monitor` and `manage` users.

`locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja`
`|Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t`
Optional. The display language.

`password password`
Optional in console format; required for XML API format. Sets a new password for the user. The value is case sensitive; can include a maximum of 32 bytes using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket. A value that includes a space must be enclosed in double quotes. If this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed encrypted. For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password and must include at least 8 characters.

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

`privacy-password encryption-password`
Optional. For an SNMPv3 user whose `privacy-type` parameter is set to use encryption, this specifies the encryption password. The value is case sensitive; can include a maximum of 32 bytes using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket; must include at least 8 characters.

`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`.
- `AES`.
- `none`: No encryption.

`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.

`timeout #`
Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 minutes).

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

```
type novice|standard|advanced|diagnostic
```
Optional. Identifies the user's experience level. This parameter does not affect access to commands.

```
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.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

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

```
level
```
Use the `roles` parameter.

name
A name for the new user, which cannot already exist in the system. The name is case sensitive; cannot include a comma, double quote, backslash, or space; and can have a maximum of 29 bytes.

📝 **NOTE:** The user name `admin` is reserved for internal use.

Example Create user `John` who will view system information using base 2 in RAIDar:

```
# create user base 2 interfaces wbi role monitor John
Enter new password: ****
Re-enter new password: ****
Success: Command completed successfully. (John) - The new user was created.
(2012-01-20 15:54:35)
```

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

```
# create user interfaces snmpuser password whoAreYou authentication-type SHA
privacy-type AES privacy-password whoAreYou MIB
Success: Command completed successfully. (MIB) - The new user was created.
(2012-01-20 15:54:45)
```

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

```
# create user interfaces snmptarget authentication-type MD5 trap-host
172.22.4.171 Traps
Enter new password: *********
Re-enter new password: *********
Success: Command completed successfully. (Traps) - The new user was created.
(2012-01-20 15:54:55)
```

See also
- delete user
- set snmp-parameters
- set user
- show users

create vdisk

Description   Creates a vdisk using the specified RAID level, disks, and spares. All disks used in a vdisk and its spares must be SAS SSD, enterprise SAS, or midline SAS; mixing disk types is not supported.

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

- NRAID: 1
- RAID0: 2–16
- RAID1: 2
- RAID3: 3–16
- RAID5: 3–16
- RAID6: 4–16
- RAID10: 4–16
- RAID50: 6–32

For best practices for creating vdisks, see the *AssuredSAN 4000 Series RAIDar User Guide*.

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

Parameters   `level nraid|raid0|r0|raid1|r1|raid3|r3|raid5|r5|raid6|r6|raid10|r10 |raid50|r50`
Specifies the RAID level.

`disks disks`
IDs of the disks to include in the vdisk. RAID 10 requires a minimum of two RAID1 sub-vdisks each having two disks. RAID 50 requires a minimum of two RAID5 sub-vdisks each having three disks. For disk syntax, see "Command syntax" on page 19.

`assigned-to a|b|auto`
Optional. For a system operating in Active-Active ULP mode, this specifies the controller to own the vdisk. To let the system automatically load-balance vdisks between controllers, use auto or omit this parameter.

`spare disks`
Optional. IDs of 1–4 dedicated spares to assign to a RAID 1, 3, 5, 6, 10, or 50 vdisk. For disk syntax, see "Command syntax" on page 19.

`chunk-size 16k|32k|64k|128k|256k|512k`
Optional. The amount of contiguous data, in KB, that is written to a vdisk member before moving to the next member of the vdisk. For RAID 50, this option sets the chunk size of each RAID5 subvdisk. The chunk size of the RAID50 vdisk is calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For NRAID and RAID 1, `chunk-size` has no meaning and is therefore not applicable.

`mode online|offline`
Optional. Specifies whether the vdisk is initialized online or offline.

- `online`: Enables you to use the vdisk immediately after creating it while it is initializing. Because online uses the verify method to create the vdisk, it takes longer to complete initializing than offline. Online initialization is fault-tolerant.

- `offline`: You must wait for the vdisk initialization process to finish before using the vdisk; however, offline takes less time to complete initializing than online.

name
A name for the new vdisk. The name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 20 bytes. A name that includes a space must be enclosed in double quotes.

Example Create the RAID1 vdisk `VD1` using two disks in the first enclosure:

```
# create vdisk level raid1 disks 0.1,0.3 VD1
Success: Command completed successfully. (2012-01-20 09:57:49)
```

Create the RAID50 vdisk `VD2` having four RAID5 sub-vdisks, each having three disks:

```
# create vdisk level r50 disks 0.1-3:0.4-6:0.7-9:0.10-12 VD2
Success: Command completed successfully. (2011-10-03 11:12:54)
```

Create the RAID6 vdisk `vdR6` using four disks:

```
# create vdisk level r6 disks 2.3-4,2.8-9 vdR6
Success: Command completed successfully. (2012-01-20 12:58:43)
```

See also • delete vdisks
             • set vdisk
             • show disks
             • show vdisks

create volume

Description Creates a volume in a vdisk. You must specify a size for the volume. You can create the volume unmapped or set its default mapping. Default mapping settings apply to all hosts, unless overridden by an explicit mapping between a host and the volume. You can later change the mapping by using the map volume and unmap volume commands.

By default, this command will not map the created volume.

Syntax
```
create volume
    vdisk vdisk
    size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
    [mapping ports.LUN]
    [access read-write|rw|read-only|ro|no-access]
    [lun LUN]
    [ports ports]
    name
```

Parameters vdisk *vdisk*
Name or serial number of the vdisk to create the volume in. For vdisk syntax, see "Command syntax" on page 19.

size *size*[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
Sets the volume size using the current base, as shown by the show cli-parameters command. The unit can be specified as follows:

- If base 2 is in use: B (bytes), KiB (kibibytes), MiB (mebibytes), or GiB (gibibytes)
- If base 10 is in use: B (bytes), KB (kilobytes), MB (megabytes), or GB (gigabytes)

If no unit is specified, the unit is 512-byte blocks.

mapping *ports.LUN*
Deprecated; use the ports and lun parameters.

access read-write|rw|read-only|ro|no-access
Optional. The access permission for hosts connected to the controller for this volume: read-write (rw), read-only (ro), or no-access. If no-access is specified, the volume is not mapped.

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

ports *ports*
Optional. The ports through which the host can access the volume. If this parameter is omitted, all ports are selected.

name
A name for the new volume. The name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 20 bytes. A name that includes a space must be enclosed in double quotes.

Example Create the 20 GB volume V1 on vdisk VD1, and map it to ports A1 and B1 using LUN 5:

```
# create volume vdisk VD1 size 20GB ports a1,b1 lun 5 V1
Info: The volume was created. (V1)
Info: The volume was mapped. (V1) (2012-01-18 16:53:27)
Success: Command completed successfully. (2012-01-18 16:53:27)
```

See also
- delete volumes
- set volume
- show vdisks
- show volumes

create volume-set

Description Creates a specified number of volumes in a vdisk. You must specify a base name and a size for the volumes. You can create the volumes unmapped or set their default mapping. Default mapping settings apply to all hosts, unless overridden by an explicit mapping between a host and the volume. You can later change mappings by using the map volume and unmap volume commands.

Syntax
```
create volume-set
    vdisk vdisk
    basename base-name
    count #
    size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
    [baselun base-LUN]
    [access read-write|rw|read-only|ro|no-access]
    [ports ports]
```

Parameters vdisk *vdisk*
Name or serial number of the vdisk to create the volumes in. For vdisk syntax, see "Command syntax" on page 19.

basename *base-name*
A name to which a number will be appended to generate a different name for each volume. A name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 16 bytes. A name that includes a space must be enclosed in double quotes.

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

count *#*
The number of volumes to create, from 1 to 128. Volumes are created up to the maximum number supported per vdisk.

size *size*[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]
Sets the size for each volume using the current base, as shown by the show cli-parameters command. The unit can be specified as follows:

- If base 2 is in use: B (bytes), KiB (kibibytes), MiB (mebibytes), or GiB (gibibytes)
- If base 10 is in use: B (bytes), KB (kilobytes), MB (megabytes), or GB (gigabytes)

If no unit is specified, the unit is 512-byte blocks. If the combined size of the volumes exceeds the capacity of the vdisk, an error message is displayed and no volumes are created.

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.

access read-write|rw|read-only|ro|no-access
Optional. Access privilege that hosts have to these volumes: read-write (rw), read-only (ro), or no-access. If no-access is specified, the volume is not mapped.

ports *ports*
Optional. The controller ports through which hosts can access the volumes using LUNs specified by the baselun parameter. For port syntax, see "Command syntax" on page 19. If not all ports are specified, the unspecified ports are not mapped. If the ports and baselun parameters are omitted, the volumes are not mapped.

Example Create two unmapped, 100 GB volumes with base name `data-` in vdisk `data`, and show the results:

```
# create volume-set count 2 size 100GB vdisk data basename data-
Info: The volume was created. (data-0000)
Info: The volume was created. (data-0001)
Success: Command completed successfully. (2012-01-20 14:24:09)

# show volume-maps
Volume View [Serial Number (SN) Name (data-0000) ] Mapping:
   Ports LUN   Access        Host-Port-Identifier Nickname
   --------------------------------------------------------
             not-mapped   all other hosts


Volume View [Serial Number (SN) Name (data-0001) ] Mapping:
   Ports LUN   Access        Host-Port-Identifier Nickname
   --------------------------------------------------------
             not-mapped   all other hosts

Success: Command completed successfully. (2012-01-20 14:24:27)
```

Create ten 20 GB volumes with the base name `vd1_v` in vdisk `vd1`, mapped starting with LUN 5 with read-only access through port A1, and show the results:

```
# create volume-set count 10 size 20GB vdisk vd1 basename vd1_v baselun 5
access ro ports a1
Info: The volume was created. (vd1_v0000)
...
Info: The volume was created. (vd1_v0009)
Info: The volume was mapped. (vd1_v0000)
...
Info: The volume was mapped. (vd1_v0009)
Success: Command completed successfully. (2012-01-20 14:26:37)

# show volume-maps
Volume View [Serial Number (SN) Name (vd1_v0000) ] Mapping:
   Ports LUN   Access        Host-Port-Identifier Nickname
   --------------------------------------------------------
   A1    5     read-only   all other hosts


Volume View [Serial Number (SN) Name (vd1_v0001) ] Mapping:
   Ports LUN   Access        Host-Port-Identifier Nickname
   --------------------------------------------------------
   A1    6     read-only   all other hosts


...


Volume View [Serial Number (SN) Name (vd1_v0009) ] Mapping:
   Ports LUN   Access        Host-Port-Identifier Nickname
   --------------------------------------------------------
   A1    14    read-only   all other hosts

Success: Command completed successfully. (2012-01-20 14:26:47)
```

See also
- create volume
- delete volumes
- map volume
- set volume
- show vdisks
- show volume-maps
- show volumes
- unmap volume

delete global-spare

Description Deletes specified global spare disks.

Syntax `delete global-spare disks` *`disks`*

Parameters `disks` *`disks`*
IDs of the global spares to delete. For disk syntax, see "Command syntax" on page 19.

Example Delete two global spares:

```
# delete global-spare disks 1.1,1.5
Info: Global spare disk 1.1 was deleted. (1.1)
Info: Global spare disk 1.5 was deleted. (1.5)
Success: Command completed successfully. (2012-01-20 11:32:56)
```

See also • delete vdisk-spare
• set spares
• show disks

delete host

Description Deletes a manually created host or the nickname of a discovered host. If the host is not mapped or has only default mappings, you can delete the host. If the host has explicit mappings, you must delete the mappings before you can delete the host.

If you delete the nickname of a discovered host, commands will show the host by its ID only.

Syntax `delete host host`

Parameters *host*
The ID or nickname of the host.

Example Delete the manually created host named `MyHost`:

```
# delete host MyHost
Success: Command completed successfully. (2012-01-18 17:06:41)
```

Delete the nickname of discovered host `Host1`:

```
# delete host Host1
Success: Command completed successfully. (2011-10-10 17:06:51)
```

Try to delete the mapped host whose ID is `100000062b0e5e15`:

```
# delete host 100000062b0e5e15
Error: The specified host is mapped to one or more volumes so the host was not
deleted. (2012-01-18 17:10:20)
```

See also
- create host
- set host-name
- show host-maps
- show hosts

delete host-wwn-name

Obsolete command. See "delete host" on page 50.

delete schedule

Description Deletes a task schedule.

Syntax `delete schedule schedule`

Parameters *schedule*
The schedule to delete.

Example Delete schedule `Sched1`:

```
# delete schedule Sched1
Success: Command completed successfully. (Sched1) - The schedule was deleted.
(2012-01-21 17:05:15)
```

See also • create schedule
• show schedule-details
• 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.

Syntax `delete task task`

Parameters `task`
The task to delete.

Example Delete task `Task1`:

```
# delete task Task1
Success: Command completed successfully. (Task1) - The task was deleted.
(2012-01-21 17:05:46)
```

See also • create task
• delete schedule
• show schedule-details
• show schedules
• show task-details
• show tasks

delete user

Description Deletes a user account. You can delete any user that has been created and the default users `monitor` and `ftp`.

Syntax `delete user`
    `[noprompt]`
    `name`

Parameters `noprompt`
Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

`name`
The user to delete. Names are case sensitive.

Example Delete user `jsmith`:

```
# delete user jsmith
Are you sure you want to delete user jsmith? yes
Success: Command completed successfully. (2011-10-10 15:55:16)
```

Delete user `Kim` and suppress the confirmation prompt:

```
# delete user noprompt Kim
Success: Command completed successfully. (2012-01-21 15:55:26)
```

See also
- create user
- show users

delete vdisks

Description   Deletes specified vdisks. Unmaps and deletes all volumes in the vdisks and disassociates all disks assigned to the vdisks.

Alias for `delete vdisk`.

△ **CAUTION:**   Deleting a vdisk will delete all data on that vdisk.

📝 **NOTE:**   If you delete a quarantined vdisk and its missing disks are later found, the vdisk reappears as quarantined or offline and you must delete it again (to clear those disks).

Syntax   `delete vdisks`
       `[prompt yes|no]`
       vdisks

Parameters   `prompt yes|no`
Optional. Specifies an automatic response to the prompt that appears if a utility is running on the vdisk:

- `yes`: Stop the utility and allow the command to proceed.
- `no`: Cancel the command.

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

vdisks
Names or serial numbers of the vdisks to delete. For vdisk syntax, see "Command syntax" on page 19.

Example   Delete vdisks `VD1` and `VD2`:

```
# delete vdisks VD1,VD2
Info: Vdisk VD1 was deleted. (VD1) (2012-01-21 12:59:54)
Info: Vdisk VD2 was deleted. (VD2) (2012-01-21 12:59:54)
Success: Command completed successfully. (2012-01-21 12:59:54)
```

Delete vdisk `VD3` on which a utility is running:

```
# delete vdisks VD3
Vdisk VD3 has jobs running. Do you want to continue? yes
Info: Please wait - vdisks are being deleted.
Info: Vdisk VD3 was deleted. (VD3) (2012-01-21 13:00:18)
Success: Command completed successfully. (2012-01-21 13:00:18)
```

See also
- create vdisk
- show vdisks

delete vdisk-spare

Description Deletes specified spares that are assigned to a vdisk.

Syntax
```
delete vdisk-spare
    disks disks
    vdisk
```

Parameters disks *disks*
IDs of the spares to delete. For disk syntax, see "Command syntax" on page 19.

vdisk
Name or serial number of the vdisk to delete the spares from. For disk syntax, see "Command syntax" on page 19.

Example Delete spare disk 1.5 from vdisk VD1:

```
# delete vdisk-spare disks 1.5 VD1
Info: Vdisk spare disk 1.5 was deleted. (1.5)
Success: Command completed successfully. (2011-10-12 11:11:29)
```

See also
- delete global-spare
- set spares
- show disks
- show vdisks

delete volumes

Description Deletes specified volumes.

△ **CAUTION:** Deleting a volume will delete all data in that volume and its schedules.

Syntax `delete volumes` *`volumes`*

Parameters *`volumes`*
Names or serial numbers of the volumes to delete. For volume syntax, see "Command syntax" on page 19.

Example Delete volumes `V1` and `V2`:

```
# delete volumes V1,V2
Info: Volume V1 was deleted. (V1) (2012-01-18 12:18:50)
Info: Volume V2 was deleted. (V2) (2012-01-18 12:18:50)
Success: Command completed successfully. (2012-01-18 12:18:50)
```

See also • create volume
        • show volumes

dequarantine

Description Removes a vdisk from quarantine.

△ **CAUTION:** If a vdisk is removed from quarantine and does not have enough disks to continue operation, its status will change to OFFL and its data cannot be recovered. To continue operation, a RAID3 or RAID5 vdisk can have only one inaccessible disk; a RAID6 vdisk can have only one or two inaccessible disks; a RAID10 or RAID50 vdisk can have only one inaccessible disk per sub-vdisk. For example, a 16-disk RAID10 vdisk can remain online (critical) with 8 inaccessible disks if one disk per mirror is inaccessible.

The system will automatically quarantine a vdisk having a fault-tolerant RAID level if one or more of its disks becomes inaccessible, or to prevent invalid ("stale") data that may exist in the controller from being written to the vdisk. Quarantine will not occur if a known-failed disk becomes inaccessible or if a disk becomes inaccessible after failover or recovery. The system will automatically quarantine an NRAID or RAID0 vdisk to prevent invalid data from being written to the vdisk. If quarantine occurs because of an inaccessible disk, event 172 is logged. If quarantine occurs to prevent writing invalid data, event 485 is logged.

Examples of when quarantine can occur are:

- At system power-up, a vdisk has fewer disks online than at the previous power-up. This may happen because a disk is slow to spin up or because an enclosure is not powered up. The vdisk will be automatically dequarantined if the inaccessible disks come online and the vdisk status becomes FTOL (fault tolerant and online), or if after 60 seconds the vdisk status is QTCR or QTDN.
- During system operation, a vdisk loses redundancy plus one more disk; for example, three disks are inaccessible in a RAID6 vdisk or two disks are inaccessible for other fault-tolerant RAID levels. The vdisk will be automatically dequarantined if after 60 seconds the vdisk status is FTOL, FTDN, or CRIT.

Quarantine isolates the vdisk from host access and prevents the system from changing the vdisk status to OFFL (offline). The number of inaccessible disks determines the quarantine status; from least to most severe:

- QTDN (quarantined with down disks): The RAID 6 vdisk has one inaccessible disk. The vdisk is fault tolerant but degraded.
- QTCR (quarantined critical): The vdisk is critical with at least one inaccessible disk. For example, two disks are inaccessible in a RAID6 vdisk or one disk is inaccessible for other fault-tolerant RAID levels.
- QTOF (quarantined offline): The vdisk is offline with multiple inaccessible disks causing user data to be incomplete, or is an NRAID or RAID0 vdisk.

When a vdisk is quarantined, its disks become write-locked, its volumes become inaccessible, and it is not available to hosts until it is dequarantined. If there are interdependencies between the quarantined vdisk's volumes and volumes in other vdisks, quarantine may temporarily impact operation of those other volumes. Depending on the operation, the length of the outage, and the settings associated with the operation, the operation may automatically resume when the vdisk is dequarantined or may require manual intervention. A vdisk can remain quarantined indefinitely without risk of data loss.

A vdisk is dequarantined when it is brought back online, which can occur in three ways:

- If the inaccessible disks come online, making the vdisk FTOL, the vdisk is automatically dequarantined.
- If after 60 seconds from being quarantined the vdisk is QTCR or QTDN, the vdisk is automatically dequarantined. The inaccessible disks are marked as failed and the vdisk status changes to CRIT (critical) or FTDN (fault tolerant with down disks). If the inaccessible disks later come online, they are marked as LEFTOVR (leftover).
- The dequarantine command is used to manually dequarantine the vdisk. If the inaccessible disks later come online, they are marked as LEFTOVR (leftover). If event 485 was logged, use the dequarantine command only as specified by the event's recommended-action text to avoid data corruption or loss.

A quarantined vdisk can be fully recovered if the inaccessible disks are restored. Make sure that all disks are properly seated, that no disks have been inadvertently removed, and that no cables have been unplugged. Sometimes not all disks in the vdisk power up. Check that all enclosures have restarted after a power failure. If these problems are found and then fixed, the vdisk recovers and no data is lost.

If the inaccessible disks cannot be restored (for example, they failed), and the vdisk's status is FTDN or CRIT, and compatible spares are available to replace the inaccessible disks, reconstruction will automatically begin.

If a replacement disk (reconstruct target) is inaccessible at power up, the vdisk becomes quarantined; when the disk is found, the vdisk is dequarantined and reconstruction starts. If reconstruction was in process, it continues where it left off.

NOTE: The only commands allowed for a quarantined vdisk are dequarantine and delete vdisk. If you delete a quarantined vdisk and its inaccessible disks later come online, the vdisk will reappear as quarantined or offline and you must delete it again (to clear those disks).

Syntax dequarantine vdisk *vdisk*

Parameters vdisk *vdisk*
Name or serial number of the vdisk to remove from quarantine. For vdisk syntax, see "Command syntax" on page 19.

Example After determining that vdisk VD1 is quarantined, remove it from quarantine and re-check its status:

```
# show vdisks
Name ... Status ...
----------------
VD1  ... QTDN   ...
...
----------------
Success: Command completed successfully. (2012-01-18 12:18:50)

# dequarantine vdisk VD1
Success: Command completed successfully

# show vdisks
Name ... Status ...
----------------
VD1  ... FTDN   ...
...
----------------
Success: Command completed successfully. (2012-01-18 12:18:50)
```

See also • show vdisks

down disk

⚠ **CAUTION:** Intended for use by administrative personnel and should only be used under their supervision.

📝 **NOTE:** Only available to users on certain systems.

Description Simulates vdisk failure due to loss of a disk. This command only applies to disks that are part of fault-tolerant vdisks.

When using this command, you should:

1. Run the `show vdisks` command to view all vdisks to determine whether the vdisk on which you want to simulate failure is in a fault-tolerant state.
2. Run the `down disk` command.
3. Run the `show disks` command to ensure the disk is in a down state. A disk is in a down state when How Used displays `LEFTOVR` and the Health is `Degraded`.
4. Run the `show vdisks` command again to verify the vdisk has failed.

To use the disk, change the `LEFTOVR` status to `AVAIL` using the `clear disk-metadata` command.

Syntax `down disk disk`

Parameters `disk`

IDs of the disks to force into a down state. For disk syntax, see "Command syntax" on page 19.

Example Force disk 0.4 to be put in a down state:

```
# down disk 0.4
Info: Disk 0.4 was placed in a down state. (0.4)
Success: Command completed successfully. (2012-08-24 14:51:47)
```

See also
- clear disk-metadata
- show disks
- show vdisks

exit

Description Log off and exit the CLI session.

Syntax `exit`

expand vdisk

Description Adds disks to a vdisk. All disks used in a vdisk and its spares must be SAS SSD, enterprise SAS, or midline SAS; mixing disk types is not supported.

The expansion capability for each supported RAID level is:

RAID level	Expansion capability	Maximum disks
NRAID	Cannot expand.	1
0, 3, 5, 6	Can add 1–4 disks at a time.	16
1	Cannot expand.	2
10	Can add 2 or 4 disks at a time.	16
50	Can expand the vdisk one RAID5 sub-vdisk at a time. The added RAID5 sub-vdisk must contain the same number of disks as each original sub-vdisk.	32

> **IMPORTANT:** Vdisk expansion cannot be stopped and can take days to complete, depending on disk type, RAID level, and other factors.

Syntax
```
expand vdisk
    vdisk
    disks disks
    [prompt yes|no]
```

Parameters *vdisk*
Name or serial number of the vdisk to expand. For vdisk syntax, see "Command syntax" on page 19.

disks *disks*
IDs of the disks to add. For disk syntax for RAID levels other than RAID10 and RAID50, see "Command syntax" on page 19. For RAID10 and RAID50, you must use a comma (not a colon) to separate each mirror pair or sub-vdisk.

prompt yes|no
Optional. Specifies an automatic response to the confirmation prompt:

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

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

Example Expand vdisk VD1 to include disk 1.11:

```
# expand vdisk disks 1.11 VD1
Success: Command completed successfully. - Expansion of vdisk was started.
(2012-01-21 12:19:36)
```

Expand RAID10 vdisk R10 to include two additional mirror pairs:

```
# expand vdisk disks 2.4,2.8:2.9-10 R10
Success: Command completed successfully. - Expansion of vdisk was started.
(2012-01-21 12:19:36)
```

Expand RAID50 vdisk R50, which has three 3-disk sub-vdisks, to include one additional 3-disk sub-vdisk:

```
# expand vdisk disks 2.1-2,2.5 R50
Success: Command completed successfully. - Expansion of vdisk was started.
(2012-01-21 12:19:36)
```

See also • show disks
  • show vdisks

expand volume

Description Expands a volume. Expansion is restricted to the space available on the vdisk containing the volume. If insufficient space is available for expansion on the vdisk, first expand the vdisk by using expand vdisk.

Syntax To expand by a specific size:

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

To expand to the maximum size:

```
expand volume
    volume
    size max
```

Parameters *volume*
Name or serial number of the volume to expand. For volume syntax, see "Command syntax" on page 19.

`size size[B|KB|MB|GB|TB|KiB|MiB|GiB|TiB]`
Specifies the size using the current base, as shown by the show cli-parameters command. The unit can be specified as follows:

- If base 2 is in use: `B` (bytes), `KiB` (kibibytes), `MiB` (mebibytes), or `GiB` (gibibytes)
- If base 10 is in use: `B` (bytes), `KB` (kilobytes), `MB` (megabytes), or `GB` (gigabytes)

If no unit is specified, the unit is 512-byte blocks.

`size max`
Expands the volume to fill the available space on the vdisk.

Example Expand volume `V1` by 100 GB:

```
# expand volume size 100GB V1
Success: Command completed successfully. - Expansion of volume V1 was started.
(2012-01-21 10:16:05)
```

See also
- expand vdisk
- show vdisks
- show volumes

fail

> △ **CAUTION:** For use by or with direction from a service technician.

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 SC in the partner controller module. This might be helpful to gather debug information that is only available via a crash dump.

Syntax `fail controller [a|b]`

Parameters `fail controller [a|b]`
Specifies whether to kill controller A or B. You cannot kill the controller on which the command is issued.

Example From controller A, fail controller B:

```
# fail controller b
Success: Command completed successfully. (2012-01-21 10:16:05)
```

See also • unfail controller

help

Description Shows brief help for all available commands or full help for a specific command. For information about using command shortcuts, see "Command completion, editing, and history" on page 20.

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

```
help
```

To view help for a specific command, enter:

```
help command name
```

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

```
help syntax
```

Parameters *command-name*
Optional. Name of CLI command. Displays help for a specific command.

syntax
Optional. Displays information about the syntax for specifying parameters, disks, and so forth.

If you do not specify a command name or syntax, help will display a brief description of all commands that are available to the user.

map volume

Description Maps specified volumes using settings that override the volumes' default mapping.

When a volume is created, if no mapping settings are specified the volume is not mapped; otherwise, those settings become its default mapping, which specifies the controller host ports and access level that all connected hosts have to the volume, and the LUN presented to all hosts to identify the volume. The default mapping's LUN is known as the volume's *default LUN*.

The `map volume` command creates mappings with different settings for different hosts. Optionally, you can specify the LUN, ports, and access level for a mapping. A mapping can make a volume accessible to hosts, or inaccessible to hosts (known as *masking*). For example, assume a volume's default mapping allows read-only access using LUN 5. You can give one host read-write access using LUN 6, and you can give a second host no access to the volume.

📝 **NOTE:** When mapping a volume to a host using the Linux ext3 file system, specify read-write access; otherwise, the file system will be unable to mount/present/map the volume and will report an error such as "unknown partition table."

Syntax
```
map volume
    [access read-write|rw|read-only|ro|no-access]
    [mapping ports.LUN]
    [lun LUN]
    [ports ports]
    [host hosts]
    volumes
```

Parameters `access read-write|rw|read-only|ro|no-access`
Optional. The access permission available to attached hosts: `read-write` (`rw`), `read-only` (`ro`), or `no-access`. If the access parameter is specified as `read-write` or `read-only`, either the `mapping` parameter or the `lun` parameter must be specified. For an explicit mapping, `no-access` causes the volume to be masked from specified hosts. If the `access` parameter is omitted, access is set to `read-write`.

`mapping ports.LUN`
Deprecated; use the `ports` and `lun` parameters.

`lun LUN`
Optional. The LUN to use for the mapping. If a single volume and multiple hosts are specified, the same LUN is used for each host. If multiple volumes and a single host are specified, the LUN will increment for the second and subsequent volumes. If multiple volumes and hosts are specified, each host will have the same LUN for the first volume, the next LUN for the second volume, and so on. The `lun` parameter is ignored if `access` is set to `no-access`. If the `lun` parameter is omitted, the default LUN is presented. Do not use the `lun` parameter with the `mapping` parameter.

`ports ports`
Optional. The ports to use for the mapping; any unspecified ports become unmapped. If the `ports` parameter is specified, the `lun` parameter must also be specified. The `ports` parameter is ignored if `access` is set to `no-access`. If the `ports` parameter is omitted, all ports are mapped. Do not use the `ports` parameter with the `mapping` parameter.

`host hosts`
Optional. For FC and SAS, the nickname or 16-hex-digit WWPN of each host to map the volumes to. For nickname syntax, see "Command syntax" on page 19. If the host parameter is specified, either the `mapping` parameter or both the `lun` and `ports` parameters must be specified. If the `host` parameter is omitted, the mapping applies to all hosts that are not explicitly mapped.

`volumes`
Names or serial numbers of the volumes to map. For volume syntax, see "Command syntax" on page 19.

Example Map volume v2 with read-only access for Host1, using port A1 and LUN 100:

```
# map volume access ro ports a1 lun 100 host Host1 v2
Info: Mapping succeeded. Host 207000c0ff001121 was mapped for volume v2 with LUN
100. (v2) (2012-01-18 13:58:06)
Success: Command completed successfully. (2012-01-18 13:58:06)
```

Map volumes v2 and v3 with read-write access for Host2, using ports A1 and B1 and LUN 101:

```
# map volume access rw ports a1,b1 lun 101 host Host2 v2,v3
Info: Mapping succeeded. Host 207000c0ff001122 was mapped for volume v2 with LUN
101. (v2) (2012-01-18 13:58:41)
Info: Mapping succeeded. Host 207000c0ff001122 was mapped for volume v3 with LUN
102. (v3) (2012-01-18 13:58:41)
Success: Command completed successfully. (2011-09-28 13:58:41)
```

Mask volume v4 from Host1 and Host3:

```
# map volume v4 access no-access host Host1,Host3
Info: Mapping succeeded. Host 207000c0ff001121 was mapped for volume v4 with LUN
0. (v4) (2012-01-18 13:59:50)
Info: Mapping succeeded. Host 207000c0ff001123 was mapped for volume v4 with LUN
0. (v4) (2012-01-18 13:59:50)
Success: Command completed successfully. (2012-01-18 13:59:50)
```

Map volumes v1 and v2 to hosts Host1 and Host2, using ports A1 and B1 starting with LUN 6, and view the results:

```
# map volume ports a1,b1 lun 6 host Host1,Host2 v1,v2
Info: Mapping succeeded. Host 207000c0ff001121 was mapped for volume v1 with LUN
6. (v1) (2012-01-18 14:01:03)
Info: Mapping succeeded. Host 207000c0ff001122 was mapped for volume v1 with LUN
6. (v1) (2012-01-18 14:01:03)
Info: Mapping succeeded. Host 207000c0ff001121 was mapped for volume v2 with LUN
7. (v2) (2012-01-18 14:01:03)
Info: Mapping succeeded. Host 207000c0ff001122 was mapped for volume v2 with LUN
7. (v2) (2012-01-18 14:01:03)
Success: Command completed successfully. (2012-01-18 14:01:03)

# show volume-maps
Volume View [Serial Number (SN) Name (v1) ] Mapping:
    Ports LUN    Access        Host-Port-Identifier Nickname
    --------------------------------------------------------
    A1,B1 6      read-write    207000c0ff001121     Host1
    A1,B1 6      read-write    207000c0ff001122     Host2
                 not-mapped    all other hosts

Volume View [Serial Number (SN) Name (v2) ] Mapping:
    Ports LUN    Access        Host-Port-Identifier Nickname
    --------------------------------------------------------
    A1,B1 7      read-write    207000c0ff001121     Host1
    A1,B1 7      read-write    207000c0ff001122     Host2
                 not-mapped    all other hosts

Success: Command completed successfully. (2012-01-18 14:44:01)
```

See also • show host-maps
  • show hosts
  • show volume-maps
  • show volumes
  • unmap volume

meta

Description In XML API format only, shows all property metadata for objects. This includes data not shown in `brief` mode. The data is static and never changes.

Syntax `meta basetypes`

Parameters `basetypes`

A basetype or a list of basetypes separated by commas (with no spaces) to specify the objects to show metadata for. The basetypes are:

advanced-settings-table	ntp-status
auto-write-through-trigger	port
cache-parameter	power-supplies
cache-settings	redundancy
cli-parameters	refresh-counters
compact-flash	sas-port
controller-cache-parameters	sas-status-controller-a
controllers	sas-status-controller-b
controller-statistics	schedules
debug-log-parameters	security-communications-protocols
disk-hist-statistics	sensors
disk-statistics	ses
drive-parameters	shutdown-status
drives	snmp-parameters
drive-summary	status
email-parameters	syslog-parameters
enclosure-components	system
enclosure-fru	system-parameters-table
enclosure-list	tasks
enclosures	time-settings-table
enclosure-sku	unhealthy-component
events	unwritable-cache
expander-ports	users
fan	vdisk-hist-statistics
fc-port	vdisk-statistics
host-port-statistics	versions
hosts	virtual-disks
host-view	virtual-disk-summary
host-view-mappings	volume-names
inquiry	volume-reservations
io-modules	volumes
job-parameters	volume-statistics
log-header-table	volume-view
network-parameters	volume-view-mappings

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

```
# meta drives
```

See also • set cli-parameters

ping

Description Tests communication with a remote host. The remote host is specified by IP address. Ping sends ICMP echo response packets and waits for replies.

Syntax `ping`
    host-address
    [*count*]

Parameters *host-address*
The remote host's IP address in dotted decimal form.

count
Optional. The number of packets to send. Use a small count because the command cannot be interrupted.

Example Send two packets to the remote computer at 10.134.50.6:

```
# ping 10.134.50.6 2
Info: Pinging 10.134.50.6 with 2 packets.
Success: Command completed successfully. - The remote computer responded with 2
packets. (2012-01-21 17:13:00)
```

release volume

Description Clears host registrations and releases persistent reservations for all or specified volumes. Normally, reservations placed on volumes by hosts 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 hosts, which may result in data corruption. Before issuing this command, quiesce all hosts that have visibility to the volumes whose reservations will be released.

Syntax `release volume all|`*`volumes`*

Parameters `all|`*`volumes`*
Specifies all volumes, or the names or serial numbers of specific volumes. For volume syntax, "Command syntax" on page 19.

Example Release reservations for a specific volume:

```
# release volume vd04_v0002
Success: Command completed successfully. (2011-11-08 09:01:25)
```

See also • show volume-reservations
• show volumes

rescan

Description   This command forces rediscovery of attached disks and enclosures. If both SCs are online and able to communicate with both expansion modules in each connected enclosure, this command also reassigns enclosure IDs based on controller A's enclosure cabling order. A manual rescan may be needed after system power-up to display enclosures in the proper order.

A manual rescan is not required to detect when disks are inserted or removed; the controllers do this automatically. When disks are inserted they are detected after a short delay, which allows the disks to spin up.

When you perform a manual rescan, it temporarily pauses all I/O processes, then resumes normal operation.

Syntax   rescan

Example   Scan for device changes and re-evaluate enclosure IDs:

```
# rescan
Success: Command completed successfully. (2012-01-21 12:20:57)
```

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.

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 response to the confirmation prompt that will appear if the historical parameter is specified:

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

If the historical parameter is specified and the prompt parameter is omitted, you must manually reply to the prompt. If the historical parameter is omitted, the prompt parameter has no effect. There is no confirmation prompt for live statistics.

Example Reset all live statistics for both controllers:

```
# reset all-statistics
Success: Command completed successfully. (2012-01-21 11:34:40)
```

Reset all historical disk-performance statistics for both controllers:

```
# reset all-statistics historical
This command will reset all historical disk statistics.
Do you want to reset? yes
Success: Command completed successfully. (2012-01-21 11:34:50)
```

See also
- reset controller-statistics
- reset disk-error-statistics
- reset disk-statistics
- reset host-port-statistics
- reset vdisk-statistics
- reset volume-statistics
- show controller-statistics

reset controller-statistics

Description   Resets performance statistics for controllers.

This command resets all controller statistics except Power On Time. To reset this, restart or power cycle a controller.

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.

Example   Reset statistics for both controllers:

```
# reset controller-statistics
Success: Command completed successfully. (2012-01-21 11:35:06)
```

See also   • reset all-statistics
• reset disk-error-statistics
• reset disk-statistics
• reset host-port-statistics
• reset vdisk-statistics
• reset volume-statistics
• show controller-statistics

reset disk-error-statistics

Description Resets error statistics for all or specified disks. Statistics that are reset include:

- Number of SMART events recorded
- Number of I/O timeouts accessing the disk
- Number of times the disk did not respond
- Number of attempts by the controllers to spin up the disk
- Number of media errors (errors generated by the disk as specified by its manufacturer)
- Number of non-media errors (errors generated by the controllers or by the disk and not categorized as media errors)
- Number of block reassignments
- Number of bad blocks found

To reset other disk statistics, use the reset disk-statistics command.

Syntax `reset disk-error-statistics [`*`disks`*`]`

Parameters *disks*
Optional. IDs of the disks to reset statistics for. For disk syntax, see "Command syntax" on page 19. If this parameter is omitted, statistics are reset for all disks.

Example Reset error statistics for disks 1.1 and 2.1:

```
# reset disk-error-statistics 1.1,2.1
Success: Command completed successfully. (2012-01-21 11:35:34)
```

See also
- reset all-statistics
- reset controller-statistics
- reset disk-statistics
- reset host-port-statistics
- reset vdisk-statistics
- reset volume-statistics
- show disk-statistics
- show disks

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.

Syntax `reset disk-statistics`

Example Reset statistics for all disks:

```
# reset disk-statistics
Success: Command completed successfully. (2012-01-21 11:35:52)
```

See also
- reset all-statistics
- reset controller-statistics
- reset disk-error-statistics
- reset host-port-statistics
- reset vdisk-statistics
- reset volume-statistics
- show disk-statistics

reset host-channel-link

Obsolete command. See "reset host-link" on page 78.

reset host-link

Description Resets specified controller host ports (channels).

- For an FC host port configured to use FC-AL topology, a LIP is issued.
- For SAS, resetting a host port issues a `COMINIT/COMRESET` sequence and might reset other ports.

Syntax
```
reset host-link
    ports ports
    [controller a|b]
```

Parameters `port 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.

`controller a|b`
Optional. The controller ID, either A or B.

Example Reset the host link on port A1:

```
# reset host-link ports A1
Success: Command completed successfully. - Reset Host Link(s) on port(s) A1 from
current controller. (2012-01-21 11:36:28)
```

See also • show ports

reset host-port-statistics

Description Resets performance statistics for controller host ports.

Syntax `reset host-port-statistics [ports ports]`

Parameters `ports ports`
Optional. The controller ID and port number of ports to reset statistics for. For port syntax, see "Command syntax" on page 19. If this parameter is omitted, statistics are reset for all controller host ports.

Example Reset statistics for all controller host ports:

```
# reset host-port-statistics
Success: Command completed successfully. (2012-01-21 11:36:59)
```

See also
- reset all-statistics
- reset controller-statistics
- reset disk-error-statistics
- reset disk-statistics
- reset vdisk-statistics
- reset volume-statistics
- show host-port-statistics
- show ports

reset vdisk-statistics

Description Resets performance statistics for all or specified vdisks.

Syntax `reset vdisk-statistics [vdisks]`

Parameters *vdisks*
Optional. Names or serial numbers of the vdisks to reset statistics for. For vdisk syntax, see "Command syntax" on page 19. If this parameter is omitted, statistics are reset for all vdisks.

Example Reset statistics for vdisks `VD1` and `MyVdisk`:

```
# reset vdisk-statistics VD1,MyVdisk
Success: Command completed successfully. (2012-01-21 11:37:44)
```

See also
- reset all-statistics
- reset controller-statistics
- reset disk-error-statistics
- reset disk-statistics
- reset host-port-statistics
- reset volume-statistics
- show vdisk-statistics
- show vdisks

reset volume-statistics

Description Resets performance statistics for all or specified volumes.

Syntax `reset volume-statistics [`*`volumes`*`]`

Parameters *`volumes`*
Optional. Names or serial numbers of the volumes to reset statistics for. For volume syntax, see "Command syntax" on page 19. If this parameter is omitted, statistics are reset for all volumes.

Example Reset statistics for volume `vd1_v0001`:

```
# reset volume-statistics vd1_v0001
Success: Command completed successfully. (2012-01-21 11:38:05)
```

See also
- reset all-statistics
- reset controller-statistics
- reset disk-error-statistics
- reset disk-statistics
- reset host-port-statistics
- reset vdisk-statistics
- show volume-statistics
- show volumes

restart

Description   Restarts the SC or MC in a controller module.

If you restart an SC, 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 controller restarts. The MC is not restarted so it can provide status information to external interfaces.

If you restart an MC, communication with it is lost until it successfully restarts. If the restart fails, the partner MC remains active with full ownership of operations and configuration information.

△ **CAUTION:**   If you restart both controller modules, users lose access to the system and its data until the restart is complete.

📝 **NOTE:**   When an SC 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.

Syntax   `restart`
        `sc|mc`
        `[a|b|both]`
        `[noprompt]`

Parameters   `sc|mc`
The controller to restart:

- `sc`: SC
- `mc:` MC

`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 in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

Example   Restart the MC in controller A, which you are logged in to:

```
# restart mc a
During the restart process you will briefly lose communication with the
specified Management Controller(s).
Continue? yes
Info: Restarting the local MC (A)...
Success: Command completed successfully. (2012-01-21 11:38:47)
```

From controller A, restart the SC in controller B:

```
# restart sc b
Success: Command completed successfully. - SC B was restarted. (2012-01-21
11:42:10)
```

From controller A, restart the SC in controller B:

```
# restart sc b
Success: Command completed successfully. - SC B was restarted. (2012-01-21
11:42:10)
```

Restart both SCs:

```
# restart sc both
Restarting both controllers can cause a temporary loss of data availability.
Do you want to continue? yes
Success: Command completed successfully. - Both SCs were restarted. (2012-01-21
13:09:52)
```

See also • shutdown

restore defaults

⚠ **CAUTION:** For use by or with direction from a service technician.

Description Restores the default configuration to the controllers. For details about which settings are restored, see "Settings changed by restore defaults" on page 375.

⚠ **CAUTION:** This command changes how the system operates and might require some reconfiguration to restore host access to volumes.

Syntax
```
restore defaults
     [noprompt]
     [prompt yes|no]
```

Parameters noprompt
Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

prompt yes|no
Optional. Specifies an automatic response to the confirmation prompt:

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

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

Example Restore the controllers' default configuration:

```
# restore defaults
WARNING: The configuration of the array controller will be re-set to default
settings. The Management Controller will restart once this is completed. Are you
sure? yes
Success: Command completed successfully. - Device default configuration was
restored.
```

See also • restart

scrub vdisk

Description Analyzes specified vdisks to find and fix disk errors. This command acts on disks that are associated with a vdisk and are neither dedicated spares nor leftovers. This command will fix parity mismatches for RAID 3, 5, 6, and 50; mirror mismatches for RAID 1 and 10; and media errors for all RAID levels.

Vdisk scrub can last over an hour, depending on vdisk size, utility priority, and amount of I/O activity. However, a "foreground" scrub performed with this command is typically faster than a background scrub enabled with the set job-parameters command. You can use a vdisk while it is being scrubbed. To check the progress of a vdisk scrub (VRSC) job, use the show vdisks command.

When a scrub is complete, event 207 is logged and specifies whether errors were found and whether user action is required.

Syntax `scrub vdisk vdisks`

Parameters *vdisks*
Names or serial numbers of the vdisks to scrub. For vdisk syntax, see "Command syntax" on page 19.

Example Start scrubbing vdisk `vd1`:

```
# scrub vdisk vd1
Info: Scrub was started on vdisk vd1. (vd1)
Success: Command completed successfully. (2012-01-20 15:41:38)
```

See also
- abort scrub
- set advanced-settings
- set job-parameters
- show vdisks

set advanced-settings

Description Sets advanced system configuration options.

Syntax
```
set advanced-settings
    [auto-write-back enabled|disabled|on|off]
    [background-disk-scrub enabled|disabled|on|off]
    [background-scrub enabled|disabled|on|off]
    [background-scrub-interval interval]
    [compact-flash-failure enabled|disabled|on|off]
    [controller-failure enabled|disabled|on|off]
    [dynamic-spares enabled|disabled|on|off]
    [emp-poll-rate rate]
    [fan-failure enabled|disabled|on|off]
    [host-cache-control enabled|disabled|on|off]
    [independent-cache enabled|disabled|on|off]
    [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]
    [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]
    [spin-down enabled|disabled|on|off]
    [spin-down-delay delay]
```

Parameters `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.

`background-disk-scrub enabled|disabled|on|off`
Optional. Sets whether disks that are not in vdisks are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 24 hours.

- `disabled` or `off`: Background disk scrub is disabled.
- `enabled` or `on`: Background disk scrub is enabled.

`background-scrub enabled|disabled|on|off`
Optional. Sets whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between background vdisk scrub finishing and starting again is specified by the `background-scrub-interval` parameter.

- `disabled` or `off`: Background vdisk scrub is disabled.
- `enabled` or `on`: Background vdisk scrub is enabled.

`background-scrub-interval interval`
Optional. Sets the interval in hours between background vdisk scrub finishing and starting again, from 1–360 hours.

`compact-flash-failure enabled|disabled|on|off`
Optional. Sets whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST, fails during POST, or fails during controller operation.

- `disabled` or `off`: The CompactFlash failure trigger is disabled.
- `enabled` or `on`: The CompactFlash failure trigger is enabled.

`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.
- `enabled` or `on`: The controller failure trigger is enabled.

`dynamic-spares enabled|disabled|on|off`
Optional. Sets whether the storage system will automatically designate an available compatible disk as a spare to replace a failed disk in a vdisk. A compatible disk has enough capacity to replace the failed disk and is the same type (SAS SSD, enterprise SAS, or midline SAS).

- `disabled` or `off`: The dynamic spares feature is disabled.
- `enabled` or `on`: The dynamic spares feature is enabled.

`emp-poll-rate` *rate*
Optional. Sets the interval at which the storage system will poll each enclosure's EMP for status changes, from 5–3600 seconds.

`fan-failure enabled|disabled|on|off`
Optional. Sets whether the cache policy will change from write-back to write-through when a fan fails.

- `disabled` or `off`: The fan failure trigger is disabled.
- `enabled` or `on`: The fan failure trigger is enabled.

`host-cache-control enabled|disabled|on|off`
Optional. Sets whether hosts are allowed to use the `SCSI MODE SELECT` command to change the storage system's write-back cache setting.

- `disabled` or `off`: Host control of caching is disabled.
- `enabled` or `on`: Host control of caching is enabled.

`independent-cache enabled|disabled|on|off`
Optional. Sets the cache redundancy mode for a dual-controller storage system.

For the change to take effect, the user must restart both SCs.

- `disabled` or `off`: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller.
- `enabled` or `on`: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.

`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.
- `enabled` or `on`: The managed logs feature is enabled.

`missing-lun-response notready|illegal`
Optional. Sets whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.

- `notready`: Sends a reply that there is a LUN where a gap has been created but that it is "not ready." Sense data returned is sensekey = 2, code = 4, qualifier = 3.
- `illegal`: Sends a reply that there is a LUN but that the request is "illegal." Sense data returned is sensekey = 5, code = 25h, qualifier = 0. If the system is used in a VMware environment, use this option.

`partner-firmware-upgrade enabled|disabled|on|off`
Optional. Sets whether component firmware versions are monitored and will be automatically updated on the partner controller.

- `disabled` or `off`: PFU is disabled.
- `enabled` or `on`: PFU is enabled.

`partner-notify enabled|disabled|on|off`
Optional. Sets whether to notify the partner controller that a trigger condition occurred. Enable this option to have the partner also change to write-through mode for better data protection. Disable this option to allow the partner continue using its current caching mode for better performance.

- `disabled` or `off`: Notification is disabled.
- `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 PSU fails.

- `disabled` or `off`: The power-supply failure trigger is disabled.
- `enabled` or `on`: The power-supply failure trigger is enabled.

`smart enabled|disabled|on|off|detect-only`
Optional. Enables or disables SMART monitoring for all disks in the storage system.

- `disabled` or `off`: Disables SMART for all disks in the system and for all disks added to the system.
- `enabled` or `on`: Enables SMART for all disks in the system and for all disks added to the system.
- `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.

`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.
- `flush`: Good status is returned only after all write-back data for the specified volume is flushed to disk.

`temperature-exceeded enabled|disabled|on|off`
Optional. Sets whether the system will shut down a controller when its temperature exceeds the critical operating range.

- `disabled` or `off`: The over-temperature trigger is disabled.
- `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 vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk 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.
- `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.

```
spin-down enabled|disabled|on|off
```
Optional. Sets whether available disks and global spares will spin down after a period of inactivity shown by the `spin-down-delay` parameter.

- `disabled` or `off`: DSD for available disks and global spares is disabled.
- `enabled` or `on`: DSD for available disks and global spares is enabled.

```
spin-down-delay delay
```
Optional. Sets the period of inactivity after which available disks and global spares will spin down. Setting the delay to 1–360 minutes will enable spin down; setting the delay to 0 will disable spin down.

Example Enable PFU:

```
# set advanced-settings partner-firmware-upgrade enabled
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-20 11:57:01)
```

Enable managed logs:

```
# set advanced-settings managed-logs enabled
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-21 16:25:58)
```

See also
- scrub vdisk
- set job-parameters
- set spares
- show advanced-settings

set auto-write-through-trigger

Description Sets the trigger conditions that cause the controller to change the cache policy from write-back to write-through. You can set multiple triggers.

Alias for `set awt`.

When the cache mode is changed, an event is logged.

Syntax
```
set auto-write-through-trigger
    [controller-failure enabled|disabled|on|off]
    [super-cap-failure enabled|disabled|on|off]
    [compact-flash-failure enabled|disabled|on|off]
    [power-supply-failure enabled|disabled|on|off]
    [fan-failure enabled|disabled|on|off]
    [temperature-exceeded enabled|disabled|on|off]
    [partner-notify enabled|disabled|on|off]
    [auto-write-back enabled|disabled|on|off]
```

Parameters `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.
- `enabled` or `on`: The controller failure trigger is enabled.

`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.

`compact-flash-failure enabled|disabled|on|off`
Optional. Sets whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST, fails during POST, or fails during controller operation.

- `disabled` or `off`: The CompactFlash failure trigger is disabled.
- `enabled` or `on`: The CompactFlash failure trigger is enabled.

`power-supply-failure enabled|disabled|on|off`
Optional. Sets whether the cache policy automatically changes to write-through when a PSU fails.

- `disabled` or `off`: The power-supply failure trigger is disabled.
- `enabled` or `on`: The power-supply failure trigger is enabled.

`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.
- `enabled` or `on`: The fan failure trigger is enabled.

`temperature-exceeded enabled|disabled|on|off`
Optional. Sets whether the system will shut down a controller when its temperature exceeds the critical operating range.

- `disabled` or `off`: The over-temperature trigger is disabled.
- `enabled` or `on`: The over-temperature trigger is enabled.

`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.
- `enabled` or `on`: Notification is enabled.

`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.

Example Enable the controller-failure trigger and disable the partner-notification trigger:

```
# set auto-write-through-trigger controller-failure enabled partner-notify
disabled
Success: Command completed successfully. - Auto-write-through-trigger parameters
were changed. (2012-01-21 11:50:05)
```

See also
- show auto-write-through-trigger
- show events

set awt

See set auto-write-through-trigger.

set cache-parameters

Description Sets a volume's cache options.

📝 **NOTE:** Only change the read-ahead cache settings if you fully understand how the host operating system, application, and adapter move data so that you can adjust the settings accordingly. Be prepared to monitor system performance and adjust read-ahead size until you find the optimal size for your application.

Syntax `set cache-parameters`
`    [write-policy write-back|write-through|wb|wt]`
`    [optimization standard|no-mirror|atomic-write]`
`    [read-ahead-size disabled|default|maximum|64KB|128KB|256KB|512KB|1MB|2MB|4MB`
`    |8MB|16MB|32MB]`
`    `*`volume`*

Parameters `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.
- `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 auto-write-through-trigger command.

`optimization standard|no-mirror|atomic-write`
Optional. Sets the cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.
- `atomic write`: This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

`read-ahead-size`
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 after two back-to-back reads are made. Read ahead is triggered by two back-to-back accesses to consecutive LBA ranges. Read ahead can be forward (that is, increasing LBAs) or reverse (that is, 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.

- `disable`: Turns off read-ahead cache.
- `default`: Sets one chunk for the first access in a sequential read and one stripe for all subsequent accesses. The controllers treat non-RAID and RAID1 vdisks internally as if they have a stripe size of 64 KB, even though they are not striped. This setting works well for most applications.
- `maximum`: Allows the controller to dynamically calculate the maximum read-ahead cache size for the volume.
- `64 KB, 128 KB, 256 KB, 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB,` or `32 MB`: Sets a specific cache size.

volume
Name or serial number of the volume to change. For volume syntax, see "Command syntax" on page 19.

Example Set the cache policy and cache optimization mode for volume `V1`:

```
# set cache-parameters V1 optimization standard read-ahead-size maximum
Success: Command completed successfully. - Cache parameters were changed.
(2012-01-21 11:52:03)
```

See also • show cache-parameters
- show volumes

set cli-parameters

Description   Sets options that control CLI behavior. If you are accessing the CLI through the network port, settings apply to the current CLI session only. If you are accessing the CLI through the enclosure's CLI port, settings persist across sessions.

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

Syntax   ```
set cli-parameters
     [base 2|10]
     [console|api|api-embed]
     [brief enabled|disabled|on|off]
     [locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja
     |Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t]
     [pager enabled|disabled|on|off]
     [precision #]
     [storage-size-base 2|10]
     [storage-size-precision #]
     [storage-size-units auto|MB|GB|TB]
     [temperature-scale celsius|c|fahrenheit|f]
     [timeout #]
     [units auto|MB|GB|TB]
```

**Parameters**   base 2|10
Optional. Sets the base for entry and display of storage-space sizes:

- 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude.
- 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.

console|api|api-embed
Optional. Sets the output format:

- console: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes.
- 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 for internal use only.
- json: Alternate data-interchange format for internal use only.

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.

locale
English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja|Korean
|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t
Optional. The display language.

`pager enabled|on|disabled|off`
Optional.

- `enabled` or `on`: Halts output after each full screen to wait for keyboard input.
- `disabled` or `off`: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.

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

`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.

`timeout #`
Optional. Sets the timeout value in seconds for the login session. Valid values are 120–43200 seconds (2–720 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.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

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

**Example**  Set CLI parameters:

```
# set cli-parameters timeout 600 precision 2 units GB temperature-scale f
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-21 11:56:08)
```

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 CLI to show output in console format:

```
# set cli-parameters console
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-21 11:56:17)
```

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 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.

Syntax   To set the date and time manually:

```
set controller-date
    jan|feb|mar|apr|may|jun|jul|aug|sep|oct|nov|dec
    day
    hh:mm:ss
    year
```

To set the date and time manually by specifying a timestamp:

```
set controller-date
    timestamp timestamp
    timezone +|-hh[:mm]
```

To configure use of NTP:

```
set controller-date
    ntp enabled|disabled|on|off
    ntpaddress IP-address
    timezone +|-hh[:mm]
```

Parameters   jan|feb|mar|apr|may|jun|jul|aug|sep|oct|nov|dec
The month.

day
The day number (1–31).

hh:mm:ss
The hour (0–23), the minutes (0–59), and the seconds (0–59).

year
The year as a four-digit number.

ntp enabled|disabled|on|off
Enables or disables use of NTP. When NTP is enabled and the specified NTP server is available, each controller's time is synchronized with the server.

ntpaddress IP-address
The network address of an available NTP server.

timezone +|-hh[:mm]
The system's time zone as an offset in hours (-1 to -12, +1 to +13) and minutes (0–59) from UTC. For example, the Pacific Time Zone offset is -8 during Pacific Standard Time or -7 during Pacific Daylight Time.

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.

Example Manually set the system time and date to 1:45 PM on September 22, 2011:

```
# set controller-date sep 22 13:45:0 2011
Success: Command completed successfully. - Date/Time successfully set.
(2011-11-02 13:45:03)
```

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
Success: Command completed successfully. - Date/Time successfully set.
(2011-11-02 16:30:53)
```

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
Success: Command completed successfully. - Date/Time successfully set.
(2011-11-02 12:15:22)
```

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
Success: Command completed successfully. - Date/Time successfully set.
(2011-11-02 23:00:02)
```

See also • set ntp-parameters
   • show controller-date
   • show ntp-status

set debug-log-parameters

> △ **CAUTION:** For use by or with direction from a service technician.

Description Sets the types of debug messages to include in the SC debug log.

Syntax `set debug-log-parameters` *message-type*`+|-` `[...]`

Parameters *message-type*`+|-`
One of the following message types, followed by a plus (+) to enable or a minus (-) to disable inclusion in the log:

- `awt`: Auto-write-through cache triggers debug messages.
- `bkcfg`: Internal configuration debug messages.
- `cache`: Cache debug messages.
- `capi`: Internal CAPI debug messages.
- `capi2`: Internal CAPI tracing debug messages.
- `disk`: Disk interface debug messages.
- `emp`: EMP debug messages.
- `fo`: Failover and recovery debug messages.
- `fruid`: FRU ID debug messages.
- `hb`: Not used.
- `host` or `host-dbg`: Host interface debug messages.
- `init`: Not used.
- `ioa`: I/O interface driver debug messages (standard).
- `iob`: I/O interface driver debug messages (resource counts).
- `ioc`: I/O interface driver debug messages (upper layer, verbose).
- `iod`: I/O interface driver debug messages (lower layer, verbose).
- `mem`: Internal memory debug messages.
- `misc`: Internal debug messages.
- `msg`: Inter-controller message debug messages.
- `mui`: Internal service interface debug messages.
- `ps`: Not used.
- `raid`: RAID debug messages.
- `rcm`: Removable-component manager debug messages.
- `res2`: Internal debug messages.
- `resmgr`: Reservation Manager debug messages.

Example Include RAID and cache messages, exclude EMP messages, and leave other message types unchanged:

```
# set debug-log-parameters raid+ cache+ emp-
Success: Command completed successfully. - Debug-log parameters were changed.
(2012-01-21 11:58:38)
```

See also • show debug-log-parameters

set disk-parameters

Description Sets parameters that affect disk operation. Two features controlled by these parameters are disk SMART and DSD.

- Disks equipped with SMART technology can alert the controller of impending disk failure. When SMART is enabled, the system checks for SMART events one minute after a restart and every five minutes thereafter. SMART events are recorded in the event log. Changes to the SMART setting take effect after a rescan or a controller restart.
- The DSD feature monitors disk activity within system enclosures and spins down inactive disks, based on user-specified settings. This command sets spin-down parameters for available disks and global spares. To set spin-down parameters for a vdisk, use set vdisk.

📝 **NOTE:** DSD affects disk operations as follows:
- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

Syntax
```
set disk-parameters
    [smart enabled|disabled|on|off|detect-only]
    [spin-down enabled|disabled|on|off]
    [spin-down-delay delay]
```

Parameters smart enabled|disabled|on|off|detect-only
Optional. Sets whether SMART is enabled or disabled for disks:

- disabled or off: Disables SMART for all disks in the system and for all disks added to the system.
- enabled or on: Enables SMART for all disks in the system and for all disks added to the system.
- detect-only: Detects but does not change the SMART setting of each disk in the system, and for each new disk added to the system.

spin-down enabled|disabled|on|off
Optional. Sets whether available disks and global spares will spin down after a period of inactivity shown by the spin-down-delay parameter.

- disabled or off: DSD for available disks and global spares is disabled.
- enabled or on: DSD for available disks and global spares is enabled.

spin-down-delay delay
Optional. Sets the period of inactivity after which available disks and global spares will spin down. Valid values are 1–360 minutes.

Example Enable SMART and DSD, and set the spin-down delay to 10 minutes:

```
# set disk-parameters smart on spin-down on spin-down-delay 10
Success: Command completed successfully. (2012-01-21 11:59:37)
```

See also • show disk-parameters

set drive-parameters

Obsolete command. See "set disk-parameters" on page 100.

set email-parameters

Description   Sets SMTP notification parameters for events and managed logs.

Syntax
```
set email-parameters
    domain domain
    email-list email-addresses
    [include-logs enabled|disabled|on|off]
    notification-level crit|error|warn|info|none
    [sender sender]
    server server
```

Parameters   domain *domain*
The domain name that is joined with an @ symbol to the sender name to form the "from" address for remote notification. The domain name can have a maximum of 255 bytes. Because this name is used as part of an email address, do not include spaces. For example: `MyDomain.com`. If the domain name is not valid, some email servers will not process the mail.

email-list *email-addresses*
Enter up to four comma-separated email addresses for recipients of event notifications. Each email address can have a maximum of 320 bytes. If the managed logs feature is enabled, the fourth email-address is used to specify 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.

notification-level crit|error|warn|info|none
The minimum severity for which the system should send notifications:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables email notification. If this option is specified, no other parameters are required and their current values are not changed.

sender *sender*
Optional. 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. Because this name is used as part of an email address, do not include spaces. For example: `Storage-1`.

server *server*
The IP address of the SMTP mail server to use for the email messages.

Example Set the system to send an email from `RAIDsystem@mydomain.com` to both `sysadmin@mydomain.com` and `JSmith@domain2.com` when a non-Informational event occurs, and to send an email with attached logs to `logcollector@mydomain.com` when logs need to be transferred:

```
# set email-parameters server 10.1.1.10 sender RAIDsystem domain mydomain.com
notification-level warn include-logs enabled email-list
sysadmin@mydomain.com,JSmith@domain2.com,,logcollector@mydomain.com
Info: Set Email Address 1 to: sysadmin@mydomain.com (sysadmin@mydomain.com)
Info: Set Email Address 2 to: JSmith@domain2.com (sysadmin@mydomain.com)
Info: Set Email Address 3 to:
Info: Set Email Address 4 to: logcollector@mydomain.com
(logcollector@mydomain.com)
Info: Set Email Server Name to: 10.1.1.10 (10.1.1.10)
Info: Set Email Domain Name to: mydomain.com (mydomain.com)
Info: Set Email Notification Level to: warn (mydomain.com)
Info: Set Email Sender Name to: RAIDsystem (RAIDsystem)
Info: Set Email Include Logs: enabled (enabled)
Success: Command completed successfully. (2012-01-21 15:07:46)
```

See also • show email-parameters

• test

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

These values are used when user interfaces show enclosure-related data; for example, in output of the show enclosures command and in event-log entries related to enclosures.

Syntax
```
set enclosure
    [name new-name]
    [location location]
    [rack-number rack-number]
    [rack-position rack-position]
    enclosure-number
```

Parameters

name *new-name*
A new name for the enclosure. The name can include a maximum of 20 bytes, using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket. A value that contains a space must be enclosed in double quotes.

location *location*
The location of the enclosure. The name can include a maximum of 20 bytes, using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket.

rack-number *rack-number*
The number of the rack containing the enclosure, from 0–255.

rack-position *rack-position*
The enclosure's position in the rack, from 0–255.

enclosure-number
The enclosure ID.

Example Set parameters for enclosure 1:

```
# set enclosure 1 name Storage-5 location Lab rack-number 9 rack-position 3
Success: Command completed successfully. (2012-01-21 12:03:12)
```

See also • show enclosures

set expander-fault-isolation

⚠ **CAUTION:** For use by or with direction from a service technician.

Description The EC in each IOM performs fault-isolation analysis of SAS expander PHY statistics. When one or more error counters for a specific PHY exceed the built-in thresholds, the PHY is disabled to maintain storage system operation.

While troubleshooting a storage system problem, a service technician can use this command to temporarily disable fault isolation for a specific EC in a specific enclosure.

📝 **NOTE:** If fault isolation is disabled, be sure to re-enable it before placing the system back into service. Serious problems can result if fault isolation is disabled and a PHY failure occurs.

Syntax
```
set expander-fault-isolation
    [wwn wwn]
    encl enclosure-ID
    controller a|b|both
    enabled|disabled|on|off
```

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

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

controller a|b|both
The IOM containing the EC whose setting you want to change: A, B, or `both`.

enabled|disabled|on|off
Whether to enable or disable PHY fault isolation.

Example Disable PHY fault isolation for EC A in an enclosure:

```
# set expander-fault-isolation encl 0 controller a disabled
Success: Command completed successfully. - Expander fault isolation was
disabled. (2012-01-21 12:05:41)
```

Re-enable PHY fault isolation for EC A in the same enclosure:

```
# set expander-fault-isolation encl 0 controller a enabled
Success: Command completed successfully. - Expander fault isolation was enabled.
(2012-01-21 12:05:51)
```

See also • set expander-phy
• show enclosures
• show expander-status

set expander-phy

⚠ **CAUTION:** For use by or with direction from a service technician.

Description Disables or enables a specific PHY.

Syntax
```
set expander-phy
    [encl enclosure-ID]
    controller a|b|both
    [type drive|inter-exp|sc|sc-0|sc-1|ingress|ingress-0|ingress-1|egress
    |egress-0|egress-1]
    [phy phy-ID]
    enabled|disabled|on|off
    [wwn wwn]
```

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

controller a|b|both
The IOM containing the PHY to enable or disable: A, B, or both.

type drive|inter-exp|sc|sc-0|sc-1|ingress|ingress-0|ingress-1|egress
|egress-0|egress-0]
Optional. The PHY type:

- drive: PHY connected to a disk drive.
- inter-exp: PHY in an expansion module that communicates between its expander and the expander in the partner expansion module.
- sc: PHY in the ingress bus to the SC.
- sc-0: PHY in the ingress bus to the local SC.
- sc-1: PHY in the ingress bus to the partner SC.
- ingress: PHY in an ingress port.
- ingress-0: PHY in an ingress port.
- ingress-1: PHY in an ingress port.
- egress: PHY in an egress port.
- egress-0: PHY in an egress port.
- egress-1: PHY in an egress port.

phy *phy-ID*
Optional. The logical PHY number.

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

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

Example Disable the first egress PHY in controller A, and check the resulting status:

```
# set expander-phy encl 0 controller a type egress phy 0 disabled
Success: Command completed successfully. - Disabled PHY 0 on controller a in
enclosure 0. (PHY type: egress) (2012-01-21 12:07:36)


# show expander-status
Encl  Ctlr  Phy  Type    Status          Elem Status  Disabled  Reason
---------------------------------------------------------------------------
...
0     A     0    Egress  Disabled        Disabled     Disabled  PHY control
---------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-21 12:03:42)
```

Enable the PHY for disk 5 in controller B, and check the resulting status:

```
# set expander-phy encl 0 controller b type drive phy 5 enabled
Success: Command completed successfully. - Enabled PHY 5 on controller b in
enclosure 0. (PHY type: drive) (2012-01-21 12:07:50)


# show expander-status
Encl  Ctlr  Phy  Type    Status          Elem Status  Disabled  Reason
---------------------------------------------------------------------------
...
0     B     5    Drive   Enabled-Healthy OK           Enabled
---------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-21 12:03:42)
```

See also
- set expander-fault-isolation
- show enclosures
- show expander-status

set global-spare

Obsolete command. See "set spares" on page 124.

set host-name

Description Changes the nickname, if any, of a host entry.

This command can also be used to remove a manually created host. If the host is unmapped, it is immediately removed; if the host is mapped, it will be removed after you unmap it.

Syntax `set host-name`
      `id host`
      `[new-nickname]`

Parameters `id host`
The ID or nickname of the host.

`new-nickname`
Optional. Changes the host's nickname to the specified name. The name is case sensitive; cannot include a comma, double quote, angle bracket, or backslash; and can have a maximum of 15 bytes. A name that includes a space must be enclosed in double quotes. If this parameter is omitted for a manually created host, the host will be removed.

Example Initially set the nickname for a discovered host:

```
# set host-name id 257000c0ffd74c07 Host1
Success: Command completed successfully. (2011-10-12 12:17:00)
```

Change `Host1`'s nickname to `MyHost`:

```
# set host-name id Host1 MyHost
Success: Command completed successfully. (2012-01-21 12:14:07)
```

Remove the nickname for a discovered host:

```
# set host-name id MyHost
Success: Command completed successfully. (2011-10-12 12:17:20)
```

Remove a manually created host:

```
# set host-name id MyHost
Success: Command completed successfully. (2012-01-21 12:19:16)
```

See also • create host
      • delete host
      • show hosts

set host-parameters

Description   Sets controller host-port parameters for communication with attached hosts. You can set parameters for FC ports; there are no parameters for SAS ports.

Attempting to change FC loop IDs requires restarting the controllers; otherwise, new settings take effect without restarting the controllers.

Syntax   To set FC-port parameters:

```
set host-parameters
    [controller a|b|both]
    [fibre-connection-mode loop|point-to-point|auto]
    [fibre-loop-id values]
    [noprompt]
    [ports ports|all]
    [prompt yes|no|y|n|expert]
    [speed 2g|4g|8g|auto]
    [channel ports|all]
```

Parameters   `controller a|b|both`
Deprecated; use the `ports` parameter.

`fibre-connection-mode loop|point-to-point|auto`
Optional. For FC, sets the topology for the specified ports to:

- `loop`: FC-AL (public or private).
- `point-to-point`: FC point-to-point. To ensure maximum performance, this is the only option for some models.
- `auto`: Loop preferred, otherwise point-to-point, based on the detected connection type.

You must also specify the `ports` parameter.

`fibre-loop-id values`
Optional. For FC, specifies comma-separated loop ID values to request for host ports when controllers arbitrate during a LIP. Use this option if you want ports to have specific addresses, if your system checks addresses in reverse order (lowest address first), or if an application requires that specific IDs be assigned to recognize the controller. If the loop ID is changed for one port, the same ID is used for other ports in the same controller. If the ports parameter is specified, loop IDs are set based on the controllers that the ports are in. You cannot specify the same value for ports on different controllers.

- `soft` or `255`: Soft target addressing enables the LIP to determine the loop ID. Use this setting if the loop ID is permitted to change after a LIP or power cycle.
- `0–125`: Specify a hard target address if you do not want the loop ID to change after a LIP or power cycle. If the port cannot acquire the specified ID, it is assigned a soft target address.

You must restart affected controllers to make loop ID changes take effect.

`noprompt`
Optional in console format; required for XML API format. Suppresses the confirmation prompt, which requires a yes or no response. Specifying this parameter allows the command to proceed without user interaction.

`ports ports|all`
Optional. Specific host port numbers or all ports. For port syntax, see "Command syntax" on page 19.

```
prompt yes|no|expert
```
Optional. Specifies an automatic response to the confirmation prompt:

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

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

```
speed 2g|4g|8g|auto
```
Optional. For FC, sets a forced link speed in Gbit/s or lets the speed be auto-negotiated (`auto`). Because a speed mismatch prevents communication between the port and host, set a speed only if you need to force the port to use a known speed for testing, or you need to specify a mutually supported speed for more than two FC devices connected in an arbitrated loop.

```
channel ports|all
```
Deprecated; use the `ports` parameter.

Example   On a system with FC ports, set the link speed to 8 Gbit/s for ports `A1` and `B1`:

```
# set host-parameters speed 8g ports a1,b1
WARNING: This change will take effect immediately. Changes may affect access to
data. Are you sure? yes
Success: Command completed successfully. - The host parameters were changed
successfully. (2012-01-21 15:42:52)
```

On a system with FC ports, set controller A ports to request loop ID `14` and controller B ports to use soft target addressing, and suppress the confirmation prompt:

```
# set host-parameters fibre-loop-id 14,soft noprompt
Info: Changes to FC loop IDs will not take effect until the affected Storage
Controller is rebooted.
Success: Command completed successfully. - The host parameters were changed
successfully. (2012-01-21 15:45:00)
```

On a system with FC ports, set the link speed to 4 Gbit/s for ports `A1` and `B1`; set controller A ports to request loop ID `5` and controller B ports to request loop ID `32`; and suppress the confirmation prompt:

```
# set host-parameters speed 4g ports a1,b1 fibre-loop-id 5,32 noprompt
Info: Changes to FC loop IDs will not take effect until the affected Storage
Controller is rebooted.
Success: Command completed successfully. - The host parameters were changed
successfully. (2012-01-21 15:46:14)
```

See also   • restart
•   show host-parameters

set host-wwn-name

Obsolete command. See "set host-name" on page 109.

set job-parameters

Description Sets parameters for background vdisk scrub, PFU, and other jobs.

Syntax
```
set job-parameters
    [background-scrub enabled|disabled|on|off]
    [partner-firmware-upgrade enabled|disabled|on|off]
    [utility-priority low|medium|high]
```

Parameters `background-scrub enabled|disabled|on|off`
Optional. Sets whether disks in vdisks are automatically checked for disk defects to ensure system health.

`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`: PFU is disabled.
- `enabled` or `on`: PFU is enabled.

`utility-priority low|medium|high`
Optional. Sets the priority at which data-redundancy utilities, such as vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk 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.
- `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.

Example Enable background scrubbing of vdisks and disable PFU:

```
# set job-parameters background-scrub on partner-firmware-upgrade off
Info: Parameter 'background-scrub' was set to 'on'. (2012-01-21 12:22:14)
Info: Parameter 'partner-firmware-upgrade' was set to 'off'. (2012-01-21
12:22:14)
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-21 12:22:14)
```

See also
- scrub vdisk
- set advanced-settings
- show job-parameters

set led

Description Changes the state of the ID LED on a specified disk or enclosure. For a disk this affects the fault LED. For an enclosure this affects the unit locator LED. LEDs are described in the *AssuredSAN 4000 Series Setup Guide*.

Syntax To set a disk LED:

```
set led
    disk ID
    enable|disable|on|off
```

To set an enclosure LED:

```
set led
    enclosure ID
    enable|disable|on|off
```

Parameters disk *ID*
The disk to locate. For disk syntax, see "Command syntax" on page 19.

enclosure *ID*
The enclosure to locate.

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

Example Identify disk 5 in the first enclosure:

```
# set led disk 0.5 on
Success: Command completed successfully. - Enabling identification LED for disk
0.5... (2012-01-21 12:23:18)
```

Stop identifying the first enclosure:

```
# set led enclosure 0 off
Success: Disabling identification LED for enclosure 0... (2012-01-21 12:24:03)
```

set network-parameters

Description Sets IP values for controller module network ports. You can manually set static IP values for each controller, or you can specify that IP values should be set automatically for both controllers through communication with a DHCP server.

Each controller has the following factory-default IP settings:

- DHCP: disabled
- Controller A IP address: `10.0.0.2`
- Controller B IP address: `10.0.0.3`
- IP subnet mask: `255.255.255.0`
- Gateway IP address: `10.0.0.1`

When DHCP is enabled, the following initial values are set and remain set until the system is able to contact a DHCP server for new addresses.

- Controller IP addresses: `169.254.x.x` (where the value of `x.x` is the lowest 16 bits of the controller serial number)
- IP subnet mask: `255.255.0.0`
- Gateway IP address: `0.0.0.0`

`169.254.x.x` addresses (including gateway `169.254.0.1`) are on a private subnet that is reserved for unconfigured systems and the addresses are not routable. This prevents the DHCP server from reassigning the addresses and possibly causing a conflict where two controllers have the same IP address. Change these IP values to proper values for your network as soon as possible.

To switch a controller from DHCP addressing to static addressing, you must set the IP address, netmask, and gateway values.

Syntax To set both controllers' IP values automatically:

```
set network-parameters dhcp
```

To set a controller's IP values manually:

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

Parameters `dhcp`
Specifies to use DHCP to set both controllers' IP values.

`ip address`
Optional. An IP address for the port.

`netmask netmask`
Optional. An IP subnet mask for the port.

`gateway gateway`
Optional. A gateway IP address for the port.

`controller a|b`
Specifies whether to apply the settings to controller A or B.

`ipv 4|6`
Optional. Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing the network ports.

- `4`: Lets you specify addresses in dot-decimal format, where the four octets of the address use decimal values without leading zeroes and the octets are separated by a period; for example, 10.132.2.205.
- `6`: Lets you specify addresses using eight groups of four hexadecimal digits, where the groups are separated by a colon. All groups must be specified. For example, 0000:0000:0000:0000:0000:0000:0A90:3442.

`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.

Example Use DHCP to set network port IP values:

```
# set network-parameters dhcp
Success: Command completed successfully. - Request to set network parameters has
been initiated. (2011-10-12 12:26:45)
```

Manually set network port IP values for controller A (disabling DHCP for both controllers, if it was enabled):

```
# set network-parameters ip 192.168.0.10 netmask 255.255.255.0 gateway
192.168.0.1 controller a
Success: Command completed successfully. - Request to set network parameters has
been initiated. (2012-01-21 12:26:50)
```

See also • show network-parameters

set ntp-parameters

Description Sets NTP parameters for the system. You can manually set system date and time parameters by using the set controller-date command.

Syntax
```
set ntp-parameters
    [ntp enabled|disabled|on|off]
    [ntpaddress IP-address]
    [timezone +|-hh[:mm]]
```

Parameters ntp enabled|disabled|on|off
Optional. Enables or disables use of NTP. When NTP is enabled and the specified NTP server is available, each controller's time is synchronized with the server.

ntpaddress *IP-address*
Optional. The network address of an available NTP server.

timezone +|-*hh*[:*mm*]
Optional. The system's time zone as an offset in hours (-1 to -12, +1 to +13) and minutes (0–59) from UTC. For example, the Pacific Time Zone offset is -8 during Pacific Standard Time or -7 during Pacific Daylight Time.

Example 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
Success: Command completed successfully. - Date/Time successfully set.
(2011-10-11 14:52:19)
```

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
Success: Command completed successfully. - Date/Time successfully set.
(2011-10-11 14:52:29)
```

See also
- set controller-date
- show controller-date
- show ntp-status

set output-format

Obsolete command. See "set cli-parameters" on page 95.

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.

Syntax set password
      [password *password*]
      [*user*]

Parameters password *password*
      Optional. Sets a new password for the user. The value is case sensitive; can include a maximum of 32 bytes using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket. A value that includes a space must be enclosed in double quotes. If this parameter is omitted, the command prompts you to enter and re-enter a value, which is displayed encrypted. For an SNMPv3 user whose authentication-type parameter is set to use authentication, this specifies the authentication password and must include at least 8 characters.

      user
      Optional. The user name to set the password for. If this parameter is omitted, this command affects the logged-in user's password.

Example Change the password for the default user, manage:

```
# set password manage
Enter new password: ****
Re-enter new password: ****
Success: Command completed successfully. (manage) - The password was changed.
(2011-10-11 14:48:03)
```

Change the password for user JDoe:

```
# set password JDoe password Abc%123
Success: Command completed successfully. (JDoe) - The password was changed.
(2011-10-11 14:48:12)
```

See also • show users

set prompt

Description   Sets the prompt for the current CLI session.

Syntax   `set prompt` *prompt*

Parameters   *prompt*
The new prompt, which can include any printable UTF-8 characters except a backslash, double quote, or angle bracket, and can have a maximum of 16 bytes. A prompt that includes a space must be enclosed in double quotes.

Example   Set the prompt to `CLI#` followed by a space, and start entering another command:

```
# set prompt "CLI# "
Success: Command completed successfully. (2011-10-11 14:47:23)
CLI# set ...
```

set protocols

Description Enables or disables management services and protocols.

Syntax
```
set protocols
    [debug enabled|disabled|on|off]
    [ftp enabled|disabled|on|off]
    [http enabled|disabled|on|off]
    [https enabled|disabled|on|off]
    [ses enabled|disabled|on|off]
    [smis enabled|disabled|on|off]
    [snmp enabled|disabled|on|off]
    [ssh enabled|disabled|on|off]
    [telnet enabled|disabled|on|off]
    [usmis enabled|disabled|on|off]
```

Parameters `debug enabled|disabled|on|off`
Optional. Enables or disables the Telnet debug port.

`ftp enabled|disabled|on|off`
Optional. Enables or disables the expert interface for updating firmware.

`http enabled|disabled|on|off`
Optional. Enables or disables the standard RAIDar web server.

`https enabled|disabled|on|off`
Optional. Enables or disables the secure RAIDar web server.

`ses enabled|disabled|on|off`
Optional. Enables or disables the in-band SES interface.

`smis enabled|disabled|on|off`
Optional. Enables or disables the secure SMI-S interface. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTPS port 5989. HTTPS port 5989 and HTTP port 5988 cannot be enabled at the same time, so enabling this option will disable port 5988.

`snmp enabled|disabled|on|off`
Optional. Enables or disables the SNMP 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.

`ssh enabled|disabled|on|off`
Optional. Enables or disables the SSH CLI.

`telnet enabled|disabled|on|off`
Optional. Enables or disables the standard CLI.

`usmis enabled|disabled|on|off`
Optional. Enables or disables the unsecure SMI-S interface. This option allows SMI-S clients to communicate with each controller's embedded SMI-S provider via HTTP port 5988. HTTP port 5988 and HTTPS port 5989 cannot be enabled at the same time, so enabling this option will disable port 5989.

Example Disable unsecure HTTP connections and enable FTP:

```
# set protocols http disabled ftp enabled
Success: Command completed successfully. (2012-01-21 14:46:55)
```

See also • show protocols

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.

Syntax
```
set 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 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 task to run. The name is case sensitive.

`schedule-name`
Name of the schedule to change.

Example Change parameters, including the associated task, for schedule `Sched1`:

```
# set schedule schedule-specification "start 2011-01-01 00:01 every 1 days
expires 2011-12-31 00:01" task-name Sched1
Success: Command completed successfully. (Sched1) - The schedule was modified.
(2011-10-14 08:28:50)
```

See also
- show schedule-details
- show schedules
- show task-details
- 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.

Syntax `set snmp-parameters`
        `[enable crit|error|warn|info|none]`
        `[add-trap-host `*`address`*`]`
        `[del-trap-host `*`address`*`]`
        `[trap-host-list `*`trap-host-list`*`]`
        `[read-community `*`string`*`]`
        `[write-community `*`string`*`]`

Parameters `enable crit|error|warn|info|none`
        Optional. Sets the level of trap notification:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: All events are excluded from trap notification and traps are disabled.

`add-trap-host `*`address`*
Optional. Specifies the IP address of a destination host that will receive traps. Three trap hosts can be set.

`del-trap-host `*`address`*
Optional. Deletes a trap destination host.

`trap-host-list `*`trap-host-list`*
Optional. Replaces the current list.

`read-community `*`string`*
Optional. Sets a community string for read-only access. This value is also included in traps that are sent. The value is case sensitive; can include any character except a single quote or double quote; and can have a maximum of 31 bytes.

`write-community `*`string`*
Optional. Sets a community string for write access. The value is case sensitive; can include letters, numbers, hyphens, and underscores; and can have a maximum of 31 bytes.

Example 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
Success: Command completed successfully. - SNMP parameters were
changed.(2011-10-11 14:43:26)
```

See also
- set protocols
- show snmp-parameters
- test

set spares

Description Creates or deletes spare disks for fault-tolerant (RAID1, 3, 5, 6, 10, 50) vdisks.

A global spare is available to any fault-tolerant vdisk with the same disk type. The system can have 64 global spares. Each must have enough capacity to replace the smallest disk in any existing vdisk.

A dedicated spare is assigned to a fault-tolerant vdisk with the same disk type. A vdisk can have four dedicated spares. Each must have enough capacity to replace the smallest disk in that vdisk.

△ **CAUTION:** When setting global spares, the existing set of global spares is completely replaced by the newly specified set of disks. When setting dedicated spares, the existing set of dedicated spares for the specified vdisk is completely replaced by the newly specified set of disks. So, for example, if you want to add new global spares to the ones that already exist, you must specify all the existing global spare disks as well as the new disks that you want to add.

Syntax
```
set spares
    disks disks
    [vdisk vdisk]
```

Parameters disks *disks*
IDs of the disks to designate as spares. For disk syntax, see "Command syntax" on page 19.

vdisk *vdisk*
Optional. Name or serial number of the vdisk to assign spares to. For vdisk syntax, see "Command syntax" on page 19. If this parameter is omitted, the disks will be global spares.

Example Designate disk 1.2 as a global spare:

```
# set spares disks 1.2
Info: Global spare disk 1.2 was added.
Success: Command completed successfully. (2012-01-20 15:00:36)
```

Designate disk 1.3 as a dedicated spare for vdisk VD1:

```
# set spares disks 1.3 vdisk VD1
Info: Vdisk spare disk 1.3 was added. (1.3)
Success: Command completed successfully. (2012-01-20 10:12:01)
```

Try to designate a disk of one type as a spare for a vdisk using a different disk type:

```
# set spares disk 2.1 vdisk VD1
Error: The specified spare cannot be used. - Disk 2.1 is not the same type as the
ones currently used by the vdisks. (2.1)
Error: Command failed. (2011-10-12 10:09:30)
```

See also • delete global-spare
• delete vdisk-spare
• set advanced-settings
• show disks
• show vdisks

set syslog-parameters

Description Sets remote syslog notification parameters for events and managed logs.

Syntax
```
set syslog-parameters
     [host-ip ip-address]
     priority-level crit|error|warn|info|none
     [host-port port-number]
```

Parameters host-ip *ip-address*
Optional. An IP address for the host.

priority-level crit|error|warn|info|none
The minimum severity for which the system should send notifications:

- crit: Sends notifications for Critical events only.
- error: Sends notifications for Error and Critical events.
- warn: Sends notifications for Warning, Error, and Critical events.
- info: Sends notifications for all events.
- none: Disables email notification.

host-port *port-number*
Optional. A number for the host port.

Example Set the system to send an entry to the syslog when a critical event occurs:

```
# set syslog-parameters crit
Success: Command completed successfully. (2012-01-21 15:07:46)
```

See also • show syslog-parameters

set system

Description Sets the system's name, contact person, location, and description. Each value can include a maximum of 79 bytes, using printable UTF-8 characters except a backslash, double quote, or angle brackets. A value that contains a space must be enclosed in double quotes.

The name, location, and contact are included in event notifications. All four values are included in system debug logs for reference by service personnel. When using RAIDar, the system name appears in the browser title bar or tab.

Syntax
```
set system
    [name value]
    [contact value]
    [location value]
    [info value]
```

Parameters `name value`
A name to identify the system.

`contact value`
The name of the person who administers the system.

`location value`
The location of the system.

`info value`
A brief description of what the system is used for or how it's configured.

Example Set the system name to `Test` and the contact to `J. Doe`:

```
# set system name Test contact "J. Doe"
Success: Command completed successfully. (2012-01-21 14:42:12)
```

See also • show system

set user

Description Changes user preferences for the session or permanently. You cannot change the access level of user `manage`. User changes take effect when the user next logs in.

Syntax
```
set user
      [authentication-type MD5|SHA|none]
      [base 2|10]
      [interfaces interfaces]
      [roles monitor|manage|admin|diagnostic]
      [locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja
      |Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t]
      [password password]
      [precision #]
      [privacy-password encryption-password]
      [privacy-type DES|AES|none]
      [session-preferences]
      [storage-size-base 2|10]
      [storage-size-precision #]
      [storage-size-units auto|MB|GB|TB]
      [temperature-scale celsius|c|fahrenheit|f]
      [timeout #]
      [trap-host IP-address]
      [type novice|standard|advanced|diagnostic]
      [units auto|MB|GB|TB]
      name
      [level]
```

Parameters `authentication-type MD5|SHA|none`
Optional. For an SNMPv3 user, this specifies whether to use a security authentication protocol. This parameter requires the password parameter and, for the `snmptarget` interface, the `trap-host` parameter.

- `MD5`: MD5 authentication.
- `SHA`: SHA 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.
- `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.

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

- `cli`: CLI.
- `wbi`: WBI (RAIDar).
- `ftp`: FTP interface.
- `smis`: SMI-S interface.
- `snmpuser`: Allows an SNMPv3 user to view the SNMP MIB.
- `snmptarget`: Allows an SNMPv3 user to receive SNMP trap notifications. This option requires the `trap-host` parameter.
- `none`: No interfaces.

`roles monitor|manage|admin|diagnostic`
Optional. Specifies the user's roles as one or more of the following values:

- `monitor`: User can view but not change system settings.
- `manage`: User can view and change system settings.
- `admin`: User can view and change system settings and access certain commands unavailable to `monitor` and `manage` users.
- `diagnostic`: User can view and change system settings and access certain commands unavailable to `monitor` and `manage` users.

`locale English|en|Spanish|es|French|fr|German|de|Italian|it|Japanese|ja |Korean|ko|Dutch|nl|Chinese-simplified|zh-s|Chinese-traditional|zh-t`
Optional. The display language.

`password password`
Optional in console format; required for XML API format. Sets a new password for the user. The value is case sensitive; can include a maximum of 32 bytes using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket. A value that includes a space must be enclosed in double quotes. For an SNMPv3 user whose `authentication-type` parameter is set to use authentication, this specifies the authentication password and must include at least 8 characters.

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

`privacy-password encryption-password`
Optional. For an SNMPv3 user whose `privacy-type` parameter is set to use encryption, this specifies the encryption password. The value is case sensitive; can include a maximum of 32 bytes using printable UTF-8 characters except a backslash, comma, double quote, or angle bracket; and must include at least 8 characters.

`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`
- `AES`
- `none`: No encryption.

`session-preferences`
Optional. Specifies that the current CLI settings will become permanent settings for the user.

`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.

`timeout #`
Optional. Sets the timeout value in seconds for the login session. Valid values are `120–43200` seconds (`2–720` minutes).

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

`type novice|standard|advanced|diagnostic`
Optional. Identifies the user's experience level. This parameter does not affect access to commands.

`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.
- `MB`: Sizes are shown in megabytes.
- `GB`: Sizes are shown in gigabytes.
- `TB`: Sizes are shown in terabytes.

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

name
Specifies the user account to change. Names are case sensitive.

`level`
Use the `roles` parameter.

Example   Change the temperature scale and accessible interfaces for user `jsmith`:

```
# set user jsmith interfaces wbi,cli temperature-scale f
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-21 14:39:50)
```

Change the password for user `JDoe`:

```
# set user JDoe password Abc%123
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-21 14:39:56)
```

Change the authentication type for SNMPv3 user `Traps`:

```
# set user Traps authentication-type MD5 password snmptraps
Success: Command completed successfully. - The settings were changed
successfully. (2012-01-12 14:40:10)
```

See also   • set password
• show users

set vdisk

Description Changes parameters for a specified vdisk.

Syntax
```
set vdisk
    [name new-name]
    [owner a|b]
    [spin-down-delay delay]
    vdisk
```

Parameters name *new-name*
Optional. A new name for the vdisk. For vdisk syntax, see "Command syntax" on page 19.

owner a|b
Optional. The new owner: controller A or B.

△ **CAUTION:** Before changing the owning controller for a vdisk, you must stop host I/O to the vdisk's volumes. Volume mappings are not affected.

---

spin-down-delay *delay*
Optional. Sets the period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1–360 minutes. Setting the delay to 1–360 minutes will enable spin down; setting the delay to 0 will disable spin down.

📝 **NOTE:** DSD affects disk operations as follows:
- Spun-down disks are not polled for SMART events.
- Operations requiring access to disks may be delayed while the disks are spinning back up.

---

vdisk
Name or serial number of the vdisk to change. For vdisk syntax, see "Command syntax" on page 19.

Example Rename vdisk VD1, change its owner to controller A, and set its spin-down delay to 10 minutes:

```
# set vdisk name VD2 owner a spin-down-delay 10 VD1
Success: Command completed successfully. (2012-01-21 12:29:15)
```

See also • show vdisks

set vdisk-spare

Obsolete command. See "set spares" on page 124.

set volume

Description Changes a volume's name and identifying information.

Syntax
```
set volume
    [access read-write|rw|read-only|ro]
    [identifying-information description]
    [name new-name]
    volume
```

Parameters access read-write|rw|read-only|ro
Deprecated; to change mapping settings, use the "map volume" on page 92.

identifying-information *description*
Optional. A description of the volume to help a host-side user identify it. The value can have a
maximum of 127 bytes, using printable UTF-8 characters except a backslash, double quote, or angle
bracket. A value that contains a space must be enclosed in double quotes.

name *new-name*
Optional. A new name for the volume. For volume syntax, see "Command syntax" on page 19.

volume
Name or serial number of the volume to change. For volume syntax, see "Command syntax" on
page 19.

Example Rename volume V1 to V2:

```
# set volume name V2 V1
Success: Command completed successfully. - The specified volume name change(s)
were made. (2012-01-21 14:36:13)
```

Set identifying information for V3:

```
# set volume identifying-information "Project X data" V3
Success: Command completed successfully. - The specified volume name change(s)
were made. (2012-01-21 14:36:33)
```

See also • show host-maps
• show volumes
• show volume-maps

show advanced-settings

Description Shows the settings for advanced system-configuration options.

Syntax `show advanced-settings`

Output `Vdisk Background Scrub`
Shows whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between background vdisk scrub finishing and starting again is specified by the Vdisk `Background Scrub Interval` field.

- `Disabled`: Background vdisk scrub is disabled.
- `Enabled`: Background vdisk scrub is enabled.

`Vdisk Background Scrub Interval`
Shows the interval between background vdisk scrub finishing and starting again, from 1–360 hours.

`Partner Firmware Upgrade`
Shows whether component firmware versions are monitored and will be automatically updated on the partner controller.

- `Disabled`: PFU is disabled.
- `Enabled`: PFU is enabled.

`Utility Priority`
Priority at which data-redundancy utilities, such as vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk 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 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 a compatible disk as a spare to replace a failed disk in a vdisk if no compatible spare is available.

- `Disabled`: The dynamic spares feature is disabled.
- `Enabled`: The dynamic spares feature is enabled.

`Enclosure Polling Rate`
Shows the interval in seconds at which the storage system will poll each enclosure's EMP for status changes, from 5–3600 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`: Host control of caching is disabled.
- `Enabled`: Host control of caching is enabled.

Sync Cache Mode
Shows how the `SCSI SYNCHRONIZE CACHE` command is handled:

- `Immediate`: Good status is returned immediately and cache content is unchanged.
- `Flush To Disk`: Good status is returned only after all write-back data for the specified volume is flushed to disk.

Independent Cache Performance Mode
Shows the cache redundancy mode for a dual-controller storage system.

- `Disabled`: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller.
- `Enabled`: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.

Missing LUN Response
Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access.

- `Not Ready`: Sends a reply that there is a LUN where a gap has been created but that it's "not ready." Sense data returned is sensekey = 2, code = 4, qualifier = 3.
- `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.

CompactFlash Failure
Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST, fails during POST, or fails during controller operation.

- `Disabled`: The CompactFlash failure trigger is disabled.
- `Enabled`: The CompactFlash failure trigger is enabled.

Power Supply Failure
Shows whether the cache policy will change from write-back to write-through when a PSU 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.

`Drive Spin Down Non-Vdisk Enable`
Shows whether available disks and global spares will spin down after a period of inactivity shown by the `Drive Spin Down Non-Vdisk Delay` field.

- `Disabled`: DSD for available disks and global spares is disabled.
- `Enabled`: DSD for available disks and global spares is enabled.

`Drive Spin Down Non-Vdisk Delay`
Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1–360 minutes. The value 0 means spin down is disabled.

`Disk Background Scrub`
Shows whether disks that are not in vdisks are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 24 hours.

- `Disabled`: Background disk scrub is disabled.
- `Enabled`: Background disk scrub is enabled.

`Managed Logs`
Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log collection system to avoid losing diagnostic data as logs fill.

- `Disabled`: The managed logs feature is disabled.
- `Enabled`: The managed logs feature is enabled.

Example Show advanced system-configuration settings:

```
# show advanced-settings
Vdisk Background Scrub: Enabled
Vdisk Background Scrub Interval: 24
Partner Firmware Upgrade: Disabled
Utility Priority: High
SMART: Enabled
Dynamic Spare Configuration: Disabled
Enclosure Polling Rate: 5
Host Control of Caching: Enabled
Sync Cache Mode: Immediate
Independent Cache Performance Mode: Disabled
Missing LUN Response: Not Ready
Controller Failure: Disabled
Supercap Failure: Enabled
CompactFlash Failure: Enabled
Power Supply Failure: Disabled
Fan Failure: Disabled
Temperature Exceeded: Disabled
Partner Notify: Disabled
Auto Write Back: Enabled
Drive Spin Down Non-Vdisk Enable: Enabled
Drive Spin Down Non-Vdisk Delay: 30
Disk Background Scrub: Disabled
Managed Logs: Disabled

Success: Command completed successfully. (2012-01-18 14:29:38)
```

Basetypes • advanced-settings-table
- status

See also • set advanced-settings

show auto-write-through-trigger

Description Shows the system's write-through trigger settings. When a trigger condition occurs and the trigger is enabled, the RAID controller cache mode changes from write-back to write-through. Alias: `show awt`.

Syntax `show auto-write-through-trigger`

Output `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.

`CompactFlash Failure`
Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST, fails during POST, or fails during controller operation.

- `Disabled`: The CompactFlash failure trigger is disabled.
- `Enabled`: The CompactFlash failure trigger is enabled.

`Power Supply Failure`
Shows whether the cache policy will change from write-back to write-through when a PSU 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.

Example Show the system's auto-write-through trigger settings:

```
# show auto-write-through-trigger
Auto Write-Through Triggers
---------------------------
Controller Failure: Disabled
Supercap Failure: Enabled
CompactFlash Failure: Enabled
Power Supply Failure: Disabled
Fan Failure: Disabled
Temperature Exceeded: Disabled
Partner Notify: Disabled
Auto Write Back: Enabled

Success: Command completed successfully. (2012-01-18 14:30:31)
```

Basetypes   • auto-write-through-trigger
           • status

See also   • set auto-write-through-trigger

show awt

Alias for show auto-write-through-trigger.

show cache-parameters

Description Shows cache settings and status for the system and optionally for a volume.

Syntax `show cache-parameters [volume]`

Parameters *volume*
Optional. Name or serial number of the volume to show settings for. Case sensitive. For volume syntax, see "Command syntax" on page 19. If this parameter is not specified, only system-wide settings are shown.

Output **System/controller cache parameters:**

`Operation Mode`
Shows the system's operating mode, also called the cache redundancy mode:

- `Independent Cache Performance Mode`: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- `Active-Active ULP`: Both controllers are active using ULP. Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- `Fail 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.

`Write Back Status`
Shows the current, system-wide cache policy as determined by AWT logic. This value is not settable by users. If an AWT trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume.

- `Enabled`: Write-back. This is the normal state.
- `Disabled`: Write-through.
- `Not up`: The controller is not up.

`CompactFlash Status`

- `Not Installed`: The CompactFlash card is not installed.
- `Installed`: The CompactFlash card is installed.
- `Unknown`: The CompactFlash card's status is unknown.

`CompactFlash Health`

- `OK`
- `Fault`
- `Unknown`

`Cache Flush`

- `Enabled`: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down.
- `Disabled`: Cache flush is disabled.

Volume cache parameters:

`Serial Number`
If a volume is specified, its serial number

`Name`
If a volume is specified, its name

```
Cache Write Policy
```
If a volume is specified, its cache write policy:

- `write-back`: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput.
- `write-through`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.

```
Cache Optimization
```
If a volume is specified, its cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.
- `atomic-write`
  This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

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

- `Disabled`: Read-ahead caching is disabled.
- `Default`: One chunk for the first access in a sequential read and one stripe for all subsequent accesses.
- `Maximum`: Maximum read-ahead size calculated by the controller.
- `64 KB, 128 KB, 256 KB, 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB,` or `32 MB`: Size selected by a user.

Example   Show the cache parameters for the system and for volume `V1`:

```
# show cache-parameters V1
System Cache Parameters
-----------------------
Operation Mode: Active-Active ULP

    Controller A Cache Parameters
    -----------------------------
    Write Back Status: Enabled
    CompactFlash Status: Installed
    CompactFlash Health: OK
    Cache Flush: Enabled

    Controller B Cache Parameters
    -----------------------------
    Write Back Status: Enabled
    CompactFlash Status: Installed
    CompactFlash Health: OK
    Cache Flush: Enabled

Volume Cache Parameters
-----------------------
Serial Number: SN
Name: V1
Cache Write Policy: write-back
Cache Optimization: standard
Read Ahead Size: Default

Success: Command completed successfully. (2012-01-18 14:31:19)
```

Basetypes   • cache-settings
   • cache-parameter
   • status

See also   • set cache-parameters
   • show volumes

show channels

Obsolete command. See "show ports" on page 194.

show cli-parameters

Description Shows the current CLI session preferences.

Syntax `show cli-parameters`

Output `Timeout`
Time in seconds that the session can be idle before it automatically ends. Valid values are
120–43200 seconds (2–720 minutes).

`Output Format`

- `Console`: Supports interactive use of the CLI by displaying command output in easily readable
  format. This format automatically sizes fields according to content and adjusts content to window
  resizes.
- `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 for internal use only.
- `json`: Alternate data-interchange format for internal use only.

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

`Locale`
Display language.

`Precision`
Number of decimal places (1–10) shown for display of storage-space sizes.

`Units`
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 0.11709 TB is instead shown as 117.1 GB.

```
Temperature Scale
```

- `Fahrenheit`: Temperatures are shown in degrees Fahrenheit.
- `Celsius`: Temperatures are shown in degrees Celsius.

Example Show current CLI settings:

```
# show cli-parameters
CLI Parameters
--------------
Timeout: 1800
Output Format: Console
Brief Mode: Disabled
Base: 10
Pager: Enabled
Locale: English
Precision: 1
Units: Auto
Temperature Scale: Celsius

Success: Command completed successfully. (2012-01-18 14:32:33)
```

Basetypes
- cli-parameters
- status

See also
- set cli-parameters

show configuration

Description   Shows system configuration information.

Syntax   `show configuration`

Output
- System information from show system
- Controller information from show controllers
- Controller firmware and hardware version information from versions with the `details` option
- Host and expansion port information from show ports
- Disk information from show disks
- Disk information by enclosure from show disks with the `encl` option
- Vdisk information from show vdisks
- Enclosure status information from show enclosures
- FRU information from show frus

Basetypes
- system
- controllers
- versions
- port
- drives
- enclosure-list
- virtual-disks
- enclosures
- status

show controller-date

Description Shows the system's current date and time.

Syntax `show controller-date`

Output `Controller Date`
Date and time in the format *year-month-day hour*:*minutes*:*seconds.*

`Time-Zone Offset`
The system's time zone as an offset in hours and minutes from UTC. This is shown only if NTP is enabled.

Example Show the date and time on a system that is using NTP:

```
# show controller-date
Controller Date: 2012-01-18 14:57:04
Time-Zone Offset: -6:00

Success: Command completed successfully. (2012-01-18 14:57:04)
```

Basetypes • time-settings-table
• status

See also • set controller-date
• show ntp-status

show controllers

Description Shows information about each controller module in the storage system.

Syntax `show controllers`

Output `Controller ID`

- `A`: Controller A.
- `B`: Controller B.

`Serial Number`

- Serial number of the controller module.
- `Not Available`: The controller module is down or not installed.

`Hardware Version`
Controller module hardware version.

`CPLD Version`
CPLD firmware version.

`MAC Address`
Controller network port MAC address.

`WWNN`
Storage system WWNN.

`IP Address`
Controller network port IP address.

`IP Subnet Mask`
Controller network port IP subnet mask.

`IP Gateway`
Controller network port gateway IP address.

`Disks`
Number of disks in the storage system.

`Vdisks`
Number of vdisks in the storage system.

`Cache Memory Size (MB)`
Controller module cache memory size (MB).

`Host Ports`
Number of host ports in the controller module.

`Disk Channels`
Number of expansion ports in the controller enclosure.

`Disk Bus Type`
Type of interface between the controller module and disks:

- `SAS`

`Status`

- `Operational`
- `Down`
- `Not Installed`
- `Unknown`

`Failed Over to This Controller`
Indicates whether the partner controller has failed over to this controller:

- `No`: The partner controller has not failed over to this controller.
- `Yes`: The partner controller has failed 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` is `Yes`, a reason for the failover appears; otherwise, `Not applicable` appears.

`Health`

- `OK`
- `Fault`
- `Unknown`

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

`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:

- `Independent Cache Performance Mode`: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- `Active-Active ULP`: Both controllers are active using ULP. Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- `Fail Over`: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- `Down`: Both controllers are not operational.

`Controller Redundancy Status`

- `Redundant with independent cache`: Both controllers are operational but are not mirroring their cache metadata to each other.
- `Redundant`: Both controllers are operational.
- `Operational but not redundant`: In active-active mode, one controller is operational and the other is offline.
- `Down`: This controller is not operational.
- `Unknown`: Status information is not available.

Example Show controller information:

```
# show controllers
Controllers
-----------
Controller ID: A
Serial Number: SN
Hardware Version: 25
CPLD Version: 8
MAC Address: 00:C0:FF:27:50:24
WWNN: WWNN
IP Address: 10.134.11.100
IP Subnet Mask: 255.255.0.0
IP Gateway: 10.134.0.1
Disks: 17
Vdisks: 2
Cache Memory Size (MB): 1024
Host Ports: 4
Disk Channels: 2
Disk Bus Type: SAS
Status: Operational
Failed Over to This Controller: No
Fail Over Reason: Not applicable
Health: OK
Health Reason:
Health Recommendation:
Position: Top
Phy Isolation: Enabled
Controller Redundancy Mode: Active-Active ULP
Controller Redundancy Status: Redundant

Controllers
-----------
Controller ID: B
...

Success: Command completed successfully. (2012-01-18 14:58:54)
```

Basetypes
- controllers
- status

See also
- show configuration
- show frus

show controller-statistics

Description Shows live performance statistics for controller A, B, or both.

Properties shown only in XML API format are described in "XML API basetype properties" on page 251.

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`
Controller ID in the form `controller_ID`.

`CPU Load`
Percentage of time the processor is busy, from 0–100.

`Power On Time (Secs)`
Number of seconds since the controller was restarted.

`Bytes per second`
Data transfer rate 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`
IOPS 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`
Number of read operations since these statistics were last reset or since the controller was restarted.

`Number of 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.

`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`
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.

Example   Show statistics for controller A:

```
# show controller-statistics a
Durable ID   CPU Load  Power On Time (Secs)  Bytes per second  IOPS
   Number of Reads  Number of Writes  Data Read  Data Written
   Num Forwarded Cmds  Reset Time         Total Power On Hours
-------------------------------------------------------------------
controller_A  5         437034                    5596.6KB         406
   235196190        331183103         6922.3GB   7999.1GB
   0                     2012-01-18 10:14:50  127449.88
-------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 11:34:41)
```

Basetypes   • controller-statistics
　　　　　　　• status

See also   • reset all-statistics
　　　　　　• reset controller-statistics
　　　　　　• show disk-statistics
　　　　　　• show host-port-statistics
　　　　　　• show vdisk-statistics
　　　　　　• show volume-statistics

show debug-log-parameters

> △ **CAUTION:** For use by or with direction from a service technician.

Description Shows which debug message types are enabled (On) or disabled (Off) for inclusion in the SC debug log.

Syntax show debug-log-parameters

Output
- host: Host interface debug messages.
- disk: Disk interface debug messages.
- mem: Internal memory debug messages.
- fo: Failover and recovery debug messages.
- msg: Inter-controller message debug messages.
- ioa: I/O interface driver debug messages (standard).
- iob: I/O interface driver debug messages (resource counts).
- ioc: I/O interface driver debug messages (upper layer, verbose).
- iod: I/O interface driver debug messages (lower layer, verbose).
- misc: Internal debug messages.
- rcm: Removable-component manager debug messages.
- raid: RAID debug messages.
- cache: Cache debug messages.
- emp: EMP debug messages.
- capi: Internal CAPI debug messages.
- mui: Internal service interface debug messages.
- bkcfg: Internal configuration debug messages.
- awt: Auto-write-through cache triggers debug messages.
- res2: Internal debug messages.
- capi2: Internal CAPI tracing debug messages.
- fruid: FRU ID debug messages.
- resmgr: Reservation Manager debug messages.
- init: Not used.
- ps: Not used.
- hb: Not used.

Example Show debug log parameters:

```
# show debug-log-parameters
Debug Log Parameters
--------------------
host: On
disk: On
mem: Off
...

Success: Command completed successfully. (2012-01-18 14:59:52)
```

Basetypes
- debug-log-parameters
- status

See also
- set debug-log-parameters

show disk-parameters

Description Shows disk settings.

Syntax `show disk-parameters`

Output `SMART`
Shows whether SMART 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 parameter cannot be changed.

`Timeout Retry Maximum`
Maximum number of times a timed-out I/O operation can be retried before the operation is failed.

`Attempt Timeout`
Number of seconds before an I/O operation is aborted and possibly retried.

Overall Timeout
Total time in seconds before an I/O operation is failed regardless of the `Attempt Timeout` and `Number of Retries` settings.

`Drive Spin Down Non-Vdisk Enable`
Shows whether available disks and global spares will spin down after a period of inactivity shown by the `Drive Spin Down Non-Vdisk Delay` field.

- `Disabled`: DSD for available disks and global spares is disabled.
- `Enabled`: DSD for available disks and global spares is enabled.

`Drive Spin Down Non-Vdisk Delay`
Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1–360 minutes. The value 0 means spin down is disabled.

Example Show disk settings:

```
# show disk-parameters
Disk Parameters
-------------
SMART: Enabled
Drive Write Back Cache: Disabled
Timeout Retry Maximum: 3
Attempt Timeout: 8
Overall Timeout: 105
Drive Spin Down Non-Vdisk Enable: Disabled
Drive Spin Down Non-Vdisk Delay: 0

Success: Command completed successfully. (2012-01-18 15:00:13)
```

Basetypes
- drive-parameters
- status

See also
- set disk-parameters

show disks

Description Shows information about disks in the storage system. If no parameter is specified, the command shows information for all installed disks.

📝 **NOTE:** In console format, to aid reading, disks are sorted to display in order by enclosure and disk number. In API formats, output is not sorted because it is expected to be manipulated by a host application.

Syntax To show information about disks:

```
show disks
    [disks]|[free]|[all]|[vdisk vdisk]
    [perf]
```

To show information about all disk slots:

```
show disks encl
```

Parameters *disks*
Optional. IDs of the disks to show information about. For disk syntax, see "Command syntax" on page 19.

free
Optional. Shows information about all disks that are available.

all
Optional. Shows information about all installed disks.

vdisk *vdisk*
Optional. Shows information for disks in the specified vdisk. For vdisk syntax, see "Command syntax" on page 19.

perf
Optional. 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.

encl
Optional. Shows information about each disk slot, whether it contains a disk or not. Do not specify this parameter with other parameters; they will be ignored.

Output **Without the `encl` option:**

Location
Disk's enclosure ID and slot number

Serial Number
Disk serial number

Vendor
Disk vendor

Rev
Firmware revision number

How Used

- `AVAIL`: Available
- `FAILED`: The disk is unusable and must be replaced. Reasons for this status include: excessive media errors; SMART error; disk hardware failure; unsupported disk.
- `GLOBAL SP`: Global spare
- `LEFTOVR`: Leftover
- `VDISK`: Used in a vdisk
- `VDISK SP`: Spare assigned to a vdisk

Any jobs running on the disk or its vdisk follow the How Used value:

- `DRSC`: The disk is being scrubbed
- `EXPD`: The vdisk is being expanded
- `INIT`: The vdisk is being initialized
- `RCON`: The vdisk is being reconstructed
- `VRFY`: The vdisk is being verified
- `VRSC`: The vdisk is being scrubbed
- `CPYBK`: The vdisk is being used in a copyback operation

Type

- SAS: Dual-port SAS
- SAS MDL: Midline SAS
- sSAS: Dual-port SAS SSD

`Job%`
If a job is running, the percent complete

`Speed (kr/min)`
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`
Disk capacity

`Rate*(Gbit/s)`
Data transfer rate in Gbit/second. A footnote indicates that it is normal behavior for the rate to vary.

Some 6 Gbit/s disks might not consistently support a 6 Gbit/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3 Gbit/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.

`SP`

- 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.

`Recon State`
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.

`Copyback State`
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.

`Health`

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

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

With the `encl` option:

`Status`

- `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 DSD 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.

`Encl`
Enclosure number where the disk is located

`Slot`
Slot number in the enclosure where the disk is located

`Vendor`
Disk vendor

`Model`
Disk model number

`Serial Number`
Disk serial number

`Size`
Disk size

Example Show information for all installed disks:

```
# show disks
Location  Serial Number  Vendor  Rev  How Used   Type     Job%  Speed (kr/min)
   Size      Rate*(Gbit/s)  SP  Recon State  Copyback State  Health
   Health Reason   Health Recommendation
-------------------------------------------------------------------------------
0.0       SN             Vendor  Rev  VDISKVRSC  SAS MDL  26%   7
   3000.5GB  6.0                 N/A           N/A             OK

0.0       SN             Vendor  Rev  VDISKVRSC  SAS MDL  26%   7
   3000.5GB  6.0                 N/A           N/A             OK
...
-------------------------------------------------------------------------------
Info: * Rates may vary. This is normal behavior. (2012-09-04 12:53:41)

Success: Command completed successfully. (2012-09-04 12:53:41)
```

Show information for all disk slots:

```
# show disks encl
Status      Encl  Slot  Vendor  Model  Serial Number  Size
------------------------------------------------------------------
Up          0     0     vendor  model  SN             3000.5GB
Not Present 0     1     N/A     N/A    N/A            N/A
...
------------------------------------------------------------------

Success: Command completed successfully. (2012-09-04 12:53:41)
```

Show performance statistics for all installed disks:

```
# show disks perf
Location  Serial Number  Vendor  Rev  How Used   Type     Job%  Speed (kr/min)
   Size      Rate*(Gbit/s)  SP  Recon State  Copyback State  Total I/Os
   Data Transferred  I/O Resp Time  Health  Health Reason  Health Recommendation
-------------------------------------------------------------------------------
0.0       SN             Vendor  Rev  VDISKVRSC  SAS MDL  26%   7
   3000.5GB  6.0                 N/A           N/A             159092
   8434.2MB       61168          OK
0.1       SN             Vendor  Rev  VDISKVRSC  SAS MDL  26%   7
   3000.5GB  6.0                 N/A           N/A             158885
   8425.4MB       51673          OK
...
-------------------------------------------------------------------------------
Info: * Rates may vary. This is normal behavior. (2012-01-18 12:57:41)

Success: Command completed successfully. (2012-01-18 12:57:41)
```

Basetypes
- drives
- enclosure-list
- status

See also
- show vdisks

show disk-statistics

Description Shows live or historical performance statistics for disks. You can view live statistics for all or specified disks, or historical statistics for a specified disk. The system samples disk-performance statistics every quarter hour and retains performance data for 6 months.

The historical option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters; if both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

Properties shown only in XML API format are described in "XML API basetype properties" on page 251.

Syntax To show live statistics:

```
show disk-statistics [disks]
```

To show historical statistics:

```
show disk-statistics
    disk
    historical
    [time-range "date/time-range"]
    [count number-of-data-samples]
    [all]
```

Parameters *disks*
Optional. Identifies one or more disks to show live statistics for. If this parameter is omitted, statistics will be shown for all disks. For disk syntax, see "Command syntax" on page 19.

disk
Identifies one disk to show historical statistics for. For disk syntax, see "Command syntax" on page 19.

`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.

`count number-of-data-samples`
Optional. Specifies the number of data samples to display, from 1–100. 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.

`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.

Output (Live) `Durable ID`
Disk ID in the form `disk_enclosure-number.disk-number`.

`Serial Number`
Disk serial number.

```
Bytes per second
```
Data transfer rate 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
```
IOPS 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
```
Number of read operations since these statistics were last reset or since the controller was restarted.

```
Number of 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.

Output (Historical)
```
Durable ID
```
Disk ID in the form disk_*enclosure-number.disk-number*.

```
Serial Number
```
Disk serial number.

```
Total I/Os
```
Total number of read and write operations since the last sampling time.

```
Data Transferred
```
Total amount of data read and written since the last sampling time.

```
Total IOPS
```
Total number of read and write operations per second since the last sampling time.

```
Total B/s
```
Total data transfer rate, in bytes/s, since the last sampling time.

```
I/O Resp Time
```
Average response time, in microseconds, for read and write operations since the last sampling time.

```
Sample Time
```
Date and time, in the format *year-month-day hour:minutes:seconds*, when the data sample was taken.

Output (Historical, all)
```
Durable ID
```
Disk ID in the form disk_*enclosure-number.disk-number*.

```
Serial Number
```
Disk serial number.

```
Total I/Os
```
Total number of read and write operations since the last sampling time.

```
Number of Reads
```
Shown by the `all` parameter. Number of read operations since the last sampling time.

```
Number of Writes
```
Shown by the `all` parameter. Number of write operations since the last sampling time.

```
Data Transferred
```
Total amount of data read and written since the last sampling time.

Data Read
Shown by the `all` parameter. Amount of data read since the last sampling time.

Data Written
Shown by the `all` parameter. Amount of data written since the last sampling time.

Total IOPS
Total number of read and write operations per second since the last sampling time.

Read IOPS
Shown by the `all` parameter. Number of read operations per second since the last sampling time.

Write IOPS
Shown by the `all` parameter. Number of write operations per second since the last sampling time.

Total B/s
Total data transfer rate, in bytes/s, since the last sampling time.

Read B/s
Shown by the `all` parameter. Data transfer rate, in bytes/s, for read operations since the last sampling time.

Write B/s
Shown by the `all` parameter. Data transfer rate, in bytes/s, for write operations since the last sampling time.

Queue Depth
Shown by the `all` parameter. 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
Average response time, in microseconds, for read and write operations since the last sampling time.

Read Resp Time
Shown by the `all` parameter. Average response time, in microseconds, for read operations since the last sampling time.

Write Resp Time
Shown by the `all` parameter. Average response time, in microseconds, for write operations since the last sampling time.

Average I/O Size
Shown by the `all` parameter. Average data size of read and write operations since the last sampling time.

Average Read I/O Size
Shown by the `all` parameter. Average data size of read operations since the last sampling time.

Average Write I/O Size
Shown by the `all` parameter. Average data size of write operations since the last sampling time.

Number of Disk Errors
Shown by the `all` parameter. 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.

Example   Show live statistics for disks 1.1 and 2.1:

```
# show disk-statistics 1.1,2.1
Durable ID  Serial Number  Bytes per second  IOPS  Number of Reads
   Number of Writes  Data Read  Data Written  Reset Time
------------------------------------------------------------------
disk_1.1    SN                3936.2KB          67    23241330
   14457080         1309.8GB   857.1GB       2012-01-17 19:22:54
disk_2.1    SN                4972.0KB          85    33941798
   14529518         1935.5GB   846.1GB       2012-01-17 21:01:20
------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 12:53:55)
```

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"
Durable ID            Serial Number
-------------------------------------------
disk_1.5              SN

   Total I/Os  Data Transferred  Total IOPS  Total B/s  I/O Resp Time
      Sample Time
   ------------------------------------------------------------------
   183018      11.9GB            203         13.3MB     222
      2011-12-05 17:00:00
   1961773     128.5GB           2179        142.8MB    240
      2011-12-05 16:45:00
-------------------------------------------
Success: Command completed successfully. (2012-01-18 12:39:11)
```

Show all samples of historical statistics for disk 1.5:

```
# show disk-statistics 1.5 historical all
Durable ID            Serial Number
-------------------------------------------
disk_1.5              SN

   Total I/Os   Number of Reads  Number of Writes  Data Transferred  Data Read
      Data Written  Total IOPS  Read IOPS  Write IOPS  Total B/s  Read B/s
      Write B/s  Queue Depth  I/O Resp Time  Read Resp Time  Write Resp Time
      Average I/O Size  Average Read I/O Size  Average Write I/O Size
      Number of Disk Errors  Sample Time
   ---------------------------------------------------------------------------
   121174       60588            60586             5800.5MB          2900.3MB
      2900.1MB      134         67         67          6445.0KB   3222.5KB
      3222.0KB   709072       13062          12759           13366
      47.6KB          47.6KB                    47.6KB
      0                       2012-01-18 12:30:00
      ...
-------------------------------------------
Success: Command completed successfully. (2012-01-18 12:39:27)
```

Basetypes
- disk-statistics (live)
- drive-summary (historical)
- status

See also
- reset all-statistics
- reset disk-error-statistics
- reset disk-statistics
- show controller-statistics
- show disks
- show host-port-statistics
- show vdisk-statistics
- show volume-statistics

show drive-parameters

Obsolete command. See "show disk-parameters" on page 154.

show email-parameters

Description Shows email (SMTP) notification parameters for events and managed logs.

Syntax `show email-parameters`

Output `Email Notification`

- `Disabled`: Email notification is disabled.
- `Enabled`: Email notification is enabled.

`Email Notify Filter`

Shows the minimum severity for which the system should send event notifications:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables email notification and clears the settings.

This parameter does not apply to managed-logs notifications.

`Email Address (1–3)`
Shows up to three email addresses for recipients of event notifications.

`Log Destination`
Shows the email address for the log collection system used by the managed logs feature.

`Email Server`
The IP address of the SMTP mail server to use for the email messages.

`Email Domain`
The domain name that, with the sender name, forms the "from" address for remote notification.

`Email Sender`
The sender name that, with the domain name, forms the "from" address for remote notification.

`Include Logs`
Shows whether system log files will automatically be attached to email notification messages generated by the managed logs feature. This is the "push" mode for managed logs.

Example Show settings for email notification:

```
# show email-parameters
Email Parameters (SMTP)
-----------------------
Email Notification: Enabled
Email Notify Filter: warn
Email Address 1: sysadmin@mydomain.com
Email Address 2:
Email Address 3:
Log Destination: logCollector@mydomain.com
Email Server: 10.1.1.10
Email Domain: mydomain.com
Email Sender: RAIDsystem
Include Logs: Disabled

Success: Command completed successfully. (2012-01-18 12:51:04)
```

Basetypes
- email-parameters
- status

See also
- set email-parameters

show enclosure-status

Obsolete command. See:

- show enclosures
- show frus
- show sensor-status

show enclosures

Description Shows information about the enclosures in the storage system. Full detail available in XML API output only.

Syntax `show enclosures`

Output `Encl`
Enclosure ID

`Encl WWN`
Enclosure WWN

`Name`
Enclosure name

`Location`
Enclosure location; blank if not set

`Rack`
Number of the rack containing the enclosure

`Pos`
Position of the enclosure in the rack

`Vendor`
Enclosure vendor

`Model`
Enclosure model

`EMP # CH:ID Rev`
EMP # Channel ID Revision. Address and firmware revision of the EMP in each controller's EC

`Midplane Type`

- `2U24-6Gv2`: Midplane for 2U, reduced-depth, 24-disk enclosure with 6 Gbit/s maximum data rate to disks
- `2U24-6G`: Midplane for 2U, 24-disk enclosure with 6 Gbit/s maximum data rate to disks
- `2U24-3G`: Midplane for 2U, 24-disk enclosure with 3 Gbit/s maximum data rate to disks
- `2U12-6Gv2`: Midplane for 2U, reduced-depth, 12-disk enclosure with 6 Gbit/s maximum data rate to disks
- `2U12-6G`: Midplane for 2U, 12-disk enclosure with 6 Gbit/s maximum data rate to disks
- `2U12-3G`: Midplane for 2U, 12-disk enclosure with 3 Gbit/s maximum data rate to disks
- `N/A`: Other type of midplane

`Health`

- `OK`
- `Degraded`
- `Fault`
- `Unknown`

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Example Show information about the enclosures:

```
# show enclosures
Encl  Encl WWN  Name         Location  Rack  Pos  Vendor    Model
   EMP A CH:ID  Rev  EMP B CH:ID Rev  Midplane Type  Health  Health Reason
   Health Recommendation
--------------------------------------------------------------------------
0     WWN       Controller  Lab        0     4    vendor    model
   01:031 1115       00:031 1115       2U24-3G       OK


--------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:01:05)
```

Basetypes
- enclosures
- io-modules
- status

See also
- set enclosure
- show sensor-status

show events

Description Shows events logged by each controller in the storage system. A separate set of event numbers is maintained for each controller. Each event number is prefixed with a letter identifying the controller that logged the event.

Events are listed from newest to oldest, based on a timestamp with one-second granularity; therefore the event log sequence matches the actual event sequence within about one second.

For further information about diagnosing and resolving problems, see:

- The troubleshooting chapter and the LED descriptions appendix in the *AssuredSAN 4000 Series Setup Guide*
- Topics about verifying component failure in the *AssuredSAN 4000 Series Service Guide*

Syntax To show a certain number of events:

```
show events
    [detail]
    [last #]
    [a|b|both|error]
```

To show events by time:

```
show events
    [detail]
    [from timestamp]
    [to timestamp]
    [a|b|both|error]
```

To show events by ID:

```
show events
    [detail]
    [from-event event-ID]
    [to-event event-ID]
    [a|b|both|error]
```

Parameters detail
Optional. Shows additional information and recommended actions for displayed events. This information is also in the *AssuredSAN 4000 Series Service Guide*.

last #
Optional. Shows the latest specified number of events. If this parameter is omitted, all events are shown.

from *timestamp*
Optional. Shows events including and after a timestamp specified with the format *MMDDYYhhmmss*. For example, 043011235900 represents April 30 2011 at 11:59:00 p.m. This parameter can be used with the to parameter or the to-event parameter.

to *timestamp*
Optional. Shows events before and including a timestamp specified with the format *MMDDYYhhmmss*. For example, 043011235900 represents April 30 2011 at 11:59:00 p.m. This parameter can be used with the from parameter or the from-event parameter.

`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.

`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.

`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.

Output
- Date and time when the event was logged
- Event code identifying the type of event to help diagnose problems; for example, `[181]`
- Event ID prefixed by `A` or `B`, indicating which controller logged the event; for example, `#A123`
- Model, serial number, and ID of the controller module that logged the event
- Severity:
  - `CRITICAL`: A failure occurred that may cause a controller to shut down. Correct the problem *immediately*.
  - `ERROR`: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible.
  - `WARNING`: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary.
  - `INFORMATIONAL`: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
- Event-specific message giving details about the event

Example 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 2011 at 11:59:00 p.m. through May 2 2011 at 11:59:00 a.m.:

```
# show events from 043011235900 to 050211115900
```

Show a range of events logged by controller A:

```
# show events from-event a100 to-event a123
```

Show detailed output for a specific event:

```
# show events from-event A2264 to-event A2264 detail
```

Basetypes
- events
- status

See also
- clear events
- set snmp-parameters
- show snmp-parameters

show expander-status

> △ **CAUTION:** For use by or with direction from a service technician.

Description Shows diagnostic information relating to SAS EC physical channels, known as PHY lanes. For each enclosure, this command shows status information for PHYs in IOM A and then IOM B.

Syntax `show expander-status`

Output `Encl`
Enclosure that contains the SAS expander.

`Ctlr`
IOM that contains the SAS expander.

`Phy`
Identifies a PHY's logical location within a group based on the PHY type. Logical IDs are 0–23 for drive PHYs; 0–1 for SC PHYs; and 0–3 for other PHYs. If the PHY's controller module or expansion module is not installed, this field shows "`--`".

`Type`

- `Drive`: 1-lane PHY that communicates between the expander and a disk drive.
- `Egress`: 4-lane PHY that communicates between the expander and an expansion port or SAS Out port.
- `SC-1`: (Controller module only) 2-lane PHY that communicates between the expander and the partner's expander.
- `SC-0`: (Controller module only) 4-lane PHY that communicates between the expander and the SC.
- `Ingress`: (Expansion module only) 4-lane PHY that communicates between the expander and an expansion port.
- `Inter-Exp`: (Expansion module only) Communicates between the expander and the partner's expander.
- `Undefined`: No status information is available.
- `Unused`: The PHY exists in the expander but is not connected, by design.

`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 IOM indicates it has fewer PHYs than the reporting IOM, 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 an SC or user.
- `Not ready`: PHY is enabled but not ready. Appears for SC-1 PHYs when the partner IOM is not installed. Appears for Drive, SC-1, or Ingress PHYs when a connection problem exists such as a broken connector.
- `Drive removed`: PHY disabled because drive slot is empty.
- `Unused - disabled by default`: PHY is disabled by default because it is not used.
- `Excessive Phy changes`: PHY is disabled because of excessive PHY change counts.

Example Show expander status with an empty disk slot:

```
# show expander-status
Encl  Ctlr  Phy  Type    Status             Elem Status   Disabled
      Reason
------------------------------------------------------------------
0     A     0    Drive   Enabled - Healthy  OK            Enabled
0     A     1    Drive   Enabled - Degraded Non-critical  Enabled
      Not ready
  ...
0     A     23   Drive   Disabled           OK            Disabled
      Drive removed
0     A     0    SC-1    Enabled - Healthy  OK            Enabled
0     A     1    SC-1    Enabled - Healthy  OK            Enabled
0     A     0    SC-0    Enabled - Healthy  OK            Enabled
  ...
0     A     3    SC-0    Enabled - Healthy  OK            Enabled
0     A     0    Egress  Enabled - Healthy  OK            Enabled
  ...
0     A     3    Egress  Enabled - Healthy  OK            Enabled
------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:02:13)
```

Basetypes
- sas-status-controller-a sas-status-controller-b
- status

See also
- clear expander-status
- set expander-fault-isolation
- set expander-phy

show fans

Description Shows information about each fan in the storage system.

Syntax `show fans`

Output `Name`
Fan name in the form `Fan loc:`*`position`*`-PSU `*`power-supply-ID`*. The position as viewed from the rear of the enclosure.

`Location`
Fan location in the form `Enclosure `*`enclosure-ID - position`*. The position as viewed from the rear of the enclosure.

`Status`

- `Up`
- `Warning`
- `Error`
- `Not Present`
- `Unknown`

`Speed`
Fan speed (revolutions per minute).

`Position`
Fan position, as viewed from the rear of the enclosure:

- Left
- Right

`Serial Number`
(blank): Not applicable.

`Firmware Version`
(blank): Not applicable.

`Hardware Version`
(blank): Not applicable.

`Health`

- `OK`
- `Degraded`
- `Fault`
- `Unknown`

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Example Show fan information:

```
# show fans
Name                     Location              Status  Speed  Position
    Serial Number  Firmware Version  Hardware Version  Health  Health Reason
    Health Recommendation
-----------------------------------------------------------------------
Fan Loc:left-PSU 0   Enclosure 0 - Left    Up       495    Left
                                                             OK


Fan Loc:right-PSU 1  Enclosure 0 - Right   Up       502    Right
                                                             OK


-----------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 13:28:22)
```

Basetypes • fan
  • status

See also • show power-supplies

show frus

Description Shows FRU information for the storage system. Some information is for use by service technicians.

Syntax `show frus`

Output `Name`

- `CHASSIS_MIDPLANE`: 2U chassis and midplane circuit board
- `RAID_IOM`: Controller module
- `BOD_IOM`: Expansion module
- `POWER_SUPPLY`: PSU

`Description`
FRU description

`Part Number`
FRU part number

`Serial Number`
FRU serial number

`Revision`
Hardware revision level

`Dash Level`
FRU template revision number

`FRU Shortname`
Short description

`Manufacturing Date`
Date and time in the format `year-month-day hour.minutes:seconds` when a PCBA was programmed or a PSU was manufactured

`Manufacturing Location`
City, state/province, and country where the FRU was manufactured

`Manufacturing Vendor ID`
JEDEC ID of the manufacturer

`FRU Location`
Location of the FRU in the enclosure:

- `MID-PLANE SLOT`: Chassis midplane
- `UPPER IOM SLOT`: Controller module or expansion module A
- `LOWER IOM SLOT`: Controller module or expansion module B
- `LEFT PSU SLOT`: PSU on the left, as viewed from the rear
- `RIGHT PSU SLOT`: PSU on the right, as viewed from the rear

`Configuration SN`
Configuration serial number

`FRU Status`

- `Absent`: Component is not present
- `Fault`: One or more subcomponents has a fault
- `OK`: All subcomponents are operating normally
- `Not Available`: Status is not available

`Enclosure ID`
Enclosure number

```
                Original SN
                For a PSU, the original manufacturer serial number; otherwise, does not display.

                Original PN
                For a PSU, the original manufacturer part number; otherwise, does not display.

                Original Rev
                For a PSU, the original manufacturer hardware revision; otherwise, does not display.
```

Example Show FRUs

```
                # show frus
                FRU
                ---
                Name: CHASSIS_MIDPLANE
                Description: Box 2U12 Chass+Midplane 6 GB V2
                Part Number: PN
                Serial Number: SN
                Revision: Rev
                Dash Level:
                FRU Shortname: Midplane/Chassis
                Manufacturing Date: 2012-02-29 13:00:25
                Manufacturing Location: Longhua, Schenzhen, CN
                Manufacturing Vendor ID: ID
                FRU Location: MID-PLANE SLOT
                Configuration SN: SN
                FRU Status: OK
                Enclosure ID: 0


                ...


                FRU
                ---
                Name: POWER_SUPPLY
                Description: FRU PSU 595W AC 2U
                Part Number: PN
                Serial Number: SN
                Revision: Rev
                Dash Level:
                FRU Shortname: AC Power Supply
                Manufacturing Date: 2012-02-18 07:45:09
                Manufacturing Location: Zhongshan, Guangdong, CN
                Manufacturing Vendor ID: ID
                FRU Location: LEFT PSU SLOT
                Configuration SN: SN
                FRU Status: OK
                Original SN: SN
                Original PN: PN
                Original Rev: Rev
                Enclosure ID: 0

                Success: Command completed successfully. (2012-01-18 15:02:52)
```

Basetypes • enclosure-sku
              • enclosure-fru
              • status

show host-maps

Description Shows mapping information for volumes that are mapped to all hosts or to a specified host.

Syntax `show host-maps [host]`

Parameters *host*
Optional. Specifies the host's nickname or ID. If this parameter is omitted, mapping information for all hosts is shown

Output `ID`
For FC and SAS: Host WWPN.

`Name`
Host port nickname.

`Name`
Name of the volume seen by the host.

`Serial Number`
Serial number of the volume seen by the host.

`LUN`
LUN used to access the volume.

`Access`
Type of host access to the volume:

- `read-write`: Read and write
- `read-only`: Read only
- `no-access`: No access

`Ports`
Controller host ports that the mapping applies to.

Example Show volume mappings for all hosts:

```
# show host-maps
Host View [ID (AABBCCDDEEFF0011) Name (Host1) ] Mapping:
   Name    Serial Number                     LUN    Access      Ports
   -----------------------------------------------------------------
   vd2_v2 SN                                 1      read-write  A0,A1,B0,B1
   vd2_v0 SN                                 10     read-write  A1,B1
   vd2_v1 SN                                        no-access

Host View [ID (1A2B3C4D5E6F8900) Name (Host2) ] Mapping:
   Name    Serial Number                     LUN    Access      Ports
   -----------------------------------------------------------------
   vd2_v2 SN                                 0      read-write  A0,A1,B0,B1
   vd2_v0 SN                                 10     read-only   A1,B
   vd2_v1 SN                                 11     read-write  A1

Host View [ID (210100E08B33340B) Name (Host3) ] Mapping:
   Name    Serial Number                     LUN    Access      Ports
   -----------------------------------------------------------------
   vd2_v2 SN                                 0      read-write  A0,A1,B0,B1
   vd2_v0 SN                                 10     read-only   A1,B1
   vd2_v1 SN                                        no-access

Success: Command completed successfully. (2012-01-18 15:02:52)
```

Basetypes • host-view
          • status

See also • show hosts
          • show volume-maps
          • show volumes

show host-parameters

Description Shows information about host ports on both controllers. This command shows the same information as the show ports command.

Syntax `show host-parameters`

Output `Ports`
Controller ID and port number

`Media`

- `FC(L)`: FC-AL (public or private)
- `FC(P)`: FC Point-to-Point
- `FC(-)`: FC disconnected
- `SAS`: SAS

`Target ID`
Port WWN

`Status`

- `Up`: Port is cabled and has an I/O link.
- `Disconnected`: Either no I/O link is detected or the port is not cabled.

`Speed (A)`
Actual link speed in Gbit/s. Blank if not applicable.

`Speed (C)`
Configured host-port link speed. Does not display for SAS.

- FC: `Auto`, `8Gb`, `4Gb`, or `2Gb` (Gbit/s)
- Blank if not applicable

`Health`

- `OK`
- `Degraded`
- `Fault`
- `N/A`

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

`Topo (C)`
FC only. Configured topology.

`Width`
SAS only. Number of PHY lanes in the SAS port. Displays instead of `PID`.

`PID`
FC only. Primary ID, or blank if not applicable. Displays instead of `Width`.

Example Show port information for a system with two FC ports:

```
# show host-parameters
Ports Media    Target ID         Status        Speed(A) Speed(C)  Health
    Health Reason                 Health Recommendation
-------------------------------------------------------------------------
A0    FC(L)    WWPN              Up            8Gb      Auto      OK
    OK


    Topo(C) PID
    ------------
    Loop    0


A1    FC(L)    WWPN              Up            8Gb      Auto      OK
    OK


    Topo(C) PID
    ------------
    Loop    0


-------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:03:24)
```

Show port information for a system with two SAS ports:

```
# show host-parameters
Ports Media    Target ID         Status        Speed(A)  Health
    Health Reason                 Health Recommendation
----------------------------------------------------------------
A0    SAS      WWPN              Up            Auto      OK


    Topo(C) Width
    -------------
    Direct  4


A1    SAS      WWPN              Disconnected  Auto      N/A
    There is no host connection to this host port.  - No action is required.

    Topo(C) Width
    -------------
    Direct  4


----------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:04:10)
```

Basetypes • port
• status

See also • set host-parameters
• show ports

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.

Syntax `show host-port-statistics [ports ports]`

Parameters `ports ports`
Optional. The controller ID and port number of ports to show information about. For port syntax, see "Command syntax" on page 19. If this parameter is omitted, information is shown for all host ports.

Output `Durable ID`
Host port ID in the form `hostport_controller-ID-and-port-number.`

`Bytes per second`
Data transfer rate 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`
IOPS 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`
Number of read operations since these statistics were last reset or since the controller was restarted.

`Number of 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.

`Queue Depth`
Number of pending I/O operations being serviced.

`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.

`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.

Example Show host-port statistics:

```
# show host-port-statistics
Durable ID   Bytes per second  IOPS  Number of Reads  Number of Writes
   Data Read  Data Written  Queue Depth  I/O Resp Time  Read Resp Time
   Write Resp Time  Reset Time
----------------------------------------------------------------------
hostport_A0  72.0MB            549   45372779         5020328
   5947.1GB   657.8GB       0            1517248        1106826
   5226569          2012-01-17 21:01:20
...
----------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 16:25:41)
```

Basetypes
- host-port-statistics
- status

See also
- reset all-statistics
- reset host-port-statistics
- show controller-statistics
- show disk-statistics
- show ports
- show vdisk-statistics
- show volume-statistics

show host-wwn-names

Obsolete command. See "show hosts" on page 186.

show hosts

Description Shows hosts to which volumes can be mapped.

Host entries are created in two ways:

- Hosts are automatically detected. Entries are created for hosts that have sent an `inquiry` command or a `report luns` command to the system. Hosts typically do this when they boot up or scan 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 nickname for the host.
- Hosts are not automatically detected. Hosts are created by the user by assigning nicknames.

This command shows all hosts.

Syntax `show hosts`

Output `Host ID`
Host WWPN node name

`Host Name`
Host nickname

`Discovered`

- `Yes`: The host was discovered and its entry was automatically created.
- `No`: The host entry was manually created.
- `No`: No volumes are explicitly mapped to the host.

`Mapped`
Shows whether the host is explicitly mapped to any volumes:

- `Yes`: At least one volume is explicitly mapped to the host.

`Host Type`

- If the host was discovered and its entry was automatically created, its host-interface type: `FC` or `SAS`.
- If the host entry was manually created: `Undefined`.

Example Show hosts:

```
# show hosts
Host ID   Host Name  Discovered  Mapped  Host Type
-------------------------------------------------
ID                   Yes         No      FC
ID        My-host    Yes         Yes     FC
...
-------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:04:59)
```

Basetypes
- hosts
- status

See also
- create host
- delete host
- set host-name

show inquiry

Description Shows inquiry data for each controller module.

Syntax `show inquiry`

Output
- Vendor name, Product ID, and SCSI Vendor ID
- Management Controller Code Version and Management Controller Loader Code Version
- Storage Controller Code Version and Storage Controller Loader Code Version
- Serial Number
- MAC Address
- IP Address

Example Show inquiry data for a system in which controller B is not installed:

```
# show inquiry
Product Information
-------------------
Vendor Name:
Product ID: model
SCSI Vendor ID: vendor

Inquiry Controller A
--------------------
Management Controller Code Version: value
Management Controller Loader Code Version: value
Storage Controller Code Version: value
Storage Controller Loader Code Version: value
Serial Number: SN
MAC Address: 00:C0:FF:29:41:60
IP Address: 10.134.1.100

Inquiry Controller B
--------------------
Management Controller Code Version: Not Present
Management Controller Loader Code Version: Not Present
Storage Controller Code Version: Not Present
Storage Controller Loader Code Version: Not Present
Serial Number: Not Present
MAC Address: Not Present
IP Address: Not Present

Success: Command completed successfully. (2012-01-18 15:05:25)
```

Basetypes
- inquiry
- status

See also
- versions

show job-parameters

Description Shows parameters for background vdisk scrub, PFU, and other jobs.

Syntax `show job-parameters`

Output `Vdisk Background Scrub`
Shows whether disks in vdisks are automatically checked for disk defects to ensure system health.

- `Disabled`: Background vdisk scrub is disabled.
- `Enabled`: Background vdisk scrub is enabled.

`Partner Firmware Upgrade`
Shows whether component firmware versions are monitored and will be automatically updated on the partner controller.

- `Disabled`: PFU is disabled.
- `Enabled`: PFU is enabled.

`Utility Priority`
Priority at which data-redundancy utilities, such as vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk 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.

Example Show a system's job parameters:

```
# show job-parameters
Job Parameters
--------------
Vdisk Background Scrub: Disabled
Partner Firmware Upgrade: Enabled
Utility Priority: High

Success: Command completed successfully. (2012-01-18 15:07:25)
```

Basetypes
- job-parameters
- status

See also
- set job-parameters

show network-parameters

Description Shows the settings and health of each controller module's network port.

Syntax `show network-parameters`

Output `IP Address`
Network port IP address

`Gateway`
Network port gateway IP address

`Subnet Mask`
Network port IP subnet mask

`MAC Address`
Controller's unique MAC address

`Addressing Mode`

- `Manual`: Network settings set manually (statically)
- `DHCP`: DHCP used to set network parameters

`Health`

- `OK`
- `N/A`

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Example Show network parameters for a storage system using DHCP:

```
# show network-parameters
Network Parameters Controller A
------------------------------
IP Address: 10.134.129.188
Gateway: 10.134.0.1
Subnet Mask: 255.255.0.0
MAC Address: 00:C0:FF:0A:A3:26
Addressing Mode: DHCP
Health: OK
Health Reason:
Health Recommendation:

Network Parameters Controller B
------------------------------
IP Address: 10.134.129.189
Gateway: 10.134.0.1
Subnet Mask: 255.255.0.0
MAC Address: 00:C0:FF:0A:A3:14
Addressing Mode: DHCP
Health: OK
Health Reason:
Health Recommendation:

Success: Command completed successfully. (2012-01-18 15:09:03)
```

Show network parameters for a storage system using manual addressing:

```
# show network-parameters
Network Parameters Controller A
-------------------------------
IP Address: 172.22.1.200
Gateway: 172.22.1.1
Subnet Mask: 255.255.255.0
MAC Address: 00:C0:FF:0A:43:18
Addressing Mode: Manual
Health: OK
Health Reason:
Health Recommendation:

Network Parameters Controller B
-------------------------------
IP Address: 172.22.1.201
Gateway: 172.22.1.1
Subnet Mask: 255.255.255.0
MAC Address: 00:C0:FF:0A:43:26
Addressing Mode: Manual
Health: OK
Health Reason:
Health Recommendation:

Success: Command completed successfully. (2012-01-18 15:09:03)
```

Basetypes
- network-parameters
- status

See also
- set network-parameters

show ntp-status

Description Shows the status of the use of NTP in the system.

Syntax show ntp-status

Output NTP Status
- `activated`: NTP is enabled
- `deactivated`: NTP is disabled

NTP Server Address
NTP server IP address, or 0.0.0.0 if not set

Last Server Contact
Date and time in the format *year-month-day hour*:*minutes*:*seconds* of the last message received from the NTP server; or none

Example Show NTP status for the system:

```
# show ntp-status
NTP Status
----------
NTP Status: activated
NTP Server Address: 69.10.36.3
Last Server Contact: 2012-01-18 15:30:44

Success: Command completed successfully. (2012-01-18 15:39:41)
```

Basetypes
- ntp-status
- status

See also
- set controller-date

show output-format

Obsolete command. See "show cli-parameters" on page 144.

show port-wwn

Obsolete command. See "show ports" on page 194.

show ports

Description Shows information about host ports on both controllers. This command shows the same information as the show host-parameters command.

Syntax `show ports`

Output Ports
Controller ID and port number

Media

- `FC(P):` FC Point-to-Point (public or private)
- `FC(L):` FC-AL
- `FC(-):` Not applicable, as when the port is disconnected
- `SAS:` SAS

Target ID
Port WWN

Status
Whether the port is operational, has a problem, or is disconnected

Speed (A)
Actual host-port link speed, or blank if not applicable.

Speed (C)
Configured host-port link speed. Does not display for SAS.

- FC: `Auto`, `8Gb`, `4Gb`, or `2Gb` (Gbit/s)
- Blank if not applicable

Health

- `OK`
- `Degraded`
- `Fault`
- `N/A`

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

Health Recommendation
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Topo (C)
FC only. Configured topology.

Width
SAS only. Number of PHY lanes in the SAS port. Displays instead of PID.

PID
FC only. Primary ID, or blank if not applicable. Displays instead of Width.

Example Show port information for a system with two FC ports:

```
# show ports
Ports Media     Target ID          Status       Speed(A) Speed(C)  Health
   Health Reason                   Health Recommendation
------------------------------------------------------------------------
A0   FC(L)   WWPN                Up            8Gb     Auto      OK
   OK

    Topo(C) PID
    ------------
    Loop    0


A1   FC(L)   WWPN                Up            8Gb     Auto      OK
   OK

    Topo(C) PID
    ------------
    Loop    0


------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:03:24)
```

Show port information for a system with two SAS ports:

```
# show ports
Ports Media     Target ID          Status       Speed(A)  Health
   Health Reason                   Health Recommendation
----------------------------------------------------------------
A0   SAS     WWPN                Up            Auto    OK

    Topo(C) Width
    --------------
    Direct  4

A1   SAS     WWPN                Disconnected  Auto    N/A
   There is no host connection to this host port.  - No action is required.

    Topo(C) Width
    --------------
    Direct  4


----------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 15:04:10)
```

Basetypes
- port
- status

See also
- set host-parameters

show power-supplies

Description Shows information about each PSU in the storage system.

Syntax `show power-supplies`

Output `Encl`
Enclosure ID

`Serial Number`
PSU serial number

`Name`
PSU identifier and location

`Health`

- `OK`

- `Degraded`

- `Fault`

- `Unknown`

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Example Show power-supply information:

```
# show power-supplies
Encl   Serial Number  Name          Health  Health Reason  Health Recommendation
-------------------------------------------------------------------------------
0      SN             PSU 0, Left   OK

0      SN             PSU 1, Right  OK


-------------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-18 12:08:57)
```

Basetypes
- unhealthy-component
- power-supplies
- fan
- status

See also
- show fans
- show frus

show protocols

Description Shows which management services and protocols are enabled or disabled.

Syntax `show protocols`

Example Show the status of service and security protocols:

```
# show protocols
Service and Security Protocols
------------------------------
Web Browser Interface (HTTP): Enabled
Secure Web Browser Interface (HTTPS): Enabled
Command Line Interface (Telnet): Enabled
Secure Command Line Interface (SSH): Enabled
Storage Management Initiative Specification (SMI-S): Enabled
Unsecure Storage Management Initiative Specification (SMI-S 5988): Disabled
File Transfer Protocol (FTP): Disabled
Simple Network Management Protocol (SNMP): Enabled
Service Debug (Debug): Disabled
In-band SES Management (SES): Enabled

Success: Command completed successfully. (2012-01-18 15:13:23)
```

Basetypes • security-communications-protocols
          • status

See also • set protocols

show redundancy-mode

Description   Shows the redundancy status of the system.

Syntax   `show redundancy-mode`

Output   `Controller Redundancy Mode`
Shows the system's operating mode, also called the cache redundancy mode:

- `Independent Cache Performance Mode`: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
- `Active-Active ULP`: Both controllers are active using ULP. Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance.
- `Fail Over`: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy.
- `Down`: Both controllers are not operational.

`Controller Redundancy Status`

- `Redundant with independent cache`: Both controllers are operational but are not mirroring their cache data to each other.
- `Redundant`: Both controllers are operational.
- `Operational but not redundant`: In active-active mode, one controller is operational and the other is offline.
- `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 partner MC.

- `Operational`
- `Not operational`

Example   From either controller, show the redundancy status of a dual-controller system where both controllers are operating:

```
# show redundancy-mode
System Redundancy
-----------------
Controller Redundancy Mode: Active-Active ULP
Controller Redundancy Status: Redundant
Controller A Status: Operational
Controller A Serial Number: SN
Controller B Status: Operational
Controller B Serial Number: SN
Other MC Status: Operational

Success: Command completed successfully. (2012-01-18 11:02:36)
```

From either controller, show the redundancy status of a dual-controller system where controller B is down:

```
# show redundancy-mode
System Redundancy
-----------------
Controller Redundancy Mode: Fail Over
Controller Redundancy Status: Operational but not redundant
Controller A Status: Operational
Controller A Serial Number: SN
Controller B Status: Down
Controller B Serial Number: SN
Other MC Status: Not Operational

Success: Command completed successfully. (2012-02-01 11:03:39)
```

From either controller, show the redundancy status of a dual-controller system where both controllers are down:

```
# show redundancy-mode
System Redundancy
-----------------
Controller Redundancy Mode: Down
Controller Redundancy Status: Down
Controller A Status: Down
Controller A Serial Number: SN
Controller B Status: Down
Controller B Serial Number: SN
Other MC Status: Not Operational

Success: Command completed successfully. (2012-02-01 11:03:39)
```

Basetypes
- redundancy
- status

show refresh-counters

Description In XML API format only, shows when the data represented by the basetype was last updated.

The value 0 means the data has never been updated and is not cached. A value other than 0 is a timestamp indicating that the data has been updated. If the value has changed since the last time you called this command then the data has changed.

Syntax `show refresh-counters`

Basetypes
- refresh-counters
- status

See also
- set cli-parameters

show sas-link-health

Description Shows the condition of SAS expansion-port connections.

Syntax `show sas-link-health`

Output `Encl`
Enclosure ID

`Ctlr`
ID of the controller module or expansion module

`Name`

- `Out Port`: Egress (expansion) port on controller module or an expansion module. Can be connected to an ingress port on an expansion module.
- `In Port`: Ingress port on an expansion module. Can be connected to an egress (expansion) port on a controller module or an expansion module.

`Status`

- `Up`
- `Disconnected`
- `Not Present`
- `Warning`
- `Error`
- `Unknown`

`Health`

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

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

`Health Recommendation`
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Example   Show the condition of SAS port connections in a two-enclosure system:

```
# show sas-link-health
Encl      Ctlr      Name                 Status            Health
    Health Reason  Health Recommendation
---------------------------------------------------------------------
0         A         Out Port             Up                OK
0         B         Out Port             Up                OK
---------------------------------------------------------------------
Encl      Ctlr      Name                 Status            Health
    Health Reason
    Health Recommendation
---------------------------------------------------------------------
1         A         Out Port             Disconnected      N/A
    No drive enclosure is connected to this expansion port. This is normal if
    this is the last (or only) enclosure in the cabling sequence of the system.
    - No action is required.
1         A         In Port              Up                OK


1         B         Out Port             Disconnected      N/A
    No drive enclosure is connected to this expansion port. This is normal if
    this is the last (or only) enclosure in the cabling sequence of the system.
    - No action is required.
1         B         In Port              Up                OK



---------------------------------------------------------------
Success: Command completed successfully. (2012-01-19 10:10:13)
```

Basetypes • expander-ports

• status

show schedule-details

Description   Shows information about a specified task schedule.

Syntax   show schedule-details *schedule*

Parameters   *schedule*
Schedule name.

Example   Show information about task schedule Sched1:

```
# show schedule-details Sched1
Schedule Details
----------------
Schedule Name: Sched1
Schedule Specification: Start 2011-10-19 23:47:00, Every 3 Minutes
Status: Ready
Next Time: 2011-10-23 12:59:00
Task To Run: Task1
Error Message:

    Tasks
    -----
    Task Name: Task1
    Task Type: DisableDSD
    Status: Ready
    Task State: Start
    Error Message:

Success: Command completed successfully. (2011-10-10 15:25:34)
```

Basetypes   • schedules
• status

See also   • create schedule
• delete schedule
• show schedules

show schedules

Description Shows information about all task schedules.

Syntax `show schedules`

Example Show information about all task schedules:

```
# show schedules
Schedule Details
----------------
Schedule Name: Sched1
Schedule Specification: Start 2011-10-19 23:47:00, Every 3 Minutes
Status: Ready
Next Time: 2012-10-19 23:50:00
Task To Run: Task1
Error Message:

    Tasks
    -----
    Task Name: Task1
    Task Type: DisableDSD
    Status: Ready
    Task State: Start
    Error Message:

Schedule Details
----------------
Schedule Name: Sched2
Schedule Specification: Start 2012-10-19 23:47:00, Every 10 Minutes
Status: Ready
Next Time: 2012-10-19 23:57:00
Task To Run: Task2
Error Message:

    Tasks
    -----
    Task Name: Task2
    Task Type: EnableDSD
    Status: Ready
    Task State: Start
    Error Message:

Success: Command Completed successfully. (2012-04-26 10:28:47
```

Basetypes
- schedules
- status

See also
- create schedule
- delete schedule
- show schedule-details

show sensor-status

Description Shows the status of each environmental sensor in each enclosure.

Information shown only for a controller enclosure: on-board temperature, disk controller temperature, memory controller temperature, supercapacitor voltage and charge, overall unit (enclosure) status.

Information shown for all enclosures: temperature, voltage, and current for each IOM (controller module or expansion module); temperature, voltage, and current for each PSU.

Normal and error ranges for temperature and voltage are specified in the *AssuredSAN 4000 Series Setup Guide*.

Syntax `show sensor-status`

Output `Encl`
Enclosure number.

`Sensor Name`
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.
- `Error`: 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 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.

Example Show sensor status for a system that includes a controller enclosure and a drive enclosure:

```
# show sensor-status
Encl   Sensor Name                       Value    Status
--------------------------------------------------------
0      On-Board Temperature 1-Ctlr A     55 C     OK
0      On-Board Temperature 1-Ctlr B     54 C     OK
0      On-Board Temperature 2-Ctlr A     76 C     OK
0      On-Board Temperature 2-Ctlr B     69 C     OK
0      On-Board Temperature 3-Ctlr A     53 C     OK
0      On-Board Temperature 3-Ctlr B     55 C     OK
0      Disk Controller Temp-Ctlr A       31 C     OK
0      Disk Controller Temp-Ctlr B       30 C     OK
0      Memory Controller Temp-Ctlr A     71 C     OK
0      Memory Controller Temp-Ctlr B     76 C     OK
0      Capacitor Pack Voltage-Ctlr A     8.20     OK
0      Capacitor Pack Voltage-Ctlr B     8.12     OK
0      Capacitor Cell 1 Voltage-Ctlr A   2.04     OK
0      Capacitor Cell 1 Voltage-Ctlr B   2.02     OK
0      Capacitor Cell 2 Voltage-Ctlr A   2.04     OK
0      Capacitor Cell 2 Voltage-Ctlr B   2.08     OK
0      Capacitor Cell 3 Voltage-Ctlr A   2.03     OK
0      Capacitor Cell 3 Voltage-Ctlr B   2.02     OK
0      Capacitor Cell 4 Voltage-Ctlr A   2.08     OK
0      Capacitor Cell 4 Voltage-Ctlr B   2.00     OK
0      Capacitor Charge-Ctlr A           100%     OK
0      Capacitor Charge-Ctlr B           100%     OK
0      Overall Unit Status               OK       OK
0      Temperature Loc: upper-IOM A      42 C     OK
0      Temperature Loc: lower-IOM B      38 C     OK
0      Temperature Loc: left-PSU         33 C     OK
0      Temperature Loc: right-PSU        36 C     OK
0      Voltage 12V Loc: upper-IOM A      11.92    OK
0      Voltage 5V Loc: upper-IOM A       5.08     OK
0      Voltage 12V Loc: lower-IOM B      11.86    OK
0      Voltage 5V Loc: lower-IOM B       5.08     OK
0      Voltage 12V Loc: left-PSU         11.93    OK
0      Voltage 5V Loc: left-PSU          5.11     OK
0      Voltage 3.3V Loc: left-PSU        3.48     OK
0      Voltage 12V Loc: right-PSU        12.04    OK
0      Voltage 5V Loc: right-PSU         5.13     OK
0      Voltage 3.3V Loc: right-PSU       3.49     OK
0      Current 12V Loc: upper-IOM A      4.33     OK
0      Current 12V Loc: lower-IOM B      4.42     OK
0      Current 12V Loc: left-PSU         5.17     OK
0      Current 5V Loc: left-PSU          7.24     OK
0      Current 12V Loc: right-PSU        5.80     OK
0      Current 5V Loc: right-PSU         7.15     OK
--------------------------------------------------------
Success: Command completed successfully. (2011-10-10 15:26:37)
```

Basetypes
- sensors
- status

show shutdown-status

Description Shows whether each SC is active or shut down.

Syntax `show shutdown-status`

Output `Controller A`

- `Up` (active)
- `Down` (shut down or killed)
- `Not installed`

`Controller B`

- `Up` (active)
- `Down` (shut down or killed)
- `Not installed`

`Other MC Status`
The operational status of the partner MC.

- `Operational`
- `Not operational`

Example Show the shutdown status of each controller:

```
# show shutdown-status
Controller A: Up
Controller B: Down
Other MC Status: Operational

Success: Command completed successfully. (2011-10-10 15:26:37)
```

Basetypes
- shutdown-status
- status

See also
- restart
- shutdown

show snmp-parameters

Description Shows SNMP settings for event notification.

Syntax `show snmp-parameters`

Output `SNMP Trap Notification Level`

- `crit`: Only Critical events are sent as traps
- `error`: Error and Critical events are sent as traps
- `warn`: Warning, Error, and Critical events are sent as traps
- `info`: All events are sent as traps
- `none`: No events are sent as traps and traps are disabled

`SNMP Trap Host IP#`
IP address of each trap host

`SNMP read community`
Community string for read-only access (not shown to Monitor users)

`SNMP write community`
Community string for write access (not shown to Monitor users)

Example Show SNMP notification settings:

```
# show snmp-parameters
SNMP Trap Notification Level: crit
SNMP Trap Host IP1: 172.22.4.171
SNMP Trap Host IP2: 0.0.0.0
SNMP Trap Host IP3: 0.0.0.0
SNMP read community: public
SNMP write community: private

Success: Command completed successfully. (2012-01-19 15:27:59)
```

Basetypes
- snmp-parameters
- status

See also
- set snmp-parameters
- set protocols
- show protocols

show syslog-parameters

Description Shows syslog notification parameters for events and managed logs.

Syntax `show syslog-parameters`

Output `Syslog Host IP`
The IP address of the remote syslog server to use for the notifications.

`Syslog Notification Level`
The minimum severity for which the system sends notifications:

- `crit`: Sends notifications for Critical events only.
- `error`: Sends notifications for Error and Critical events.
- `warn`: Sends notifications for Warning, Error, and Critical events.
- `info`: Sends notifications for all events.
- `none`: Disables syslog notification and clears the settings.

`Syslog Host Port`
The port on which the remote syslog facility is expected to listen for notifications.

Example
```
# show syslog-parameters
Syslog Parameters
-----------------
Syslog Host IP: 10.127.10.10
Syslog Notification Level: info
Syslog Host Port: 514

Success: Command completed successfully (2012-08-20 11:42:36)
```

See also
- set syslog-parameters

show system

Description Shows information about the system. If the system's health is not `OK`, each unhealthy component is listed with information to help you resolve the health problem.

Syntax `show system`

Output `System Name`
Storage system name.

`System Contact`
The name of 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's configured.

`Midplane Serial Number`
The serial number of the controller enclosure midplane.

`Vendor Name`
Vendor name.

`Product ID`
Product model identifier.

`Product Brand`
Product brand name.

`SCSI Vendor ID`
Vendor name returned by the `SCSI INQUIRY` command.

`SCSI Product ID`
Product identifier returned by the `SCSI INQUIRY` command.

`Enclosure Count`
Number of enclosures in the storage system.

`Health`

- `OK`
- `Degraded`
- `Fault`
- `Unknown`

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

`Other MC Status`
The operational status of the partner MC.

- `Operational`
- `Not operational`

`PFU Status`
Shows whether PFU is running on the system.

- `Running`
- `Idle`

`Supported Locales`
Supported display languages: English, Spanish, French, German, Italian, Japanese, Dutch, Chinese-Simplified, Chinese-Traditional, Korean.

Example Show information for a system whose health is `OK`:

```
# show system
System Information
------------------
System Name: Storage-1
System Contact: J. Smith
System Location: Main lab
System Information: Used for order processing data
Midplane Serial Number: SN
Vendor Name: vendor
Product ID: product
Product Brand: brand
SCSI Vendor ID: vendor-ID
SCSI Product ID: product-ID
Enclosure Count: 2
Health: OK
Health Reason:
Other MC Status: Operational
PFU Status: Idle
Supported Locales: English, Spanish, French, German, Italian, Japanese, Dutch,
Chinese-Simplified, Chinese-Traditional, Korean

Success: Command completed successfully. (2011-10-10 15:28:14)
```

Show information for a system whose health is degraded because of a problem with a vdisk:

```
# show system
System Information
------------------
System Name: Storage-2
System Contact: J. Smith
System Location: Main lab
System Information: Used for testing
Midplane Serial Number: SN
Vendor Name: vendor
Product ID: product
Product Brand: brand
SCSI Vendor ID: vendor-ID
SCSI Product ID: product-ID
Enclosure Count: 1
Health: Degraded
Health Reason: See the information about unhealthy components for guidance.
Other MC Status: Operational
PFU Status: Idle
Supported Locales: English, Spanish, French, German, Italian, Japanese, Dutch,
Chinese-Simplified, Chinese-Traditional, Korean

    Unhealthy Component
    -------------------
    Component ID: Vdisk vd01
    Health: Degraded
    Health Reason: The vdisk is not fault tolerant. Reconstruction cannot start
    because there is no spare disk available of the proper type and size.
    Health Recommendation: - Replace the failed disk.
    - Configure the new disk as a spare so the system can start reconstructing
    the vdisk.
    - To prevent this problem in the future, configure one or more additional
    disks as spare disks.

Success: Command completed successfully. (2012-01-19 10:37:52)
```

Basetypes
- system
- unhealthy-component
- status

See also
- set system

show system-parameters

Description Shows the current settings for the storage system.

Syntax `show system-parameters`

Output ULP Enabled
Shows that the system is using ULP, 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 vdisk 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 ALUA extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.

Number of Host Ports
Number of host-interface ports in the controller enclosure

Maximum Disks
Number of disks that the system supports

Maximum Volumes
Number of volumes that the system supports

Maximum Vdisks
Number of vdisks that the system supports

Maximum LUNs
Number of LUNs that the system supports

Maximum Vdisks Per Controller
Number of vdisks that each controller supports

Local Controller
ID of the controller you are accessing

Serial Number
Last six digits of the midplane serial number.

Example Show current settings for the storage system:

```
# show system-parameters
System Parameters
-----------------
ULP Enabled: true
Number of Host Ports: value
Maximum Disks: value
Maximum Volumes: value
Maximum Vdisks: value
Maximum LUNs: value
Maximum Vdisks Per Controller: value
Local Controller: A
Serial Number: SN

Success: Command completed successfully. (2012-01-19 15:28:32)
```

Basetypes • system-parameters-table
• status

See also • set volume
• set vdisk

show task-details

Description Shows information about a specified task.

Syntax `show task-details task`

Parameters *task*
Task name.

Output

For an EnableDSD task:

`Task Name`
Task name

`Task Type`
`EnableDSD`

`Status`

- `Uninitialized`: Task is not yet ready to run
- `Ready`: Task is ready to run
- `Active`: Task is running
- `Error`: Task has an error
- `Invalid`: Task is invalid

`Task State`
Current step of the task; always `Start`

`Error Message`
Message if an error occurred while processing the task, or blank

For a DisableDSD task:

`Task Name`
Task name

`Task Type`
`DisableDSD`

`Status`

- `Uninitialized`: Task is not yet ready to run
- `Ready`: Task is ready to run
- `Active`: Task is running
- `Error`: Task has an error
- `Invalid`: Task is invalid

`Task State`
Current step of the task; always `Start`

`Error Message`
Message if an error occurred while processing the task, or blank

Example Show information about task `Task1`:

```
# show task-details Task1
Tasks
-----
Task Name: Task1
Task Type: DisableDSD
Status: Ready
Task State: Start
Error Message:

Success: Command completed successfully. (2012-10-19 15:28:33)
```

Basetypes
- tasks
- status

See also
- create schedule
- create task
- delete task
- show schedule-details
- show schedules
- show tasks

show tasks

Description Shows information about all tasks.

Syntax `show tasks`

Output

For an EnableDSD task:

```
Task Name
```
Task name

```
Task Type
EnableDSD
```

```
Status
```

- `Uninitialized`: Task is not yet ready to run
- `Ready`: Task is ready to run
- `Active`: Task is running
- `Error`: Task has an error
- `Invalid`: Task is invalid

```
Task State
```
Current step of the task; always `Start`

```
Error Message
```
Message if an error occurred while processing the task, or blank

For a DisableDSD task:

```
Task Name
```
Task name

```
Task Type
DisableDSD
```

```
Status
```

- `Uninitialized`: Task is not yet ready to run
- `Ready`: Task is ready to run
- `Active`: Task is running
- `Error`: Task has an error
- `Invalid`: Task is invalid

```
Task State
```
Current step of the task; always `Start`

```
Error Message
```
Message if an error occurred while processing the task, or blank

Example Show all tasks:

```
# show tasks
Tasks
-----
Task Name: taskDSDresume
Task Type: EnableDSD
Status: Ready
Task State: Start
Error Message:

Tasks
-----
Task Name: taskDSDsuspend
Task Type: DisableDSD
Status: Ready
Task State: Start
Error Message:

Success: Command completed successfully. (2012-01-19 15:28:52)
```

Basetypes
- tasks
- status

See also
- create schedule
- create task
- delete task
- show schedule-details
- show schedules
- show task-details

show unwritable-cache

Description   Shows the percentage of unwritable data in the system. 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.

Syntax   `show unwritable-cache`

Example   Show the percentage of unwritable cache data in the system:

```
# show unwritable-cache
Unwritable System Cache
-----------------------
Percent of unwritable cache in controller A: 0
Percent of unwritable cache in controller B: 0

Success: Command completed successfully. (2012-01-19 15:30:50)
```

Basetypes   • unwritable-cache

See also   • clear cache

show users

Description Shows configured user accounts.

Syntax `show users [user]`

Input `user`
Optional. User name to show settings for.

Output `Username`
User name.

`Roles`

- `monitor`: View-only access to selected user interfaces.
- `manage`: Modify access to selected user interfaces.
- `diagnostic`: Modify access to user interfaces and additional commands not available to `monitor` or `manage` users.

`User Type`
The user's experience level: `Novice`, `Standard`, `Advanced`, or `Diagnostic`. This parameter does not affect access to commands.

`User Locale`
Display language for this user.

`WBI`

- `x`: The user can access the WBI.
- (blank): The user cannot access this interface.

`CLI`

- `x`: The user can access the CLI.
- (blank): The user cannot access this interface.

`FTP`

- `x`: The user can access the FTP interface.
- (blank): The user cannot access this interface.

`SMI-S`

- `x`: The user can access the SMI-S interface.
- (blank): The user cannot access this interface.

`SNMP`

- `U`: The user can access the SNMPv3 interface and view the MIB.
- `T`: The user can access the SNMPv3 interface and receive trap notifications.
- (blank): The user cannot access this interface.

`Authentication Type`

- `MD5`: MD5 authentication.
- `SHA`: SHA authentication.
- `none`: No authentication.

`Privacy Type`

- `DES`
- `AES`
- `none`: No encryption.

Password
User password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password; it is shown in clear text for reference when configuring users in the corresponding management application.

Privacy Password
Encryption password for an SNMPv3 user whose privacy type is set to DES or AES. The password is shown in clear text for reference when configuring users in the corresponding management application.

Trap Host Address
SNMP trap destination for an SNMPv3 user that can receive trap notifications.

Example Show configured users:

```
# show users
Username  Roles          User Type  User Locale  WBI  CLI  FTP  SMI-S
   SNMP  Authentication Type  Privacy Type  Password
   Privacy Password  Trap Host Address
----------------------------------------------------------------------
ftp       manage,monitor Standard   English                   x
                                          ********
   ********
john      monitor        Standard   English      X
                                          ********
   ********
manage    manage,monitor Standard   English      x   x    x    x
                                          ********
   ********
monitor   monitor        Standard   English      X   x
                                          ********
   ********
----------------------------------------------------------------------
Success: Command completed successfully. (2012-02-19 15:31:12)
```

Basetypes
- users
- status

See also
- create user
- delete user
- set user

show vdisks

Description Shows information for all or specified vdisks.

Syntax
```
show vdisks
    [vdisks]
    [perf]
```

Parameters *vdisks*
Optional. Names or serial numbers of the vdisks to show information about. For vdisk syntax, see "Command syntax" on page 19.

perf
Optional. Shows performance statistics from the latest historical sample for each vdisk (aggregated from its member disks). Statistics shown include total amount of data transferred and average bytes/s.

Output Name
Vdisk name

Size
Vdisk size

Free
Vdisk free space

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

Pref
Controller that owns the vdisk and its volumes during normal operation

RAID
Vdisk RAID level

Disks
Number of disks in the vdisk

Spr
Number of spares assigned to the vdisk

Chk

- For RAID levels except NRAID, RAID1, and RAID50, the configured chunk size for the vdisk.
- For NRAID and RAID1, chunk-size has no meaning and is therefore shown as not applicable (N/A).
- For RAID50, the vdisk chunk size calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For a vdisk configured to use 32KB chunk size and 4-disk subvdisks, the value would be 96k (32KB x 3).

Status

- `CRIT`: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down.
- `FTDN`: Fault tolerant with down disks. The vdisk is online and fault tolerant, but some of its disks are down.
- `FTOL`: Fault tolerant and online.
- `OFFL`: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost.
- `QTCR`: Quarantined critical. The vdisk is offline and quarantined because at least one disk is missing; however, the vdisk could be accessed. For instance, one disk is missing from a mirror or RAID5.
- `QTDN`: Quarantined with down disks. The vdisk is offline and quarantined because at least one disk is missing; however, the vdisk could be accessed and would be fault tolerant. For instance, one disk is missing from a RAID6.
- `QTOF`: Quarantined offline. The vdisk is offline and quarantined because multiple disks are missing and user data is incomplete.
- `STOP`: The vdisk is stopped.
- `UNKN`: Unknown.
- `UP`: Up. The vdisk is online and does not have fault-tolerant attributes.

Jobs
Shows whether a job is running and its percent complete.

- `CPYBK`: The vdisk is being used in a copyback operation.
- `DRSC`: The disk is being scrubbed.
- `EXPD`: The vdisk is being expanded.
- `INIT`: The vdisk is initializing.
- `RCON`: The vdisk is being reconstructed.
- `VRFY`: The vdisk is being verified.
- `VRSC`: The vdisk is being scrubbed.
- Blank if no job is running.

Job%

- `0%`-`99%`: Percent complete of running job.
- Blank if no job is running.

Serial Number
Vdisk serial number

Drive Spin Down

- `Disabled`: DSD is disabled for the vdisk.
- `Enabled - all spinning`: DSD is enabled for the vdisk.
- `Partial spin-down`: DSD is enabled for the vdisk and its disks are partially spun down to conserve power.
- `Full spin-down`: DSD is enabled for the vdisk and its disks are fully spun down to conserve power.

Spin Down Delay
The period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1–360 minutes.

```
Health
```

- OK
- Degraded
- Fault
- Unknown

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

```
Health Recommendation
```
If Health is not OK, this field shows recommended actions to take to resolve the health issue.

```
Data Transferred
```
If the perf parameter is specified, this field shows the total amount of data read and written since the last sampling time.

```
Total B/s
```
If the perf parameter is specified, this field shows the data transfer rate, in bytes/s, since the last sampling time.

Example Show information for all vdisks:

```
# show vdisks
Name  Size      Free  Own  Pref  RAID   Disks  Spr  Chk    Status  Jobs  Job%
   Serial Number  Drive Spin Down  Spin Down Delay  Health  Health Reason
   Health Recommendation
-----------------------------------------------------------------------------
vd1   396.0GB   0B    A    A      RAID5  3      0    512K   FTOL    VRSC  50%
   SN             Disabled         0                        OK

vd10  396.0GB   0B    B    B      RAID0  2      0    512K   UP
   SN             Disabled         0                        OK

...
-----------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-19 15:31:35)
```

Show information for all vdisks with performance statistics:

```
# show vdisks
Name  Size      Free  Own  Pref  RAID   Disks  Spr  Chk    Status  Jobs  Job%
   Serial Number  Drive Spin Down  Spin Down Delay  Data Transferred  Total B/s
   Health  Health Reason  Health Recommendation
-----------------------------------------------------------------------------
vd1   396.0GB   0B    A    A      RAID5  3      0    512K   FTOL    VRSC  50%
   SN             Disabled         0                 45.3GB            50.3GB
   OK
vd10  396.0GB   0B    B    B      RAID0  2      0    512K   UP
   SN             Disabled         0                 0B                0B
   OK
...
-----------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-19 15:31:35)
```

Basetypes
- virtual-disks
- status

See also
- create vdisk
- delete vdisk-spare
- expand vdisk
- set vdisk

show vdisk-statistics

Description Shows live or historical performance statistics for vdisks. You can view live statistics for all or specified vdisks, or historical statistics for a specified vdisk. The system samples disk-performance statistics every quarter hour and retains performance data for 6 months.

The historical option allows you to specify a time range or a number (count) of data samples to include. It is not recommended to specify both the `time-range` and `count` parameters; if both parameters are specified, and more samples exist for the specified time range, the samples' values will be aggregated to show the required number of samples.

For each vdisk these statistics quantify destages, read-aheads, and host reads that are cache misses. For example, each time data is written from a volume's cache to disks in the vdisk that contains the volume, the vdisk's statistics are adjusted.

Properties shown only in XML API format are described "XML API basetype properties" on page 251.

Syntax To show live statistics:

```
show vdisk-statistics [vdisks]
```

To show historical statistics:

```
show vdisk-statistics
    vdisk
    historical
    [time-range "date/time-range"]
    [count number-of-data-samples]
    [all]
```

Parameters *vdisks*
Optional. Identifies one or more vdisks to show live statistics for. If this parameter is omitted, statistics will be shown for all vdisks. For vdisk syntax, see "Command syntax" on page 19.

vdisk
Identifies one vdisk to show historical statistics for. For vdisk syntax, see "Command syntax" on page 19.

`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.

`count` *number-of-data-samples*
Optional. Specifies the number of data samples to display, from 1–100. 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.

`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.

Output
(Live) `Name`
Vdisk name.

`Serial Number`
Vdisk serial number.

Bytes per second
Data transfer rate 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
IOPS 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
Number of read operations since these statistics were last reset or since the controller was restarted.

Number of 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.

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.

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.

Output (Historical)

Name
Vdisk name.

Serial Number
Vdisk serial number.

Data Transferred
Total amount of data read and written since the last sampling time.

Total B/s
Data transfer rate, in bytes/s, since the last sampling time. This is the sum of `Read B/s` and `Write B/s`.

Sample Time
Date and time, in the format *year-month-day hour*:*minutes*:*seconds*, when the data sample was taken.

Output (Historical, all)

Name
Vdisk name.

Serial Number
Vdisk serial number.

Data Transferred
Total amount of data read and written since the last sampling time.

Data Read
Shown by the `all` parameter. Amount of data read since the last sampling time.

Data Written
Shown by the `all` parameter. Amount of data written since the last sampling time.

Total B/s
Data transfer rate, in bytes/s, since the last sampling time. This is the sum of `Read B/s` and `Write B/s`.

Read B/s
Shown by the `all` parameter. Data transfer rate, in bytes/s, for read operations since the last sampling time.

Write B/s
Shown by the `all` parameter. Data transfer rate, in bytes/s, for write operations since the last sampling time.

Sample Time
Date and time, in the format *year-month-day hour:minutes:seconds*, when the data sample was taken.

Example Show live statistics for vdisks `VD1` and `MyVdisk`:

```
# show vdisk-statistics VD1,MyVdisk
Name      Serial Number  Bytes per second  IOPS  Number of Reads
    Number of Writes  Data Read  Data Written  I/O Resp Time  Read Resp Time
    Write Resp Time  Reset Time
-------------------------------------------------------------------------------
VD1       SN                22.0MB           82    6179839
    10507038        478.8GB    1024.4GB      156240         12699
    240665          2011-01-17 08:15:01
MyVdisk   SN                22.1MB           78    4872260
    9913102         539.3GB    1044.1GB      79033          16405
    109815          2012-01-17 21:01:20
-------------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-19 16:25:26)
```

Show historical statistics from a specified date and time range for vdisk `VD2`:

```
# show vdisk-statistics VD2 historical time-range "start 2012-01-18 4:40 PM
end 2011-01-18 5:00 PM"
Name  Serial Number
------------------
VD2   SN

    Data Transferred    Total B/s     Sample Time
    -------------------------------------------------------
    30.5GB              33.9MB        2012-01-18 17:00:00
    31.5GB              35.0MB        2012-01-18 16:45:00
------------------
Success: Command completed successfully. (2012-01-19 12:32:51)
```

Show all historical statistics (the latest 100 samples) for vdisk VD2:

```
# show vdisk-statistics VD2 historical all
Name  Serial Number
-------------------
VD2   SN

    Data Transferred  Data Read  Data Written  Total B/s  Read B/s  Write B/s
      Sample Time
    -------------------------------------------------------------------------
    44.8GB            22.4GB     22.4GB        49.8MB     24.9MB    24.9MB
      2012-01-19 11:30:00
    ...
-------------------
Success: Command completed successfully. (2012-01-19 12:35:06)
```

Basetypes
- vdisk-statistics (live)
- virtual-disk-summary (historical)
- status

See also
- reset all-statistics
- reset vdisk-statistics
- show controller-statistics
- show disk-statistics
- show host-port-statistics
- show vdisks
- show volume-statistics

show versions

See "versions" on page 249.

show volume-maps

Description   Shows mapping information for a specified volume or for all volumes.

Syntax   `show volume-maps [volume]`

Parameters   *volume*
Optional. Name or serial number of the volume to show mappings for. For volume syntax, see "Command syntax" on page 19. If this parameter is omitted, information for all volumes is shown.

Output   `Serial Number`
Volume serial number

`Name`
Volume name

`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.

`Host-Port-Identifier`

- FC and SAS: Host WWPN
- `all other hosts` for the volume's default mapping

`Nickname`
Host nickname, or blank if not set or for `all other hosts`

Example   Show all volume mappings:

```
Volume View [Serial Number SN) Name (Vol1)] Mapping:
   Ports         LUN    Access       Host-Port-Identifier  Nickname
   ------------------------------------------------------------
   A0-A3,B0-B3  LUN    read-write   all other hosts        Host3

Success: Command completed successfully. (2012-01-19 15:33:50)
```

Basetypes

- volume-view
- status

See also

- show host-maps
- show hosts
- show volumes

show volume-names

Description Shows volume names and serial numbers.

Syntax `show volume-names [`*`volumes`*`]`

Parameters *`volumes`*
Optional. Names or serial numbers of the volumes to show information about. For volume syntax, see "Command syntax" on page 19. If this parameter is omitted, information is shown for all volumes.

Output `Name`
Name of the volume

`Serial Number`
Volume serial number

Example Show volume names and serial numbers:

```
# show volume-names
Name         Serial Number
-----------------------
Data        SN
Data_s001   SN
spData      SN
vd1_v1      SN
-----------------------
Success: Command completed successfully. (2012-01-19 15:34:14)
```

Basetypes • volume-names
 • status

See also • show volume-maps
 • show volumes

show volume-reservations

Description Shows persistent reservations for all or specified volumes. The PGR mechanism enables application clients on multiple hosts to control access to a storage volume, and limits access by other hosts.

Each host must be registered with the storage system in order to establish a persistent reservation for a volume, thereby becoming a reservation holder.

If the system gets into an abnormal state and you need to remove all registrations and reservations for specified volumes to return them to a "clean" state, you can use the release volume command. This command must be used with care, as described in its help.

For more information about persistent reservations, see the SPC-3 specification at http://www.t10.org.

Syntax `show volume-reservations all|`*`volumes`*

Parameters `all|`*`volumes`*
Specifies all volumes, or the names or serial numbers of specific volumes. For volume syntax, "Command syntax" on page 19.

Output `Name`
Name of the volume.

`Serial Number`
Volume serial number.

`Volume Reserved`

- `Free`: The volume is not reserved.
- `Reserved`: The volume has been reserved by a host.

`Host ID`
Host WWPN.

`Port`
Controller ID and port number.

`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.

Example Show reservations for all volumes:

```
# show volume-reservations all
Name    Serial Number  Volume Reserved
   Host ID

   Ports  Reservation Type
---------------------------
Vol125  SN              Free

         Undefined
Vol126  SN              Free

         Undefined
Vol127  SN              Reserved

   A1    Write Exclusive
...
---------------------------
Success: Command completed successfully. (2012-01-19 08:58:28)
```

See also • release volume
          • show volumes

show volumes

Description Shows volume information for all or specified vdisks.

Syntax `show volumes`
`    [vdisk `*`vdisks`*`]`
`    [`*`volumes`*`]`

Parameters `vdisk `*`vdisks`*
Optional. Names or serial numbers of the vdisks containing the volumes to show. For vdisk syntax, see "Command syntax" on page 19.

volumes
Optional. Names or serial numbers of volumes to show information about. For volume syntax, see "Command syntax" on page 19.

Output `Vdisk`
Name of the vdisk

`Name`
Name of the volume

`Size`
Volume size

`Serial Number`
Volume serial number

`WR Policy`
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 Opt`
Cache optimization mode:

- `standard`: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications.
- `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost.
- `atomic-write`: This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.

```
Read Ahead Size
```
Read-ahead cache setting:

- `Disabled`: Read-ahead caching is disabled.
- `Default`: One chunk for the first access in a sequential read and one stripe for all subsequent accesses.
- `Maximum`: Maximum read-ahead size calculated by the controller.
- `64 KB`, `128 KB`, `256 KB`, `512 KB`, `1 MB`, `2 MB`, `4 MB`, `8 MB`, `16 MB`, or `32 MB`: Size selected by a user.

```
Type
```

- `standard`: Standard volume

```
Class
```

- `standard`: Standard (typical) volume

```
Qualifier
```

- `N/A`: Not applicable.

```
Volume Description
```

- Blank if not set.

```
WWN
```
WWN of the volume.

```
Health
```

- `OK`
- `Degraded`
- `Fault`
- `Unknown`

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

```
Health Recommendation
```
If Health is not `OK`, this field shows recommended actions to take to resolve the health issue.

Example Show volume information for all volumes:

```
# show volumes
Vdisk  Name  Size     Serial Number          WR Policy         Cache Opt
   Read Ahead Size  Type      Class       Qualifier  Volume Description
   WWN                         Health  Health Reason  Health Recommendation
----------------------------------------------------------------------------
VD1    V1    10.0GB  SN                     write-back        atomic-write
   Default          standard  standard  N/A
   WWN                         OK
VD1    V10   10.0GB  SN                     write-back        standard
   Default          standard  standard  N/A
   WWN                         OK
----------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-19 15:34:46)
```

Show volume information for vdisk `VD1` only:

```
# show volumes vdisk VD1
Vdisk  Name  Size     Serial Number          WR Policy  Cache Opt  Read Ahead Size
   Type    Class      Qualifier  Health  Health Reason
   Health Recommendation
--------------------------------------------------------------------------------
VD1    V1    35.9GB   00c0ff13511300042654   write-back  standard  Default
   standard  standard  N/A         OK

--------------------------------------------------------------------------------
Success: Command completed successfully. (2012-01-19 15:34:46)
```

Basetypes
- volumes
- status

See also
- create volume
- delete volumes
- expand volume
- set volume
- show vdisks
- show volume-maps

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.

Properties shown only in XML API format are described in "XML API basetype properties" on page 251.

Syntax `show volume-statistics [volumes]`

Parameters `volumes`
Optional. Names or serial numbers of the volumes to show information about. For volume syntax, see "Command syntax" on page 19. If this parameter is omitted, information is shown for all volumes.

Output `Name`
Volume name.

`Serial Number`
Volume serial number.

`Bytes per second`
Data transfer rate 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`
IOPS 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`
Number of read operations since these statistics were last reset or since the controller was restarted.

`Number of 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.

Example Show statistics for volume `vd1_v0001`:

```
# show volume-statistics vd1_v0001
Name       Serial Number  Bytes per second  IOPS  Number of Reads
   Number of Writes  Data Read  Data Written  Reset Time
-----------------------------------------------------------------
vd1_v0001  SN              5696.0KB          236  44091454
   60342344          1133.0GB   1378.9GB      2012-01-20 10:14:54
-----------------------------------------------------------------
Success: Command completed successfully. (2012-01-20 12:44:50)
```

Basetypes
- volume-statistics
- status

See also
- reset all-statistics
- reset volume-statistics
- show controller-statistics
- show disk-statistics
- show host-port-statistics
- show vdisk-statistics
- show volumes

shutdown

Description Shuts down the SC 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. If the SC 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.

△ **CAUTION:** You can continue to use the CLI when either or both SCs are shut down, but information shown might be invalid.

Syntax `shutdown [a|b|both]`

Parameters `a|b|both`
Optional. Specifies to shut down the SC in controller A, B, or both. If this parameter is omitted, the command affects the controller being accessed.

Example Shut down the SC in controller A:

```
# shutdown a
Info: Shutting down SC a...
Success: Command completed successfully. (2012-01-19 12:42:23)
```

See also • restart
• show shutdown-status

start vdisk

Description   Restarts a vdisk that was stopped in order to move its disks into this system.

Syntax   `start vdisk` *`vdisk`*

Parameters   *`vdisk`*
Name or serial number of the vdisk to start. For vdisk syntax, see "Command syntax" on page 19.

Example   Start vdisk `vd1`:

```
# start vdisk vd1
Success: Command completed successfully. (2012-01-21 12:26:37)
```

See also   • show vdisks
• start vdisk

stop vdisk

Description Stops a vdisk to prepare its disks for removal.

If the stop operation succeeds, the vdisk's health is shown as `Unknown` and its status is shown as `STOP`.

Syntax `stop vdisk` *`vdisk`*

Parameters *`vdisk`*
Name or serial number of the vdisk to stop. For vdisk syntax, see "Command syntax" on page 19.

Example Stop vdisk `vd1`:

```
# stop vdisk vd1
Success: Command completed successfully. (2012-01-21 12:26:07)
```

See also • show vdisks
• start vdisk

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.

Syntax `test`
`        email|managedlogs|managedlogswarn|managedlogswrap|notification|snmp`
`        [region crash1|crash2|crash3|crash4|ecdebug|mc|scdebug]`

Parameters `email|managedlogs|managedlogswarn|managedlogswrap|notification|snmp`

- `email`: This option behaves the same as the notification option and remains for backward compatibility only.
- `managedlogs`: Specify this option to test receipt of the managed-logs notification that logs need to be transferred. (Event 400)
- `managedlogswarn`: Specify this option to test receipt of the managed-logs notification that logs are nearly full and must be transferred to avoid losing older entries. (Event 401)
- `managedlogswrap`: Specify this option to test receipt of the managed-logs notification that logs have wrapped and older entries may be lost. (Event 402)
- `notification`: Specify this option to test receipt of event-notification messages by every interface that is configured to receive them, such as email, SNMP, and SMI-S. (Event 312)
- `snmp`: Alias for `notification`.

`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) to send a notification about.

- `crash1`, `crash2`, `crash3`, or `crash4`: Specify one of these options to send notification for one of the SC's four crash logs.
- `ecdebug`: Specify this option to send notification for the EC log.
- `mc`: Specify this option to send notification for the MC log.
- `scdebug`: Specify this option to send notification for the SC log, which includes the event log.

If this parameter is omitted, the command sends four representative log types: `crash1`, `ecdebug`, `scdebug`, and `mc`.

Example Test receipt of event notifications by every interface that is configured to receive them:

```
# test notification
Success: Command completed successfully. - The test event was sent. (2012-01-20
08:01:43)
```

Test receipt of the managed-logs notification that the SC log needs to be transferred:

```
# test managedlogs region scdebug
Success: Command completed successfully. - The test event was sent. (2012-01-20
16:03:21)
```

See also
- set email-parameters
- set snmp-parameters

trust

> ⚠ **CAUTION:** It is recommended that you contact technical support for assistance in determining if the trust operation is applicable to your situation, and for assistance in performing it.

Description Enables an offline vdisk to be brought online for emergency data recovery. This command must be enabled before each use. If used improperly this command can cause unstable operation and data loss; before use, carefully read the cautions and procedures below.

The trust command resynchronizes the time and date stamp and any other metadata on a bad disk. This makes the disk an active member of the vdisk again. You might need to do this when a vdisk is offline because a disk is failing, you have no data backup, and you want to try to recover the data from the vdisk. In this case, trust may work, but only as long as the failing disk continues to operate. Trust is only able to recover data already reconstructed on a target disk at the time the other disk failed.

When the "trusted" vdisk is back online, back up its data and audit the data to make sure that it is intact. Then delete that vdisk, create a new vdisk, and restore data from the backup to the new vdisk. Using a trusted vdisk is only a disaster-recovery measure; the vdisk has no tolerance for any additional failures.

> ⚠ **CAUTION:**
> 1. Do not use the `trust` command when the storage system is unstable; for example, if there are many power or topology-change events.
> 2. The `trust` command cannot be run on a quarantined vdisk.
> 3. Never update controller-module, expansion-module, or disk firmware when the vdisk is offline.
> 4. Never clear unwritten data cache when a vdisk is offline.
> 5. Do not use the `trust` command on a vdisk that went offline during vdisk expansion.
> 6. Do not use the `trust` command on a vdisk with status `CRIT`. Instead, add spares and let the system reconstruct the vdisk.

Steps for running the trust command

1. Disable background scrub.
2. Identify the cause for the vdisk going offline.
3. If an external issue (power, cabling, and so forth) caused the vdisk to go offline, fix the external issue before continuing to the next step.
4. Disable host access to the offline vdisk.
   a. Determine the owning controller of the offline vdisk.
   b. For all online vdisks owned by that controller, change ownership to the partner controller.
   c. Remove the host-port cables of the owning controller of the offline vdisk.
5. Note the order in which the disks failed.
6. If the disks went `LEFTOVR`/failed at different times, before running the `trust` command, physically remove all disks that were members of the vdisk that were not in use or available when the vdisk was last in the critical state. This includes disks added for reconstruction of the vdisk.
   a. For a RAID5 vdisk, remove the first failed disk of the offline vdisk, according to the logs.
   b. For a RAID6 vdisk, remove the first two failed disks of the offline vdisk, according to the logs.
   c. For a RAID50 vdisk, remove the first failed disk of each failed RAID5 sub-vdisk, according to the logs.
7. If the vdisk went offline in the middle of reconstruction, remove the disk being used as the reconstruction target.

8. Unseat the spare disks associated with the vdisk 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.

---

9. Reseat the remaining affected disks.
10. Enable the trust command.
11. Run the `trust` command on the vdisk.

After running the trust command

1. Perform a complete backup of the vdisk.
2. Delete the vdisk.
3. Replace disks, if necessary.
4. Re-create the vdisk.
5. Restore the data from the backup performed in step 1.
6. Run `verify vdisk` *vdisk-name* `fix no` to verify that the correct disk was used in the trust command.
7. Restore original vdisk ownership and reinsert host-port cables.
8. Re-enable background scrub.

Syntax To enable the `trust` command:

```
trust enable
```

To trust a vdisk:

```
trust vdisk vdisk
```

Parameters `enable`
Enables the trust command before use.

`vdisk` *vdisk*
Name or serial number of the vdisk to trust. For vdisk syntax, see "Command syntax" on page 19.

Example Enable the trust command and then trust vdisk `VD1`:

```
# trust enable
Success: Command completed successfully.

# trust vdisk VD1
Success: Command completed successfully.
```

See also • show vdisks
• verify vdisk

unfail controller

> △ **CAUTION:** For use by or with direction from a service technician.

Description Allows the partner controller module to recover from a simulated failure performed with the diagnostic-level fail command. If you attempt to unfail a controller that is operating, the command will have no effect.

Syntax `unfail controller [a|b]`

Parameters `controller a|b`
Specifies whether to unfail controller A or B. You cannot unfail the controller on which the command is issued.

Example From controller A, unfail controller B:

```
# unfail controller b
Success: Command completed successfully. (2012-01-20 15:36:30)
```

See also • fail

unmap volume

Description   Deletes explicit mappings or the default mapping for specified volumes. When an explicit mapping is deleted, access by that host to the volume is controlled by the volume's default mapping (described in help for create volume). When a default mapping is deleted, access by hosts to the volume is controlled by any explicit mappings of those hosts to the volume.

If you want to mask access for a specific host to a specific volume, use the map volume command and set the access parameter to no-access.

Syntax   unmap volume
        [host *hosts*]
        volumes

Parameters   host *hosts*
Optional. For FC and SAS, the nickname or 16-hex-digit WWPN of each host to unmap the volumes from. If the host parameter is omitted, mapping changes apply to all hosts not explicitly mapped (that is, to the default mapping).

volumes
Names or serial numbers of the volumes to unmap. For volume syntax, see "Command syntax" on page 19.

Example   Delete explicit mappings of Host1 to volumes V1 and V3 (leaving the default mappings unchanged):

```
# unmap volume host Host1 V1,V3
Info: The volume was unmapped. (V1) (2012-01-20 14:34:24)
Info: The volume was unmapped. (V3) (2012-01-20 14:34:24)
Success: Command completed successfully. - The volume(s) were unmapped.
(2012-01-20 14:34:24)
```

Delete volume V2's default mapping (leaving explicit mappings unchanged):

```
# unmap volume V2
Info: The volume was unmapped. (V2) (2012-01-20 14:34:34)
Success: Command completed successfully. - The volume(s) were unmapped.
(2012-01-20 14:34:24)
```

See also   • map volume
• show host-maps
• show hosts
• show volume-maps
• show volumes

verify links

Description Verifies FC host-port link paths between controller A and controller B.

Syntax
```
verify links
     [link-type FC]
```

Parameters `link-type FC`
Optional. Specifies to verify FC host-port links.

Output `Port`
Port ID in the local system.

`Type`

`FC`: FC port.

`Links`
IDs of linked ports in the target system.

Example Verify FC links between controllers A and B in the local system:

```
# verify links
Port Type  Links
----------------
A0   FC    B0,B1
A1   FC    B0,B1
----------------
Success: Command completed successfully. (2012-01-20 15:36:30)
```

verify vdisk

Description Analyzes fault-tolerant vdisks to find and fix inconsistencies between their redundancy data and their user data. This command acts on disks that are associated with a vdisk and are neither dedicated spares nor leftovers. This command will fix parity mismatches for RAID 3, 5, 6, and 50, and mirror mismatches for RAID 1 and 10. This command can be performed only on a vdisk whose status is FTOL (fault tolerant and online); it cannot be performed for NRAID or RAID0.

Verification can last over an hour, depending on vdisk size, utility priority, and amount of I/O activity. You can use a vdisk while it is being verified. To view the progress of a vdisk verify (VRFY) job, use the `show vdisks` command.

When verification is complete, event 21 is logged and specifies the number of inconsistencies found. Such inconsistencies can indicate that a disk in the vdisk is going bad.

☆ **TIP:** Unless you want to verify without fixing errors, it is better to use the `scrub vdisk` command, which operates similarly to `verify vdisk` but also can find and fix media errors for any RAID level, including NRAID and RAID0.

Syntax
```
verify vdisk
    vdisks
    [fix yes|no]
```

Parameters *vdisks*
Names or serial numbers of the vdisks to verify. For vdisk syntax, see "Command syntax" on page 19.

`fix yes|no`
Optional. Specifies whether or not to automatically fix parity mismatches by making parity match the data in all cases. If you specify `no`, event 21 will report any errors found and they will not be fixed.

Example Start verifying vdisk `vd1`:

```
# verify vdisk vd1
Info: The verify was started on vdisk vd1. (vd1) (2012-01-20 17:08:33)
Success: Command completed successfully. (2012-01-20 17:08:33)
```

See also • abort verify
• scrub vdisk
• show vdisks

versions

Description Shows firmware and hardware version information for each controller module.

Alias: `show versions`.

Syntax `versions [detail]`

Parameters `detail`
Optional. Shows information about the versions of firmware and hardware in each controller module. If this parameter is omitted, only firmware-bundle information is shown

Example Show firmware-bundle version information for a system in which controller B is not installed:

```
# versions
Controller A Versions
---------------------
Bundle Version: value
Build Date: value

Controller B Versions
---------------------
Bundle Version: Not Present
Build Date: Not Present
```

Show detailed version information for each controller:

```
# versions detail
Controller A Versions
---------------------
Storage Controller CPU Type: value
Bundle Version: value
Build Date: value
Storage Controller Code Version: value
Storage Controller Code Baselevel: value
Memory Controller FPGA Code Version: value
Storage Controller Loader Code Version: value
CAPI Version: value
Management Controller Code Version: value
Management Controller Loader Code Version: value
Expander Controller Code Version: ver
CPLD Code Version: value
Hardware Version: value
Host Interface Module Version: value
Host Interface Module Model: value
Backplane Type: value
Host Interface Hardware (Chip) Version: value
Disk Interface Hardware (Chip) Version: value
SC Boot Memory reference Code Version: value

Controller B Versions
---------------------
...

Success: Command completed successfully. (2012-01-19 15:36:07)
```

Basetypes • versions
• status

See also • show inquiry

4 XML API basetype properties

Chapter 3 describes command output that is shown in console format. This chapter describes the basetype properties that CLI commands display in XML API format, and is organized to help you find a basetype by name. This chapter excludes basetypes that are for internal use only.

Each basetype topic includes the following information:

- For each property, the values of its `name` and `type` elements, and a description of the values that the property may show. For descriptions of other elements see Table 4 on page 17.
- Example output from a command that uses the basetype. Some basetypes are used by multiple commands. Examples in this chapter were generated using the CLI parameter settings `api-embed` and `brief on`.
- References to embedded or nested basetypes that the output may show.

advanced-settings-table

Properties

Table 10 advanced-settings-table properties

Name	Type	Description
background-scrub	string	Shows whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between background vdisk scrub finishing and starting again is specified by the `background-scrub-interval` parameter. • `Disabled`: Background vdisk scrub is disabled. • `Enabled`: Background vdisk scrub is enabled.
background-scrub-numeric	string	Numeric equivalents for `background-scrub` values. • `0`: Disabled • `1`: Enabled
background-scrub-interval	uint16	Shows the interval in hours between background vdisk scrub finishing and starting again, from 1–360 hours.
partner-firmware-upgrade	string	Shows whether component firmware versions are monitored and will be automatically updated on the partner controller. • `Disabled`: PFU is disabled. • `Enabled`: PFU is enabled.
partner-firmware-upgrade-numeric	string	Numeric equivalents for `partner-firmware-upgrade` values. • `0`: Disabled • `1`: Enabled
utility-priority	string	Priority at which data-redundancy utilities, such as vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk 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. • `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.
utility-priority-numeric	string	Numeric equivalents for `utility-priority` values. • `0`: High • `1`: Medium • `2`: Low
smart	string	Shows whether SMART 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.
smart-numeric	string	Numeric equivalents for `smart` values. • `0`: Detect-Only • `1`: Enabled • `2`: Disabled

Table 10 advanced-settings-table properties (continued)

Name	Type	Description
dynamic-spares	string	Shows whether the storage system will automatically use a compatible disk as a spare to replace a failed disk in a vdisk if no compatible spare is available. • `Disabled`: The dynamic spares feature is disabled. • `Enabled`: The dynamic spares feature is enabled.
emp-poll-rate	string	Shows the interval in seconds at which the storage system will poll each enclosure's EMP for status changes, from 5–3600 seconds.
host-cache-control	string	Shows whether hosts are allowed to use the `SCSI MODE SELECT` command to change the storage system's write-back cache setting. • `Disabled`: Host control of caching is disabled. • `Enabled`: Host control of caching is enabled.
host-cache-control-numeric	string	Numeric equivalents for `host-cache-control` values. • `0`: Disabled • `1`: Enabled
sync-cache-mode	string	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.
sync-cache-mode-numeric	string	Numeric equivalents for `sync-cache-mode` values. • `0`: Immediate • `1`: Flush to Disk
independent-cache	string	Shows the cache redundancy mode for a dual-controller storage system. • `Disabled`: Controller failover is enabled and data in a controller's write-back cache is mirrored to the partner controller. • `Enabled`: The controllers use Independent Cache Performance Mode, in which controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache.
independent-cache-numeric	string	Numeric equivalents for `independent-cache` values. • `0`: Disabled • `1`: Enabled
missing-lun-response	string	Shows whether host drivers may probe for LUNs until the host drivers reach the LUN to which they have access. • `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.
missing-lun-response-numeric	string	Numeric equivalents for `missing-lun-response` values. • `0`: Not Ready • `1`: Illegal Request
controller-failure	string	Shows whether the cache policy will change from write-back to write-through when a controller fails. • `Disabled`: The controller failure trigger is disabled. • `Enabled`: The controller failure trigger is enabled.

Table 10 advanced-settings-table properties (continued)

Name	Type	Description
controller-failure-numeric	string	Numeric equivalents for `controller-failure` values. • `0`: Disabled • `16`: Enabled
super-cap-failure	string	Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails. • `Disabled`: The supercapacitor failure trigger is disabled. • `Enabled`: The supercapacitor failure trigger is enabled.
super-cap-failure-numeric	string	Numeric equivalents for `super-cap-failure` values. • `0`: Disabled • `4`: Enabled
compact-flash-failure	string	Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST, fails during POST, or fails during controller operation. • `Disabled`: The CompactFlash failure trigger is disabled. • `Enabled`: The CompactFlash failure trigger is enabled.
compact-flash-failure-numeric	string	Numeric equivalents for `compact-flash-failure` values. • `0`: Disabled • `512`: Enabled
power-supply-failure	string	Shows whether the cache policy will change from write-back to write-through when a PSU fails. • `Disabled`: The power-supply failure trigger is disabled. • `Enabled`: The power-supply failure trigger is enabled.
power-supply-failure-numeric	string	Numeric equivalents for `power-supply-failure` values. • `0`: Disabled • `64`: Enabled
fan-failure	string	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.
fan-failure-numeric	string	Numeric equivalents for `fan-failure` values. • `0`: Disabled • `128`: Enabled
temperature-exceeded	string	Shows whether the system will shut down a controller when its temperature exceeds the critical operating range. • `Disabled`: The over-temperature trigger is disabled. • `Enabled`: The over-temperature trigger is enabled.
temperature-exceeded-numeric	string	Numeric equivalents for `temperature-exceeded` values. • `0`: Disabled • `8`: Enabled
partner-notify	string	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.

Table 10 advanced-settings-table properties (continued)

Name	Type	Description
partner-notify-numeric	string	Numeric equivalents for `partner-notify` values. • `0`: Disabled • `2`: Enabled
auto-write-back	string	Shows whether the cache policy 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.
auto-write-back-numeric	string	Numeric equivalents for `auto-write-back` values. • `0`: Disabled • `1`: Enabled
disk-dsd-enable	string	Shows whether available disks and global spares will spin down after a period of inactivity shown by the `disk-dsd-delay` property. • `Disabled`: DSD for available disks and global spares is disabled. • `Enabled`: DSD for available disks and global spares is enabled.
disk-dsd-enable-numeric	string	Numeric equivalents for `disk-dsd-enable` values. • `0`: Disabled • `1`: Enabled
disk-dsd-delay	uint16	Specifies the period of inactivity in minutes after which available disks and global spares will spin down. The value 0 means spin down is disabled.
background-disk-scrub	string	Shows whether disks that are not in vdisks are automatically checked for disk defects to ensure system health. The interval between background disk scrub finishing and starting again is 24 hours. • `Disabled`: Background disk scrub is disabled. • `Enabled`: Background disk scrub is enabled.
background-disk-scrub-numeric	string	Numeric equivalents for `background-disk-scrub` values. • `0`: Disabled • `1`: Enabled
managed-logs	string	Shows whether the managed logs feature is enabled, which allows log files to be transferred from the storage system to a log-collection system to avoid losing diagnostic data as logs fill. • `Disabled`: The managed logs feature is disabled. • `Enabled`: The managed logs feature is enabled.
managed-logs-numeric	string	Numeric equivalents for `managed-logs` values. • `0`: Disabled • `1`: Enabled

auto-write-through-trigger

Properties

Table 11 auto-write-through-trigger properties

Name	Type	Description
controller-failure	string	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.
super-cap-failure	string	Shows whether the cache policy will change from write-back to write-through when the supercapacitor that provides backup power for cache is not fully charged or fails. • `Disabled`: The supercapacitor failure trigger is disabled. • `Enabled`: The supercapacitor failure trigger is enabled.
compact-flash-failure	string	Shows whether the cache policy will change from write-back to write-through when CompactFlash memory is not detected during POST, fails during POST, or fails during controller operation. • `Disabled`: The CompactFlash failure trigger is disabled. • `Enabled`: The CompactFlash failure trigger is enabled.
power-supply-failure	string	Shows whether the cache policy will change from write-back to write-through when a PSU fails. • `Disabled`: The power-supply failure trigger is disabled. • `Enabled`: The power-supply failure trigger is enabled.
fan-failure	string	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	string	Shows whether the system will shut down a controller when its temperature exceeds the critical operating range. • `Disabled`: The over-temperature trigger is disabled. • `Enabled`: The over-temperature trigger is enabled.
partner-notify	string	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	string	Shows whether the cache policy 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.

cache-parameter

Properties

Table 12 cache-parameter properties

Name	Type	Description
`serial-number`	string	If a volume is specified, its serial number.
`volume-name`	string	If a volume is specified, its name.
`write-policy`	string	If a volume is specified, its cache write policy. • `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.
`write-policy-numeric`	string	Numeric equivalents for `write-policy` values. • `0`: write-through • `1`: write-back
`cache-optimization`	string	If a volume is specified, its cache optimization mode. • `standard`: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. • `no-mirror`: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost. • `atomic-write`: This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
`cache-optimization-numeric`	string	Numeric equivalents for `cache-optimization` values. • `0`: standard • `2`: no-mirror • `3`: atomic-write

Table 12 cache-parameter properties (continued)

Name	Type	Description
`read-ahead-size`	string	If a volume is specified, its read-ahead cache setting. • `Disabled`: Read-ahead caching is disabled. • `Default`: One chunk for the first access in a sequential read and one stripe for all subsequent accesses. • `Maximum`: Maximum read-ahead size calculated by the controller. • `64 KB, 128 KB, 256 KB, 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB,` or `32 MB`: Size selected by a user.
`read-ahead-size-numeric`	string	Numeric equivalents for `read-ahead-size` values. • `-1`: Default • `0`: Disabled • `65536`: 64 KB • `131072`: 128 KB • `262144`: 256 KB • `524288`: 512 KB • `1048576`: 1 MB • `2097152`: 2 MB • `4194304`: 4 MB • `8388608`: 8 MB • `16777216`: 16 MB • `33554432`: 32 MB • `-2147483648`: Maximum

cache-settings

Properties

Table 13 cache-settings properties

Name	Type	Description
`operation-mode`	string	The system's operating mode, also called the cache redundancy mode. • `Independent Cache Performance Mode`: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. • `Active-Active ULP`: Both controllers are active using ULP. Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. • `Fail Over`: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. • `Down`: Both controllers are not operational.
`operation-mode-numeric`	string	Numeric equivalents for `operation-mode` values. • `1`: Independent Cache Performance Mode • `2`: Active-Active ULP • `4`: Fail Over • `5`: Down

Embedded basetypes

• controller-cache-parameters

cli-parameters

Properties

Table 14 cli-parameters properties

Name	Type	Description
`timeout`	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes).
`output-format`	string	• `console`: Supports interactive use of the CLI by displaying command output in easily readable format. This format automatically sizes fields according to content and adjusts content to window resizes. • `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 for internal use only. • `json`: Alternate data-interchange format for internal use only.
`output-format-api`	string	• `console` • `api` • `api-brief` • `api-embed` • `api-embed-brief` • `json` • `json-full`
`output-format-api-numeric`	string	Numeric equivalents for `output-format-api` values. • `1`: console • `2`: api • `3`: api-brief • `4`: api-embed • `5`: api-embed-brief • `6`: json • `7`: json-full
`brief-mode`	string	• `Enabled`: In XML output, 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.
`brief-mode-numeric`	string	Numeric equivalents for `brief-mode` values. • `0`: Disabled • `1`: Enabled
`base`	uint8	Alias for `storage-size-base`.
`pager`	string	• `Enabled`: Halts output after each full screen to wait for keyboard input. • `Disabled`: Output is not halted. When displaying output in XML API format, which is intended for scripting, disable paging.
`pager-numeric`	string	Numeric equivalents for `pager` values. • `0`: Disabled • `1`: Enabled

Table 14 cli-parameters properties (continued)

Name	Type	Description
`locale`	string	Display language. • `English` • `Spanish` • `French` • `German` • `Italian` • `Japanese` • `Korean` • `Dutch` • `Chinese-simplified` • `Chinese-traditional`
`locale-numeric`	string	Numeric equivalents for `locale` values. • `0`: English • `1`: Spanish • `2`: French • `3`: German • `4`: Italian • `5`: Japanese • `9`: Korean • `6`: Dutch • `7`: Chinese-simplified • `8`: Chinese-traditional
`storage-size-base`	uint8	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.
`storage-size-precision`	uint8	Number of decimal places (1–10) for display of storage-space sizes.
`storage-size-units`	string	Unit for display of storage-space sizes. • `Auto`: Lets the system determine the proper unit for a size. • `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 `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 117.1 GB.
`storage-size-units-numeric`	string	Numeric equivalents for `storage-size-units` values. • `0`: Auto • `1`: MB • `2`: GB • `3`: TB
`temperature-scale`	string	• `Fahrenheit`: Temperatures are shown in degrees Fahrenheit. • `Celsius`: Temperatures are shown in degrees Celsius.

Table 14 cli-parameters properties (continued)

Name	Type	Description
temperature-scale-numeric	string	Numeric equivalents for `temperature-scale` values. • `0`: Fahrenheit • `1`: Celsius
ui-refresh	uint16	User interface refresh rate.
user-type	string	The logged-in user's experience level. • `Novice` • `Standard` • `Advanced` • `Diagnostic`
user-type-numeric	string	Numeric equivalents for `user-type` values. • `1`: Novice • `2`: Standard • `3`: Advanced • `4`: Diagnostic
username	string	The logged-in user name.

compact-flash

Properties

Table 15 compact-flash properties

Name	Type	Description
durable-id	string	For internal use.
controller-id	string	• A: Controller A. • B: Controller B.
controller-id-numeric	string	Numeric equivalents for controller-id values. • 0: B • 1: A
name	string	• Controller A CompactFlash • Controller B CompactFlash
status	string	• Not Installed • Installed
status-numeric	string	Numeric equivalents for status values. • 0: Not Installed • 1: Installed
cache-flush	string	• Enabled: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down. • Disabled: Cache flush is disabled.
cache-flush-numeric	string	Numeric equivalents for cache-flush values. • 0: Disabled • 1: Enabled
health	string	• OK • Fault • N/A
health-numeric	string	Numeric equivalents for health values. • 0: OK • 2: Fault • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended action to take to resolve the health issue.

controller-cache-parameters

Properties

Table 16 controller-cache-parameters properties

Name	Type	Description
`durable-id`	string	For internal use.
`controller-id`	string	• `A`: Controller A. • `B`: Controller B.
`controller-id-numeric`	string	Numeric equivalents for `controller-id` values. • `0`: B • `1`: A
`name`	string	• Controller A Cache Parameters • Controller B Cache Parameters
`write-back-status`	string	The current, system-wide cache policy as determined by AWT logic. This value is not settable by users. If an AWT trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. • `Enabled`: Write-back. This is the normal state. • `Disabled`: Write-through. • `Not up`: The controller is not up.
`write-back-status-numeric`	string	Numeric equivalents for `write-back-status` values. • `0`: Enabled (write-back) • `1`: Disabled (write-through) • `2`: Not up
`compact-flash-status`	string	• `Not Installed` • `Installed` • `Unknown`
`compact-flash-status-numeric`	string	Numeric equivalents for `compact-flash-status` values. • `0`: Not Installed • `1`: Installed
`compact-flash-health`	string	Health of the CompactFlash card. • `OK` • `Degraded` • `Fault` • `Unknown`
`compact-flash-health-numeric`	string	Numeric equivalents for `compact-flash-health` values. • `0`: OK • `1`: Degraded • `2`: Fault • `3`: Unknown

Table 16 controller-cache-parameters properties (continued)

Name	Type	Description
cache-flush	string	• `Enabled`: If the controller loses power, it will automatically write cache data to the CompactFlash card. Cache flush is normally enabled, but is temporarily disabled during controller shut down. • `Disabled`: Cache flush is disabled.
cache-flush-numeric	string	Numeric equivalents for `cache-flush` values. • `0`: Disabled • `1`: Enabled

controllers

Properties

Table 17 controllers properties

Name	Type	Description
durable-id	string	For internal use.
controller-id	string	• A: Controller A. • B: Controller B.
controller-id-numeric	string	• 0: B • 1: A
serial-number	string	• Serial number of the controller module. • Not Available: The controller module is down or not installed.
hardware-version	string	Controller module hardware version.
cpld-version	string	CPLD firmware version.
mac-address	string	Controller network port MAC address.
node-wwn	string	Storage system WWNN.
active-version	uint32	Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing the network ports. • 4: IPv4 • 6: IPv6
ip-address	string	Controller network port IP address.
ip-subnet-mask	string	Controller network port IP subnet mask.
ip-gateway	string	Controller network port gateway IP address.
disks	uint32	Number of disks in the storage system.
virtual-disks	uint32	Number of vdisks in the storage system.
cache-memory-size	uint32	Controller cache memory size (MB).
host-ports	uint32	Number of host ports in the controller module.
drive-channels	uint32	Number of expansion ports in the controller enclosure.
drive-bus-type	string	Controller interface to disks. SAS
drive-bus-type-numeric	string	Numeric equivalent for drive-bus-type value. 8: SAS
status	string	• Operational • Down • Not installed • Unknown
status-numeric	string	Numeric equivalents for status values. • 0: Operational • 1: Down • 2: Not installed • 3: Unknown

Table 17 controllers properties (continued)

Name	Type	Description
failed-over	string	Indicates whether the controller has failed over to the partner controller. • No: The controller is not failed over. • Yes: The controller is failed over.
failed-over-numeric	string	Numeric equivalents for failed-over values. • 0: No • 1: Yes
fail-over-reason	string	If failed-over is Yes, a reason for the failover appears; otherwise, Not applicable appears.
fail-over-reason-numeric	string	Numeric equivalents for fail-over-reason values.
sc-fw	string	SC firmware version.
vendor	string	Controller manufacturer.
model	string	Controller model.
sc-cpu-type	string	SC processor type.
sc-cpu-speed	sint32	SC processor speed.
internal-serial-number	string	Internal serial number of the controller.
cache-lock	string	Shows whether hosts are prevented from using the SCSI MODE SELECT command to change the storage system's write-back cache setting. • No: Hosts are permitted to disable write-back cache. • Yes: Hosts are prevented from disabling write-back cache.
cache-lock-numeric	string	Numeric equivalents for cache-lock values. • 0: No • 1: Yes
write-policy	string	The current, system-wide cache policy as determined by AWT logic. This value is not settable by users. If an AWT trigger condition (such as a CompactFlash failure) is met, the cache policy for all volumes changes to write-through, overriding the volume-specific settings. When the problem is corrected, the cache policy reverts to the value configured for each individual volume. • write-back: This is the normal state. • write-through • Not up: The controller is not up.
write-policy-numeric	string	Numeric equivalents for write-policy values. • 0: write-back • 1: write-through • 2: Not up.
description	string	FRU long description.
part-number	string	Part number for the FRU.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format *year-month-day hour:minutes:seconds* (UTC), when the controller's PCBA was programmed.

Table 17 controllers properties (continued)

Name	Type	Description
mfg-date-numeric	string	Unformatted `mfg-date` value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
health	string	• `OK` • `Fault` • `Unknown`
health-numeric	string	Numeric equivalents for `health` values. • `0`: OK • `2`: Fault • `3`: Unknown
health-reason	string	If Health is not `OK`, the reason for the health state.
health-recommendation	string	If Health is not `OK`, the recommended actions to take to resolve the health issue.
position	string	Position of the controller in the enclosure. • `Top`: The controller is in the top slot. • `Bottom`: The controller is in the bottom slot.
position-numeric	string	Numeric equivalents for `position` values. • `0`: Top • `1`: Bottom
phy-isolation	string	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.
phy-isolation-numeric	string	Numeric equivalents for `phy-isolation` values. • `0`: Enabled • `1`: Disabled
redundancy-mode	string	The system's operating mode, also called the cache redundancy mode. • `Independent Cache Performance Mode`: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. • `Active-Active ULP`: Both controllers are active using ULP. Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. • `Fail Over`: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. • `Down`: Both controllers are not operational.
redundancy-mode-numeric	string	Numeric equivalents for `redundancy-mode` values. • `1`: Independent Cache Performance Mode • `2`: Active-Active ULP • `4`: Fail Over • `5`: Down

Table 17 controllers properties (continued)

Name	Type	Description
redundancy-status	string	• `Redundant with independent cache`: Both controllers are operational but are not mirroring their cache metadata to each other. • `Redundant`: Both controllers are operational. • `Operational but not redundant`: In active-active mode, one controller is operational and the other is offline. • `Down`: This controller is not operational. • `Unknown`: Status information is not available.
redundancy-status-numeric	string	Numeric equivalents for `redundancy-status` values. • `0`: Operational but not redundant • `1`: Redundant with independent cache • `3`: Redundant • `4`: Down • `5`: Unknown

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- unhealthy-component
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- port
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controller-statistics

Properties

Table 18 controller-statistics properties

Name	Type	Description
`durable-id`	string	For internal use.
`cpu-load`	uint32	Percentage of time the processor is busy, from 0–100.
`power-on-time`	uint32	Number of seconds since the controller was restarted.
`write-cache-used`	uint32	Percentage of write cache in use, from 0–100.
`bytes-per-second`	string	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
`bytes-per-second-numeric`	string	Unformatted `bytes-per-second` value.
`iops`	uint32	IOPS 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`	string	Amount of data read since these statistics were last reset or since the controller was restarted.
`data-read-numeric`	string	Unformatted `data-read` value.
`num-forwarded-cmds`	uint32	Current count of commands being forwarded or 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.
`data-written`	string	Amount of data written since these statistics were last reset or since the controller was restarted.
`data-written-numeric`	string	Unformatted `data-written` value.
`reset-time`	string	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.
`reset-time-numeric`	string	Unformatted `reset-time` value.
`start-sample-time`	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling started for the `iops` and `bytes-per-second` values.

Table 18 controller-statistics properties (continued)

Name	Type	Description
start-sample-time-numeric	string	Unformatted `start-sample-time` value.
stop-sample-time	string	Date and time, in the format *year-month-day hour.minutes:seconds*, when sampling stopped for the `iops` and `bytes-per-second` values.
stop-sample-time-numeric	string	Unformatted `stop-sample-time` value.
total-power-on-hours	string	Total amount of hours the controller has been powered on in its life time.

debug-log-parameters

Properties

Table 19 debug-log-parameters properties

Name	Type	Description
host-dbg	string	Shows whether host interface debug messages are enabled for inclusion in the SC debug log. • `Off`: Disabled. • `On`: Enabled.
host-numeric	string	Numeric equivalents for `host` values. • `0`: Off • `1`: On
disk	string	Shows whether disk interface debug messages are enabled for inclusion in the SC debug log. • `Off`: Disabled. • `On`: Enabled.
disk-numeric	string	Numeric equivalents for `disk` values. • `0`: Off • `1`: On
mem	string	Shows whether internal memory debug messages are enabled for inclusion in the SC debug log. • `Off`: Disabled. • `On`: Enabled.
mem-numeric	string	Numeric equivalents for `mem` values. • `0`: Off • `1`: On
fo	string	Shows whether failover and recovery debug messages are enabled for inclusion in the SC debug log. • `Off`: Disabled. • `On`: Enabled.
fo-numeric	string	Numeric equivalents for `fo` values. • `0`: Off • `1`: On
msg	string	Shows whether inter-controller message debug messages are enabled for inclusion in the SC debug log. • `Off`: Disabled. • `On`: Enabled.
msg-numeric	string	Numeric equivalents for `msg` values. • `0`: Off • `1`: On
ioa	string	Shows whether standard debug messages for an I/O interface driver are enabled for inclusion in the SC debug log. • `Off`: Disabled. • `On`: Enabled.
ioa-numeric	string	Numeric equivalents for `ioa` values. • `0`: Off • `1`: On

Table 19 debug-log-parameters properties (continued)

Name	Type	Description
iob	string	Shows whether resource-count debug messages for an I/O interface driver are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
iob-numeric	string	Numeric equivalents for iob values. • 0: Off • 1: On
ioc	string	Shows whether upper-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
ioc-numeric	string	Numeric equivalents for ioc values. • 0: Off • 1: On
iod	string	Shows whether lower-layer, verbose debug messages for an I/O interface driver are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
iod-numeric	string	Numeric equivalents for iod values. • 0: Off • 1: On
misc	string	Shows whether internal debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
misc-numeric	string	Numeric equivalents for misc values. • 0: Off • 1: On
rcm	string	Shows whether removable-component manager debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
rcm-numeric	string	Numeric equivalents for rcm values. • 0: Off • 1: On
raid	string	Shows whether RAID debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
raid-numeric	string	Numeric equivalents for raid values. • 0: Off • 1: On

Table 19 debug-log-parameters properties (continued)

Name	Type	Description
cache	string	Shows whether cache debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
cache-numeric	string	Numeric equivalents for cache values. • 0: Off • 1: On
emp	string	Shows whether EMP debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
emp-numeric	string	Numeric equivalents for emp values. • 0: Off • 1: On
capi	string	Shows whether Internal CAPI debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
capi-numeric	string	Numeric equivalents for capi values. • 0: Off • 1: On
mui	string	Shows whether internal service interface debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
mui-numeric	string	Numeric equivalents for mui values. • 0: Off • 1: On
bkcfg	string	Shows whether internal configuration debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
bkcfg-numeric	string	Numeric equivalents for bkcfg values. • 0: Off • 1: On
awt	string	Shows whether debug messages for auto-write-through cache triggers are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
awt-numeric	string	Numeric equivalents for awt values. • 0: Off • 1: On

Table 19 debug-log-parameters properties (continued)

Name	Type	Description
res2	string	Shows whether internal debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
res2-numeric	string	Numeric equivalents for res2 values. • 0: Off • 1: On
capi2	string	Shows whether Internal CAPI tracing messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
capi2-numeric	string	Numeric equivalents for capi2 values. • 0: Off • 1: On
fruid	string	Shows whether FRU ID debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
fruid-numeric	string	Numeric equivalents for fruid values. • 0: Off • 1: On
resmgr	string	Shows whether Reservation Manager debug messages are enabled for inclusion in the SC debug log. • Off: Disabled. • On: Enabled.
resmgr-numeric	string	Numeric equivalents for resmgr values. • 0: Off • 1: On
init	string	Not used.
init-numeric	string	Not used.
ps	string	Not used.
ps-numeric	string	Not used.
hb	string	Not used.
hb-numeric	string	Not used.

disk-hist-statistics

Properties

Table 20 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	string	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
data-read	string	Amount of data read since the last sampling time.
data-read-numeric	uint64	Unformatted data-read value.
data-written	string	Amount of data written since the last sampling time.
data-written-numeric	uint64	Unformatted data-written value.
total-iops	uint64	Total number of read and write operations per second since the last sampling time.
read-iops	uint64	Number of read operations per second since the last sampling time.
write-iops	uint64	Number of write operations per second since the last sampling time.
total-bytes-per-second	string	Total data transfer rate, in bytes/s, since the last sampling time.
total-bytes-per-second-numeric	uint64	Unformatted total-bytes-per-second value.
read-bytes-per-second	string	Data transfer rate, in bytes/s, for read operations since the last sampling time.
read-bytes-per-second-numeric	uint64	Unformatted read-bytes-per-second value.
write-bytes-per-second	string	Data transfer rate, in bytes/s, for write operations last sampling time.
write-bytes-per-second-numeric	uint64	Unformatted write-bytes-per-second value.
queue-depth	uint64	Average number of pending read and write operations being serviced since the last sampling time. This value represents periods of activity only and excludes periods of inactivity.
avg-rsp-time	string	Average response time, in microseconds, for read and write operations since the last sampling time.
avg-read-rsp-time	string	Average response time, in microseconds, for read operations since the last sampling time.
avg-write-rsp-time	string	Average response time, in microseconds, for write operations since the last sampling time.

Table 20 disk-hist-statistics properties (continued)

Name	Type	Description
avg-io-size	string	Average data size of read and write operations since the last sampling time.
avg-io-size-numeric	uint64	Unformatted avg-io-size value.
avg-read-io-size	string	Average data size of read operations since the last sampling time.
avg-read-io-size-numeric	uint64	Unformatted avg-read-io-size value.
avg-write-io-size	string	Average data size of write operations since the last sampling time.
avg-write-io-size-numeric	uint64	Unformatted avg-write-io-size value.
number-of-disk-errors	uint64	Total number of disk errors detected since the last sampling time. Error types include: number of SMART events; number of timeouts accessing the disk; number of times the disk did not respond; number of attempts by the storage system to spin-up the disk; media errors generated by the disk as specified by its manufacturer; non-media errors (generated by the storage system, or by the disk and not categorized as media errors); number of bad-block reassignments.
sample-time	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when the data sample was taken.
sample-time-numeric	uint32	Unformatted sample-time value.

disk-statistics

Properties

Table 21 disk-statistics properties

Name	Type	Description
`durable-id`	string	For internal use.
`serial-number`	string	Disk serial number.
`bytes-per-second`	string	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
`bytes-per-second-numeric`	string	Unformatted `bytes-per-second` value.
`iops`	uint32	IOPS 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`	string	Amount of data read since these statistics were last reset or since the controller was restarted.
`data-read-numeric`	string	Unformatted `data-read` value.
`data-written`	string	Amount of data written since these statistics were last reset or since the controller was restarted.
`data-written-numeric`	string	Unformatted `data-written` value.
`queue-depth`	uint32	Number of pending I/O operations currently being serviced.
`reset-time`	string	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.
`reset-time-numeric`	string	Unformatted `reset-time` value.
`start-sample-time`	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling started for the `iops` and `bytes-per-second` values.
`start-sample-time-numeric`	string	Unformatted `start-sample-time` value.
`stop-sample-time`	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling stopped for the `iops` and `bytes-per-second` values.
`stop-sample-time-numeric`	string	Unformatted `stop-sample-time` value.
`smart-count-1`	uint32	For port 1, the number of SMART events recorded.
`io-timeout-count-1`	uint32	For port 1, the number of timeouts accessing the disk.
`no-response-count-1`	uint32	For port 1, the number of times the disk did not respond.
`spinup-retry-count-1`	uint32	For port 1, the number of attempts by the storage system to spin up the disk.

Table 21 disk-statistics properties (continued)

Name	Type	Description
number-of-media-errors-1	uint32	For port 1, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-nonmedia-errors-1	uint32	For port 1, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-block-reassigns-1	uint32	For port 1, the number of times blocks were reassigned to alternate locations.
number-of-bad-blocks-1	uint32	For port 1, the number of bad blocks encountered.
smart-count-2	uint32	For port 2, the number of pending I/O operations currently being serviced.
io-timeout-count-2	uint32	For port 2, the number of SMART events recorded.
no-response-count-2	uint32	For port 2, the number of timeouts accessing the disk.
spinup-retry-count-2	uint32	For port 2, the number of times the disk did not respond.
number-of-media-errors-2	uint32	For port 2, the number of attempts by the storage system to spin up the disk.
number-of-nonmedia-errors-2	uint32	For port 2, the number of media errors generated by the disk, as specified by its manufacturer.
number-of-block-reassigns-2	uint32	For port 2, the number of other errors generated by the storage system, or generated by the disk and not categorized as media errors.
number-of-bad-blocks-2	uint32	For port 2, the number of times blocks were reassigned to alternate locations.

drive-parameters

Properties

Table 22 drive-parameters properties

Name	Type	Description
smart	string	Shows whether SMART 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.
smart-numeric	string	Numeric equivalents for smart values. • 0: Detect-Only • 1: Enabled • 2: Disabled
drive-write-back-cache	string	• Disabled: Disk write-back cache is disabled for all disks in the system and will be enabled for new disks added to the system. This parameter cannot be changed.
drive-write-back-cache-numeric	string	Numeric equivalents for drive-write-back-cache values. • 2: Disabled
drive-timeout-retry-max	uint8	Maximum number of times a timed-out I/O operation can be retried before the operation is failed.
drive-attempt-timeout	uint8	Number of seconds before an I/O operation is aborted and possibly retried.
drive-overall-timeout	uint8	Total time in seconds before an I/O operation is failed regardless of the drive-attempt-timeout and drive-timeout-retry-max settings.
disk-dsd-enable	string	Shows whether available disks and global spares will spin down after a period of inactivity shown by the disk-dsd-delay property. • Disabled: DSD for available disks and global spares is disabled. • Enabled: DSD for available disks and global spares is enabled.
disk-dsd-enable-numeric	string	Numeric equivalents for disk-dsd-enable values. • 0: Disabled • 1: Enabled
disk-dsd-delay	uint16	Shows the period of inactivity in minutes after which available disks and global spares will spin down, from 1–360 minutes. The value 0 means spin down is disabled.

drive-summary

Properties

Table 23 drive-summary properties

Name	Type	Description
durable-id	string	For internal use.
serial-number	string	Disk serial number.

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- disk-hist-statistics

drives

Properties

Table 24 drives properties

Name	Type	Description
durable-id	string	For internal use.
enclosure-id	uint32	Enclosure ID.
slot	uint32	Disk slot number.
location	string	Disk's enclosure ID and slot number.
port	uint32	For internal use only.
scsi-id	uint32	SCSI ID assigned to this disk for the primary channel.
blocks	uint64	Unformatted size value in 512-byte blocks.
serial-number	string	Disk serial number.
vendor	string	Disk vendor.
model	string	Disk model.
revision	string	Disk firmware revision level.
state	string	Shows the disk's state or usage. • AVAIL: The disk is available. • FAILED: The disk is unusable and must be replaced. Reasons for this status include: excessive media errors; SMART error; disk hardware failure; unsupported disk. • GLOBAL SP: The disk is a global spare. • LEFTOVR: The disk is a leftover and can be reused after its metadata is cleared. • VDISK: The disk is used in a vdisk. • VDISK SP: The disk is a spare assigned to a vdisk.
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 vdisk list.
type	string	Type of disk interface. • SAS: Dual-port SAS.
type-numeric	string	Numeric equivalents for type values. • 4: SAS • 8: sSAS
pi-format	string	Not applicable.
pi-format-numeric	string	Not applicable.

Table 24 drives properties (continued)

Name	Type	Description
job-running	string	Job running on the disk, if any. • (blank): None. • DRSC: The disk is being scrubbed. • EXPD: The vdisk is being expanded. • INIT: The vdisk is being initialized. • RCON: The vdisk is being reconstructed. • VRFY: The vdisk is being verified. • VRSC: The vdisk is being scrubbed.
job-running-numeric	string	Numeric equivalents for job-running values. • 0: None • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC
current-job-completion	string	• 0%–99%: Percent complete of running job. • (blank): No job is running.
blink	uint32	• 0: The disk's locator LED is not illuminated. • 1: The disk's locator LED is illuminated.
speed	uint32	Not used.
smart	string	• Disabled: SMART is disabled for this disk. • Enabled: SMART is enabled for this disk.
smart-numeric	string	Numeric equivalents for smart values. • 0: Disabled • 1: Enabled
dual-port	uint32	• 1: Dual-ported disk.
error	uint32	Not used.
fc-p1-channel	uint32	Port 1 channel ID.
fc-p1-device-id	uint32	Port 1 device ID.
fc-p1-node-wwn	string	Port 1 WWNN.
fc-p1-port-wwn	string	Port 1 WWPN.
fc-p1-unit-number	uint32	Port 1 unit number.
fc-p2-channel	uint32	Port 2 channel number.
fc-p2-device-id	uint32	Port 2 device ID.
fc-p2-node-wwn	string	Port 2 WWNN.
fc-p2-port-wwn	string	Port 2 WWPN.
fc-p2-unit-number	uint32	Port 2 unit number.
drive-down-code	uint8	Numeric code indicating why the disk is down.

Table 24 drives properties (continued)

Name	Type	Description
owner	string	Current owner, which is either the preferred owner during normal operation or the partner controller when the preferred owner is offline. • `A`: Controller A. • `B`: Controller B.
owner-numeric	string	Numeric equivalents for `owner` values. • `0`: B • `1`: A
index	uint32	For internal use only.
rpm	uint32	The speed of a spinning disk, in thousands of revolutions per minute, as specified by the disk vendor. For an SSD, 0 is shown.
size	string	Disk capacity, formatted to use the current base, precision, and units.
size-numeric	string	Unformatted `size` value in 512-byte blocks.
transfer-rate	string	Disk data-transfer rate in Gbit/s. • `1.5` • `3.0` • `6.0` Some 6 Gbit/s disks might not consistently support a 6 Gbit/s transfer rate. If this happens, the controller automatically adjusts transfers to those disks to 3 Gbit/s, increasing reliability and reducing error messages with little impact on system performance. This rate adjustment persists until the controller is restarted or power-cycled.
transfer-rate-numeric	string	For internal use only.
attributes	string	Blank
attributes-numeric	string	For internal use only.
virtual-disk-serial	string	Serial number of the disk's vdisk, if any.
enclosure-wwn	string	Enclosure WWN.
status	string	Disk status. • `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 DSD 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.
usage	string	Not applicable.
recon-state	string	• `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.

Table 24 drives properties (continued)

Name	Type	Description
recon-state-numeric	string	Numeric equivalents for `recon-state` values. • `1`: From • `2`: To • `0`: N/A
copyback-state	string	• `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.
copyback-state-numeric	string	Numeric equivalents for `copyback-state` values. • `1`: From • `2`: To • `0`: N/A
operation	string	Not used.
ssd-life-left	string	Predicted percentage of life remaining for SSD.
led-status	string	Disk LED status. • `Rebuild`: The disk's vdisk is being reconstructed. • `Fault`: The disk has a fault. • `ID`: The locator LED is illuminated to identify the disk. • `Remove`: The disk is ready to be removed from the enclosure.
led-status-numeric	string	Numeric equivalents for `led-status` values. • `1`: Online • `2`: Rebuild • `4`: Fault • `8`: Pred Fail • `16`: ID • `32`: Remove
disk-dsd-count	uint32	Number of times the DSD feature has spun down this disk.
number-of-ios	uint64	Total I/Os
total-data-transferred	bytes	Total bytes transferred
total-data-transferred-numeric	uint64	Unformatted `total-data-transferred` value.
avg-rsp-time	uint64	Average I/O response time in microseconds.
health	string	Disk health. • `OK` • `Degraded` • `Fault` • `Unknown` • `N/A`
health-numeric	string	Numeric equivalents for `health` values. • `0`: OK • `1`: Degraded • `2`: Fault • `3`: Unknown • `4`: N/A

Table 24 drives properties (continued)

Name	Type	Description
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

email-parameters

Properties

Table 25 email-parameters properties

Name	Type	Description
email-notification	string	Shows whether email (SMTP) notification of events is enabled. • `Disabled`: Email notification is disabled. • `Enabled`: Email notification is enabled.
email-notification-numeric	string	Numeric equivalents for `email-notification` values. • `0`: Disabled • `1`: Enabled
email-notification-filter	string	The minimum severity for which the system should send notifications: • `crit`: Sends notifications for Critical events only. • `error`: Sends notifications for Error and Critical events. • `warn`: Sends notifications for Warning, Error, and Critical events. • `info`: Sends notifications for all events. • `none`: Disables email notification. This parameter does not apply to managed-logs notifications.
email-notification-filter-numeric	string	Numeric equivalents for `email-notification-filter` values. • `8`: crit • `4`: error • `2`: warn • `1`: info • `0`: none
email-notify-address-1	string	Up to three email addresses for recipients of event notifications.
email-notify-address-2	string	
email-notify-address-3	string	
email-notify-address-4	string	Shows the email address for the log-collection system used by the log-management feature.
email-server	string	The IP address of the SMTP mail server to use for the email messages.
email-domain	string	The domain name that, with the sender name, forms the "from" address for remote notification.
email-sender	string	The sender name that, with the domain name, forms the "from" address for remote notification.
include-logs	string	Shows whether system log files will automatically be attached for email notification messages generated by the log-management feature. This is the "push" mode of log management.
include-logs-numeric	string	Numeric equivalents for `include-logs` values. • `0`: Disabled • `1`: Enabled

enclosure-components

Properties

Table 26 enclosure-components properties

Name	Type	Description
type	string	Component type. • `FAN`: Cooling fan unit • `PSU`: PSU • `Temp`: Temperature sensor • `Voltage`: Voltage sensor • `Disk`: Disk drive module
enclosure-unit-number	string	Component ID.
status	string	Component status. • `Absent`: The component is not present. • `Error`: The component or at least one subcomponent has failed. • `Warning`: The component or at least one subcomponent is not working normally. • `OK`: The component and any subcomponents are working normally. Temperature status `OK` indicates that the sensor is working properly, not that the temperature is within an acceptable range. • `N/A`: Status is not available.
fru-partnnumber	string	Part number of the FRU that contains the component.
fru_serialnumber	string	Serial number of the FRU that contains the component.
additional-data	string	Additional data, if applicable. • `addr=`: For a disk, the slot address. • `temp=`: For a temperature sensor, the temperature. • `voltage=`: For a voltage sensor, the voltage. • `--`: No data.

enclosure-fru

Properties

Table 27 enclosure-fru properties

Name	Type	Description
name	string	FRU name. • `CHASSIS_MIDPLANE`: 2U chassis and midplane circuit board • `RAID_IOM`: Controller module • `IOM`: Expansion module • `POWER_SUPPLY`: PSU
description	string	FRU long description.
part-number	string	FRU part number.
serial-number	string	FRU serial number.
revision	string	FRU hardware revision level.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds* (UTC), when a PCBA was programmed or a PSU was manufactured.
mfg-date-numeric	string	Unformatted `mfg-date` value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
fru-location	string	Location of the FRU in the enclosure. • `MID-PLANE SLOT`: Chassis midplane. • `UPPER IOM SLOT`: Controller module or expansion module A. • `LOWER IOM SLOT`: Controller module or expansion module B. • `LEFT PSU SLOT`: PSU on the left, as viewed from the rear. • `RIGHT PSU SLOT`: PSU on the right, as viewed from the rear.
configuration-serialnumber	string	Configuration serial number.
fru-status	string	FRU status. • `Absent`: Component is not present. • `Fault`: At least one subcomponent has a fault. • `OK`: All subcomponents are operating normally. • `Not Available`: Status is not available.
original-serialnumber	string	For a PSU, the original manufacturer serial number; otherwise, `N/A`.
original-partnumber	string	For a PSU, the original manufacturer part number; otherwise, `N/A`.
original-revision	string	For a PSU, the original manufacturer hardware revision; otherwise, `N/A`.
enclosure-id	uint32	Enclosure ID.

enclosure-list

Properties

Table 28 enclosure-list properties

Name	Type	Description
status	string	Disk slot status. • `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 DSD 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.
status-numeric	string	Numeric equivalents for `status` values. • `1`: Up • `2`: Error • `3`: Warning • `5`: Not Present • `6`: Unknown • `20`: Spun Down
enclosure-id	uint32	Enclosure ID.
slot	uint32	Disk slot number.
vendor	string	Disk vendor.
model	string	Disk model.
serial-number	string	Disk serial number.
size	string	Disk capacity, formatted to use the current base, precision, and units.
size-numeric	string	Unformatted `size` value in 512-byte blocks.

enclosures

Properties

Table 29 enclosures properties

Name	Type	Description
durable-id	string	For internal use.
enclosure-id	uint8	Enclosure ID.
enclosure-wwn	string	Enclosure WWN.
name	string	Enclosure name.
location	string	Enclosure location; blank if not set.
rack-number	uint8	Number of the rack containing the enclosure.
rack-position	uint8	Position of the enclosure in the rack.
number-of-coolings-elements	uint8	Number of fan units in the enclosure.
number-of-disks	uint8	Number of disk slots (not installed disks) in the enclosure.
number-of-power-supplies	uint8	Number of power supplies in the enclosure.
status	string	Disk slot status. • Unsupported • Up • Error • Warning • Unrecoverable • Not Present • Unknown • Unavailable • Spun Down
status-numeric	string	Numeric equivalents for status values. • 0: Unsupported • 1: Up • 2: Error • 3: Warning • 4: Unrecoverable • 5: Not Present • 6: Unknown • 7: Unavailable • 20: Spun Down
midplane-serial-number	string	Midplane serial number.
vendor	string	Enclosure vendor.
model	string	Enclosure model.
fru-shortname	string	FRU short description.
fru-location	string	FRU location. • MID-PLANE SLOT: Chassis midplane. • (blank): Not applicable.

Table 29 enclosures properties (continued)

Name	Type	Description
part-number	string	FRU part number.
mfg-date	string	Date and time, in the format *year-month-day hour:minutes:seconds* (UTC), when a PCBA was programmed or a PSU was manufactured.
mfg-date-numeric	string	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
description	string	FRU long description.
revision	string	Hardware revision level for the FRU.
dash-level	string	FRU template revision number.
emp-a-rev	string	Firmware revision of controller A's EMP.
emp-b-rev	string	Firmware revision of controller B's EMP.
rows	uint8	Number of rows of disk slots.
columns	uint8	Number of columns of disk slots.
slots	uint8	Number of disk slots in this enclosure
drive-orientation	string	• vertical: Disks are oriented vertically. • horizontal: Disks are oriented horizontally.
drive-orientation-numeric	string	Numeric equivalents for drive-orientation values. • 0: vertical • 1: horizontal
enclosure-arrangement	string	• vertical: Disks are numbered vertically (by column from top to bottom, proceeding rightward). • horizontal: Disks are numbered horizontally (by row from left to right. proceeding downward).
enclosure-arrangement-numeric	string	Numeric equivalents for enclosure-arrangement values. • 0: vertical • 1: horizontal
emp-a-busid	string	SCSI channel ID of controller A's EMP.
emp-a-targetid	string	SCSI target ID of controller A's EMP.
emp-b-busid	string	SCSI channel ID of controller B's EMP.
emp-b-targetid	string	SCSI target ID of controller B's EMP.
emp-a	string	Shows the field name EMP A in console format.
emp-a-ch-id-rev	string	SCSI address and firmware revision of controller A's EMP.
emp-b	string	Shows the field name EMP B in console format.
emp-b-ch-id-rev	string	SCSI address and firmware revision of controller B's EMP.

Table 29 enclosures properties (continued)

Name	Type	Description
midplane-type	string	Enclosure midplane type. • `2U24-6Gv2`: Midplane for 2U, reduced-depth, 24-disk enclosure with 6 Gbit/s maximum data rate to disks • `2U24-6G`: Midplane for 2U, 24-disk enclosure with 6 Gbit/s maximum data rate to disks • `2U24-3G`: Midplane for 2U, 24-disk enclosure with 3 Gbit/s maximum data rate to disks • `2U12-6Gv2`: Midplane for 2U, reduced-depth, 12-disk enclosure with 6 Gbit/s maximum data rate to disks • `2U12-6G`: Midplane for 2U, 12-disk enclosure with 6 Gbit/s maximum data rate to disks • `2U12-3G`: Midplane for 2U, 12-disk enclosure with 3 Gbit/s maximum data rate to disks • `N/A`: Other type of midplane
midplane-type-numeric	string	Numeric equivalents for `midplane-type` values. • `0`: 2U12-3G • `1`: 2U24-3G • `2`: 2U12-6G • `3`: 2U24-6G • `5, 9, 13`: 2U24-6Gv2 • `6, 10`: 2U12-6Gv2
enclosure-power	string	Enclosure power in watts.
pcie2-capable	string	• `False`: Enclosure is not capable of using PCI Express version 2. • `True`: Enclosure is capable of using PCI Express version 2.
pcie2-capable-numeric	string	Numeric equivalents for `pcie2-capable` values. • `0`: False • `1`: True
health	string	• `OK` • `Degraded` • `Fault` • `Unknown`
health-numeric	string	Numeric equivalents for `health` values. • `0`: OK • `1`: Degraded • `2`: Fault • `3`: Unknown
health-reason	string	If Health is not `OK`, the reason for the health state.
health-recommendation	string	If Health is not `OK`, the recommended actions to take to resolve the health issue.

Embedded basetypes

• unhealthy-component
• controllers
• power-supplies
• fan

enclosure-sku

Properties

Table 30 enclosure-sku properties

Name	Type	Description
sku-partnumber	string	System part number.
sku_serialnumber	string	System serial number.
sku-revision	string	System revision level.

events

Properties

Table 31 events properties

Name	Type	Description
time-stamp	string	Date and time, in the format *year-month-day hour.minutes:seconds* (UTC), when this event was detected.
time-stamp-numeric	string	Unformatted time-stamp value.
event-code	string	Event code. For event-code descriptions, see the *AssuredSAN 4000 Series Service Guide*.
event-id	string	Event ID.
model	string	Controller model.
serial-number	string	Controller serial number.
controller	string	• A: Controller A. • B: Controller B.
controller-numeric	string	Numeric equivalents for controller values. • 0: B • 1: A
severity	string	Event severity. • CRITICAL: A failure occurred that may cause a controller to shut down. Correct the problem *immediately*. • ERROR: A failure occurred that may affect data integrity or system stability. Correct the problem as soon as possible. • WARNING: A problem occurred that may affect system stability but not data integrity. Evaluate the problem and correct it if necessary. • INFORMATIONAL: A configuration or state change occurred, or a problem occurred that the system corrected. No action is required.
severity-numeric	string	Numeric equivalents for severity values. • 0: INFORMATIONAL • 1: WARNING • 2: ERROR • 3: CRITICAL
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.

expander-ports

Properties

Table 32 expander-ports properties

Name	Type	Description
durable-id	string	For internal use.
enclosure-id	uint32	Enclosure ID.
controller	string	• A: Controller A. • B: Controller B.
controller-numeric	string	Numeric equivalents for controller values. • 0: B • 1: A
name	string	• Out Port: Egress (expansion) port on controller module or an expansion module. Can be connected to an ingress port on an expansion module. • In Port: Ingress port on an expansion module. Can be connected to an egress (expansion) port on a controller module or an expansion module.
name-numeric	string	• 2: In Port • 3: Out Port
status	string	Expander port status. • Up • Warning • Error • Not Present • Unknown • Disconnected
status-numeric	string	Numeric equivalents for status values. • 0: Up • 1: Warning • 2: Error • 3: Not Present • 4: Unknown • 6: Disconnected
health	string	• OK • Degraded • Fault • N/A • Unknown
health-numeric	string	Numeric equivalents for health values. • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

fan

Properties

Table 33 fan properties

Name	Type	Description
durable-id	string	For internal use.
name	string	Fan unit name in the form Fan loc:*position*-PSU *power-supply-ID*. The position is as viewed from the rear of the enclosure.
location	string	Fan location in the form `Enclosure enclosure-ID - position`. The position is as viewed from the rear of the enclosure.
status	string	Fan unit status. • `Up` • `Error` • `Off`
status-numeric	string	Numeric equivalents for `status` values. • `0`: Up • `1`: Error • `2`: Off
speed	uint32	Fan speed (r/min).
position	string	Fan position, as viewed from the rear of the enclosure. • `Left` • `Right`
position-numeric	string	Numeric equivalents for `position` values. • `0`: Left • `1`: Right
serial-number	string	(blank): Not applicable.
fw-revision	string	(blank): Not applicable.
hw-revision	string	(blank): Not applicable.
health	string	• `OK` • `Degraded` • `Fault` • `Unknown`
health-numeric	string	Numeric equivalents for `health` values. • `0`: OK • `1`: Degraded • `2`: Fault • `4`: Unknown
health-reason	string	If Health is not `OK`, the reason for the health state.
health-recommendation	string	If Health is not `OK`, the recommended actions to take to resolve the health issue.

fc-port

Properties

Table 34 fc-port properties

Name	Type	Description
`configured-topology`	string	Configured topology. • `Loop`: FC-AL (public or private). • `Point-to-Point`: FC point-to-point. • `Auto`: Loop preferred, otherwise point-to-point, based on the detected connection type.
`primary-loop-id`	string	Primary loop ID; `0–125` or blank if not applicable.

host-port-statistics

Properties

Table 35 host-port-statistics properties

Name	Type	Description
`durable-id`	string	For internal use.
`bytes-per-second`	string	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
`bytes-per-second-numeric`	string	Unformatted `bytes-per-second` value.
`iops`	uint32	IOPS 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`	string	Amount of data read since these statistics were last reset or since the controller was restarted.
`data-read-numeric`	string	Unformatted `data-read` value.
`data-written`	string	Amount of data written since these statistics were last reset or since the controller was restarted.
`data-written-numeric`	string	Unformatted `data-written` value.
`queue-depth`	uint32	The number of pending I/O operations currently being serviced.
`avg-rsp-time`	string	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`	string	Average response time, in microseconds, for all read operations, calculated over the interval since these statistics were last requested or reset.
`avg-write-rsp-time`	string	Average response time, in microseconds, for all write operations, calculated over the interval since these statistics were last requested or reset.
`reset-time`	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when these statistics were last reset, either by a user or by a controller restart.
`reset-time-numeric`	string	Unformatted `reset-time` value.
`start-sample-time`	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling started for the `iops` and `bytes-per-second` values.
`start-sample-time-numeric`	string	Unformatted `start-sample-time` value.
`stop-sample-time`	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling stopped for the `iops` and `bytes-per-second` values.
`stop-sample-time-numeric`	string	Unformatted `stop-sample-time` value.

hosts

Properties

Table 36 hosts properties

Name	Type	Description
host-id	string	FC or SAS host port WWN.
host-name	string	User-defined name of the host port, or blank.
host-discovered	string	• Yes: The host was discovered and its entry was automatically created. • No: The host entry was manually created.
host-mapped	string	• Yes: At least one volume is explicitly mapped to the host. • No: No volumes are explicitly mapped to the host.
host-profile	string	• Standard: The host allows LUN 0 to be assigned to a mapping.
host-bus-type	string	• If the host was discovered and its entry was automatically created, its host interface type: FC; SAS. • If the host entry was manually created: Undefined.
host-port-bits-a	uint32	For internal use only.
host-port-bits-b	uint32	For internal use only.

host-view

Properties

Table 37 host-view properties

Name	Type	Description
id	string	FC or SAS host port WWN.
hba-nickname	string	User-defined name of the host port, or blank.
host-profile	string	Standard: The host allows LUN 0 to be assigned to a mapping.

Embedded basetypes

- host-view-mappings

host-view-mappings

Properties

Table 38 host-view-mappings properties

Name	Type	Description
volume-name	string	Volume name.
volume-serial	string	Volume serial number.
lun	string	LUN assigned to the mapping.
access	string	Type of access assigned to the mapping. • read-write: Host has read and write access to the volume. • read-only: Host has read access to the volume. • no-access: Host is denied access to the volume.
ports	string	Controller host ports assigned to the mapping.

inquiry

Properties

Table 39 inquiry properties

Name	Type	Description
mc-fw	string	MC firmware version.
mc-loader	string	MC loader firmware version.
sc-fw	string	SC firmware version.
sc-loader	string	SC loader firmware version.
serial-number	string	Controller serial number.
mac-address	string	Controller network port MAC address.
ip-address	string	Controller network port IP address.
nvram-defaults	string	For internal use only.

io-modules

Properties

Table 40 io-modules properties

Name	Type	Description
durable-id	string	For internal use.
controller-id	string	• A: Controller A. • B: Controller B.
controller-id-numeric	string	• 0: B • 1: A
name	string	IOM name.
description	string	IOM long description.
part-number	string	IOM part number.
serial-number	string	IOM serial number.
revision	string	IOM hardware revision level.
dash-level	string	IOM template revision number.
fru-shortname	string	IOM short description.
mfg-date	string	Date and time, in the format *year-month-day hour:minutes:seconds* (UTC), when the IOM was manufactured.
mfg-date-numeric	string	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the IOM was manufactured.
mfg-vendor-id	string	JEDEC ID of the IOM manufacturer.
position	string	IOM position, as viewed from the rear of the enclosure. • Left • Right • Top • Bottom
position-numeric	string	Numeric equivalents for position values. • 0: Left • 1: Right • 2: Top • 3: Bottom
configuration-serialnumber	string	Configuration serial number.
phy-isolation	string	Shows whether the automatic disabling of SAS expander PHYs having high error counts is enabled or disabled for this controller. • Enabled: PHY fault isolation is enabled. • Disabled: PHY fault isolation is disabled.
phy-isolation-numeric	string	Numeric equivalents for phy-isolation values. • 0: Enabled • 1: Disabled

Table 40 io-modules properties (continued)

Name	Type	Description
status	string	IOM status. • Operational • Down • Not installed • Unknown
status-numeric	string	Numeric equivalents for status values. • 0: Operational • 1: Down • 2: Not installed • 3: Unknown
health	string	• OK • Degraded • Fault • Unknown
health-numeric	string	Numeric equivalents for health values. • 0: OK • 1: Degraded • 2: Fault • 4: Unknown
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

job-parameters

Properties

Table 41 job-parameters properties

Name	Type	Description
`background-scrub`	string	Shows whether disks in vdisks are automatically checked for disk defects to ensure system health. The interval between background vdisk scrub finishing and starting again is 24 hours. • `Disabled`: Background vdisk scrub is disabled. • `Enabled`: Background vdisk scrub is enabled.
`background-scrub-numeric`	string	Numeric equivalents for `background-scrub` values. • `0`: Disabled • `1`: Enabled
`partner-firmware-upgrade`	string	Shows whether component firmware versions are monitored and will be automatically updated on the partner controller. • `Disabled`: PFU is disabled. • `Enabled`: PFU is enabled.
`partner-firmware-upgrade-numeric`	string	Numeric equivalents for `partner-firmware-upgrade` values. • `0`: Disabled • `1`: Enabled
`utility-priority`	string	Priority at which data-redundancy utilities, such as vdisk verify and reconstruct, run with respect to I/O operations competing for the system's processors. (This does not affect vdisk 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. • `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.
`utility-priority-numeric`	string	Numeric equivalents for `utility-priority` values. • `0`: High • `1`: Medium • `2`: Low

log-header-table

Properties

Table 42 log-header-table properties

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

network-parameters

Properties

Table 43 network-parameters properties

Name	Type	Description
durable-id	string	For internal use.
active-version	uint32	Specifies whether to use IP version 4 (IPv4) or 6 (IPv6) for addressing the network ports. • 4: IPv4 • 6: IPv6
ip-address	string	Controller network port IP address.
gateway	string	Controller network port gateway IP address.
subnet-mask	string	Controller network port IP subnet mask.
mac-address	string	Controller network port MAC address.
addressing-mode	string	• Manual: Obtain network address from manual (static) settings. • DHCP: Use DHCP to obtain network address.
addressing-mode-numeric	string	Numeric equivalents for addressing-mode values. • 1: Manual • 2: DHCP
health	string	• OK • Degraded
health-numeric	string	Numeric equivalents for health values. • 0: OK • 1: Degraded
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.
ping-broadcast	string	• Enabled: The system will respond to a broadcast ping. • Disabled: The system will not respond to a broadcast ping.
ping-broadcast-numeric	string	Numeric equivalents for ping-broadcast values. • 0: Disabled • 1: Enabled

ntp-status

Properties

Table 44 ntp-status properties

Name	Type	Description
ntp-status	string	Shows whether use of NTP is enabled. • `activated`: NTP is enabled. • `deactivated`: NTP is disabled.
ntp-server-address	string	• `0.0.0.0`: NTP server IP address is not set. • NTP server IP address.
ntp-contact-time	string	• Date and time, in the format *year-month-day hour*:*minutes*:*seconds* (UTC), of the last message received from the NTP server. • `none`: No contact.

port

Properties

Table 45 port properties

Name	Type	Description
durable-id	string	For internal use.
controller	string	• A: Controller A. • B: Controller B.
controller-numeric	string	Numeric equivalents for controller values. • 0: B • 1: A
port	string	Controller ID and port number.
port-type	string	• FC • SAS
port-type-numeric	string	Numeric equivalents for port-type values. • 6: FC • 8: SAS
media	string	• FC(P): FC Point-to-Point (public or private). • FC(L): FC-AL. • FC(-): Not applicable, as when the port is disconnected. • SAS: SAS.
target-id	string	Port WWN.
status	string	Port status. • Up • Warning • Error • Not Present • Unknown • Disconnected
status-numeric	string	Numeric equivalents for status values. • 0: Up • 1: Warning • 2: Error • 3: Not Present • 4: Unknown • 6: Disconnected
actual-speed	string	Actual port speed in Mbit/s or Gbit/s. • 10 Mbit • 100 Mbit • 1 Gbit • 1.5 Gbit • 2 Gbit • 3 Gbit • 4 Gbit • 6 Gbit • 8 Gbit • 10 Gbit • (blank): Port is disconnected.

Table 45 port properties (continued)

Name	Type	Description
`actual-speed-numeric`	string	Numeric equivalents for `actual-speed` values. • `0`: 1 Gbit • `1`: 2 Gbit • `2`: 4 Gbit • `4`: 1.5 Gbit • `5`: 3 Gbit • `6`: 6 Gbit • `7`: 8 Gbit • `8`: 10 Mbit • `9`: 100 Mbit • `10`: 10 Gbit • `255`: Port is disconnected.
`configured-speed`	string	Configured port speed in Gbit/s. • `Auto` • `1 Gbit` • `2 Gbit` • `4 Gbit` • `8 Gbit`
`configured-speed-numeric`	string	Numeric equivalents for `configured-speed` values. • `0`: 1 Gbit • `1`: 2 Gbit • `2`: 4 Gbit • `3`: Auto • `7`: 8 Gbit
`health`	string	• `OK` • `Degraded` • `Fault` • `N/A`
`health-numeric`	string	Numeric equivalents for `health` values. • `0`: OK • `1`: Degraded • `2`: Fault • `4`: N/A
`health-reason`	string	If Health is not `OK`, the reason for the health state.
`health-recommendation`	string	If Health is not `OK`, the recommended actions to take to resolve the health issue.

Embedded basetypes

- fc-port
- job-parameters
- sas-port

power-supplies

Properties

Table 46 power-supplies properties

Name	Type	Description
durable-id	string	For internal use.
enclosure-id	uint32	Enclosure ID.
serial-number	string	PSU serial number.
description	string	FRU long description.
name	string	PSU name in the form PSU *power-supply-number* Loc:*position*-PSU, where the position is as viewed from the rear of the enclosure.
revision	string	FRU hardware revision level.
model	string	PSU model.
vendor	string	PSU vendor.
location	string	PSU location in the form Enclosure *enclosure-ID - position*, where the position is as viewed from the rear of the enclosure.
position	string	PSU position, as viewed from the rear of the enclosure. • Left • Right • Top • Bottom
position-numeric	string	Numeric equivalents for position values. • 0: Left • 1: Right • 2: Top • 3: Bottom
part-number	string	FRU part number.
dash-level	string	FRU template revision number.
fru-shortname	string	FRU short description.
mfg-date	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds* (UTC), when the PSU was manufactured.
mfg-date-numeric	string	Unformatted mfg-date value.
mfg-location	string	City, state/province, and country where the FRU was manufactured.
mfg-vendor-id	string	JEDEC ID of the FRU manufacturer.
configuration-serialnumber	string	Configuration serial number.
dc12v	uint32	Voltage of the 12-volt PSU, in 100th of a volt.
dc5v	uint32	Voltage of the 5-volt PSU, in 100th of a volt.
dc33v	uint32	Voltage of the 3.3-volt PSU, in 100th of a volt.
dc12i	uint32	Voltage of the 12-volt PSU, in 100th of a volt.
dc5i	uint32	Voltage of the 5-volt PSU, in 100th of a volt.
dctemp	uint32	PSU temperature.

Table 46 power-supplies properties (continued)

Name	Type	Description
`health`	string	• OK • Degraded • Fault • Unknown
`health-numeric`	string	Numeric equivalents for `health` values. • 0: OK • 1: Degraded • 2: Fault • 3: Unknown
`health-reason`	string	If Health is not OK, the reason for the health state.
`health-recommendation`	string	If Health is not OK, the recommended actions to take to resolve the health issue.
`status`	string	PSU status. • Up • Warning • Error • Not Present • Unknown
`status-numeric`	string	Numeric equivalents for `status` values. • 0: Up • 1: Warning • 2: Error • 3: Not Present • 4: Unknown

Embedded basetypes

- unhealthy-component
- fan

redundancy

Properties

Table 47 redundancy properties

Name	Type	Description
redundancy-mode	string	The system's operating mode, also called the cache redundancy mode. • `Independent Cache Performance Mode`: For a dual-controller system, controller failover is disabled and data in a controller's write-back cache is not mirrored to the partner controller. This improves write performance at the risk of losing unwritten data if a controller failure occurs while there is data in controller cache. • `Active-Active ULP`: Both controllers are active using ULP. Data for volumes configured to use write-back cache is automatically mirrored between the two controllers to provide fault tolerance. • `Fail Over`: Operation has failed over to one controller because its partner is not operational. The system has lost redundancy. • `Down`: Both controllers are not operational.
redundancy-mode-numeric	string	Numeric equivalents for `redundancy-mode` values. • `1`: Independent Cache Performance Mode • `2`: Active-Active ULP • `4`: Fail Over • `5`: Down
redundancy-status	string	• `Redundant with independent cache`: Both controllers are operational but are not mirroring their cache metadata to each other. • `Redundant`: Both controllers are operational. • `Operational but not redundant`: In active-active mode, one controller is operational and the other is offline. • `Down`: This controller is not operational. • `Unknown`: Status information is not available.
redundancy-status-numeric	string	Numeric equivalents for `redundancy-status` values. • `0`: Redundant with independent cache • `1`: Redundant • `3`: Operational but not redundant • `4`: Down • `5`: Unknown
controller-a-status	string	• `Operational`: The controller is operational. • `Down`: The controller is installed but not operational. • `Not Installed`: The controller is not installed.
controller-a-status-numeric	string	Numeric equivalents for `controller-a-status` values. • `0`: Operational • `1`: Down • `2`: Not Installed
controller-a-serial-number	string	• Controller module serial number • `Not Available`: The controller is down or not installed.
controller-b-status	string	• `Operational`: The controller is operational. • `Down`: The controller is installed but not operational. • `Not Installed`: The controller is not installed.

Table 47 redundancy properties (continued)

Name	Type	Description
controller-b-status-numeric	string	Numeric equivalents for `controller-b-status` values. • `0`: Operational • `1`: Down • `2`: Not Installed
controller-b-serial-number	string	• Controller module serial number • `Not Available`: The controller is down or not installed.
other-MC-status	string	The operational status of the partner MC. • `up`: The controller is operational. • `down`: The controller is shut down.
other-MC-status-numeric	string	Numeric equivalents for `other-MC-status-numeric` values. • `0`: Up • `1`: Down

refresh-counters

Properties

Table 48 refresh-counters properties

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

sas-port

Properties

Table 49 sas-port properties

Name	Type	Description
`configured-topology`	string	Direct
`width`	string	Number of PHY lanes in the SAS port.

sas-status-controller-a
sas-status-controller-b

Properties

Table 50 sas-status-controller-a/sas-status-controller-b properties

Name	Type	Description
enclosure-id	uint32	Enclosure ID.
controller	string	• `A`: Controller A. • `B`: Controller B.
controller-numeric	string	Numeric equivalents for `controller` values. • `0`: B • `1`: A
phy	uint32	Logical ID of the PHY within a group based on the PHY type. • Drive PHYs have IDs 0–23. • SC PHYs have IDs 0–1. • Egress, ingress, and inter-expander PHYs have IDs 0–3.
type	string	PHY type. • `Undefined`: The PHY doesn't exist in the expander. • `Drive`: 1-lane PHY that communicates between the expander and a disk drive. • `Ingress`: (Expansion module only) 4-lane PHY that communicates between the expander and an expansion port. • `Egress`: 4-lane PHY that communicates between the expander and an expansion port or SAS Out port. • `Inter-Exp`: (Expansion module only) Communicates between the expander and the partner's expander. • `SC-0`: (Controller module only) 4-lane PHY that communicates between the expander and the SC. • `SC-1`: (Controller module only) 2-lane PHY that communicates between the expander and the partner's expander. • `Unused`: The PHY exists in the expander but is not connected, by design.
type-numeric	string	Numeric equivalents for `type` values. • `0`: Undefined • `1`: Drive • `2`: Ingress • `3`: Egress • `4`: Inter-Exp • `6`: Unused • `50`: SC-0 • `51`: SC-1
status	string	PHY status. • `Unavailable`: No status information is available. • `Enabled - Healthy`: The PHY is enabled and healthy. • `Enabled - Degraded`: The PHY is enabled but degraded. • `Disabled`: The PHY has been disabled by a user or by the system.

Table 50 sas-status-controller-a/sas-status-controller-b properties (continued)

Name	Type	Description
status-numeric	string	Numeric equivalents for status values. • 0: Unavailable • 1: Enabled - Healthy • 2: Enabled - Degraded • 3: Disabled
elem-status	string	The SES status that corresponds to the PHY status. • Disabled: Critical condition is detected. • Error: Unrecoverable condition is detected. Appears only if there is a firmware problem related to PHY definition data. • OK: Element is installed and no error conditions are known. • Non-critical: Non-critical condition is detected. • Not Used: Element is not installed in enclosure. • Unknown: Either: • Sensor has failed or element status is not available. Appears only if an IOM indicates it has fewer PHYs than the reporting IOM, in which case all additional PHYs are reported as unknown. • Element is installed with no known errors, but the element has not been turned on or set into operation.
elem-status-numeric	string	Numeric equivalents for elem-status values. • 0: Error • 1: OK • 2: Disabled • 3: Non-critical • 4: Error • 5: Not Used • 6: Unknown • 7: Unknown • 8: Unknown
elem-disabled	string	• Enabled: PHY is enabled. • Disabled: PHY is disabled.
elem-disabled-numeric	string	Numeric equivalents for elem-disabled values. • 0: Enabled • 1: Disabled

Table 50 sas-status-controller-a/sas-status-controller-b properties (continued)

Name	Type	Description
elem-reason	string	More information about the status value. • Blank if `elem-status` is `OK`. • `Error count interrupts`: PHY disabled because of error-count interrupts. • `Externally disabled`: PHY disabled externally via serial debug port. • `PHY control`: PHY disabled by a SES control page as a result of action by an SC or user. • `Not ready`: PHY is enabled but not ready. Appears for SC-1 PHYs when the partner IOM is not installed. Appears for Drive, SC-1, or Ingress PHYs when a connection problem exists such as a broken connector. • `Drive removed`: PHY disabled because drive slot is empty. • `Unused - disabled by default`: PHY is disabled by default because it is not used. • `Excessive PHY changes`: PHY is disabled because of excessive PHY change counts.
elem-reason-numeric	string	Numeric equivalents for `elem-reason` values. • `0`: (blank) • `32769`: Error count interrupts • `32770`: Externally disabled • `32771`: PHY control • `32772`: Not ready • `32774`: Drive removed • `32775`: Unused - disabled by default • `32776`: Excessive PHY changes

schedules

Properties

Table 51 schedules properties

Name	Type	Description
name	string	Schedule name.
schedule-specification	string	Schedule settings for running the associated task.
status	string	Schedule status. • Uninitialized: The schedule is not yet ready to run. • Ready: The schedule is ready to run at the next scheduled time. • Suspended: The schedule had an error and is holding in its current state. • Expired: The schedule has exceeded a constraint and will not run again. • Invalid: The schedule is invalid.
next-time	string	Date and time, in the format *year-month-day hour:minutes:seconds* (UTC), when the schedule will next run.
next-time-numeric	string	Unformatted next-time value.
task-to-run	string	Name of the task that the schedule runs.
error-message	string	Error message, or blank.

See also

• tasks

security-communications-protocols

Properties

Table 52 security-communications-protocols properties

Name	Type	Description
wbi-http	string	• `Disabled`: The standard RAIDar web server is disabled. • `Enabled`: The standard RAIDar web server is enabled.
wbi-http-numeric	string	Numeric equivalents for `wbi-http` values. • `0`: Disabled • `1`: Enabled
wbi-https	string	• `Disabled`: The secure RAIDar web server is disabled. • `Enabled`: The secure RAIDar web server is enabled.
wbi-https-numeric	string	Numeric equivalents for `wbi-https` values. • `0`: Disabled • `1`: Enabled
cli-telnet	string	• `Disabled`: The standard CLI is disabled. • `Enabled`: The standard CLI is enabled.
cli-telnet-numeric	string	Numeric equivalents for `cli-telnet` values. • `0`: Disabled • `1`: Enabled
cli-ssh	string	• `Disabled`: The SSH CLI is disabled. • `Enabled`: The SSH CLI is enabled.
cli-ssh-numeric	string	Numeric equivalents for `cli-ssh` values. • `0`: Disabled • `1`: Enabled
smis	string	• `Disabled`: The secure SMI-S interface is disabled. • `Enabled`: The secure SMI-S interface is enabled.
smis-numeric	string	Numeric equivalents for `smis` values. • `0`: Disabled • `1`: Enabled
usmis	string	• `Disabled`: The unsecure SMI-S interface is disabled. • `Enabled`: The unsecure SMI-S interface is enabled.
usmis-numeric	string	Numeric equivalents for `smis` values. • `0`: Disabled • `1`: Enabled
ftp	string	• `Disabled`: The FTP interface is disabled. • `Enabled`: The FTP interface is enabled.
ftp-numeric	string	Numeric equivalents for `ftp` values. • `0`: Disabled • `1`: Enabled
snmp	string	• `Disabled`: The SNMP interface is disabled. • `Enabled`: The SNMP interface is enabled.
snmp-numeric	string	Numeric equivalents for `snmp` values. • `0`: Disabled • `1`: Enabled

Table 52 security-communications-protocols properties (continued)

Name	Type	Description
debug-interface	string	• `Disabled`: The Telnet debug port is disabled. • `Enabled`: The Telnet debug port is enabled.
debug-interface-numeric	string	Numeric equivalents for `debug-interface` values. • `0`: Disabled • `1`: Enabled
inband-ses	string	• `Disabled`: The in-band SES interface is disabled. • `Enabled`: The in-band SES interface is enabled.
inband-ses-numeric	string	Numeric equivalents for `inband-ses` values. • `0`: Disabled • `1`: Enabled

sensors

Properties

Table 53 sensors properties

Name	Type	Description
durable-id	string	For internal use.
enclosure-id	uint32	Enclosure ID.
sensor-name	string	Sensor name and location.
value	string	• For a sensor, its value. • For overall unit status, one of the status values below.
status	string	• OK: The sensor is present and detects no error condition. • Warning: The sensor detected a non-critical error condition. Temperature, voltage, or current is between the warning and critical thresholds. • Error: 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 EMP cannot communicate with the sensor. • Unknown: The sensor is present but status is not available. • Not Installed: The sensor is not present. • Unsupported: Status detection is not implemented.
status-numeric	string	Numeric equivalents for status values. • 0: Unsupported • 1: OK • 2: Error • 3: Warning • 4: Unrecoverable • 5: Not Installed • 6: Unknown • 7: Unavailable
sensor-location	uint32	Sensor location in a controller enclosure. • 1: Unknown • 2: Overall unit status • 5: PSU • 7: Enclosure • 8: On board
sensor-type	uint32	• 2: Overall unit status • 3: Temperature • 6: Capacitor charge • 9: Voltage

ses

Properties

Table 54 ses properties

Name	Type	Description
id	string	SCSI ID of the enclosure.
chassis	string	Chassis serial number.
vendor	string	Enclosure vendor name.
product-id	string	Product model identifier.
cpld-revision	string	CPLD version.
emp-a-busid	string	SCSI channel ID of controller A's EMP.
emp-a-targetid	string	SCSI target ID of controller A's EMP.
emp-a-rev	string	Firmware revision of controller A's EMP.
emp-a	string	Shows the field name EMP A in console format.
emp-a-ch-id-rev	string	SCSI address and firmware revision of controller A's EMP.
emp-b-busid	string	SCSI channel ID of controller B's EMP
emp-b-targetid	string	SCSI target ID of controller B's EMP.
emp-b-rev	string	Firmware revision of controller B's EMP.
emp-b	string	Shows the field name EMP B in console format.
emp-b-ch-id-rev	string	SCSI address and firmware revision of controller B's EMP.
wwpn	string	WWPN of the SES device reporting the enclosure status.
topology	string	Type of topology for the disk channels. • N/A
status	string	Overall status of the enclosure. • Absent: The enclosure is not present. • Error: The enclosure has a fault. • OK: The enclosure is operating normally. • Not Available: Status is not available.

shutdown-status

Properties

Table 55 shutdown-status properties

Name	Type	Description
controller	string	• a: Controller A. • b: Controller B.
status	string	• Operational • Down • Not installed • Unknown
status-numeric	string	Numeric equivalents for status values. • 0: Operational • 1: Down • 2: Not installed • 3: Unknown

snmp-parameters

Properties

Table 56 snmp-parameters properties

Name	Type	Description
snmp-enabled	string	Shows whether the SNMP interface is enabled or disabled. • `Disabled`: SNMP is disabled. • `Enabled`: SNMP is enabled.
snmp-enabled-numeric	string	Numeric equivalents for `snmp-enabled` values. • `0`: Disabled • `1`: Enabled
snmp-filter	string	Minimum level of events to include for SNMP traps. • `crit`: Only critical events are sent as traps. • `error`: Error and critical events are sent as traps. • `warn`: Warning, error, and critical events are sent as traps. • `info`: All events are sent as traps. • `none`: No events are sent as traps and traps are disabled.
snmp-filter-numeric	string	Numeric equivalents for `snmp-filter` values. • `0`: none • `1`: info • `2`: error • `4`: warn • `8`: crit
snmp-trap-host-1	string	Trap host IP address.
snmp-trap-host-2	string	Trap host IP address.
snmp-trap-host-3	string	Trap host IP address.
snmp-read-community	string	Community string for SNMP read-only access (not shown to Monitor users). T
snmp-write-community	string	Community string for SNMP write access (not shown to Monitor users). T

status

Properties

Table 57 status properties

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

syslog-parameters

Properties

Table 58 syslog-parameters properties

Name	Type	Description
syslog-host-ip	string	IP address of remote syslog server for notifications.
syslog-notification-level	string	Minimum severity for which system sends notifications: • `crit`: Sends notifications for Critical events only. • `error`: Sends notifications for Error and Critical events. • `warn`: Sends notifications for Warning, Error, and Critical events. • `info`: Sends notifications for all events. • `none`: Disables syslog notification and clears the settings.
syslog-notification-level-numeric	string	Bitwise property. Use either bitwise or numeric equivalents for `snmp-filter` values. • `8`: Critical • `4`: Error • `2`: Warn • `1`: Info • `0`: None
syslog-host-port	uint32	Port on which remote syslog facility listens for notifications.

system

Properties

Table 59 system properties

Name	Type	Description
system-name	string	Storage system name.
system-contact	string	The name of 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's configured.
midplane-serial-number	string	The serial number of the controller enclosure midplane.
vendor-name	string	Vendor name.
product-id	string	Product model identifier.
product-brand	string	Product brand name.
scsi-vendor-id	string	Vendor name returned by the SCSI INQUIRY command.
scsi-product-id	string	Product identifier returned by the SCSI INQUIRY command.
enclosure-count	uint32	Number of enclosures in the storage system.
health	string	• OK • Degraded • Fault • Unknown
health-numeric	string	Numeric equivalents for health values. • 0: OK • 1: Degraded • 2: Fault • 3: Unknown
health-reason	string	If Health is not OK, the reason for the health state.
other-MC-status	string	The operational status of the partner MC. • up: The controller is operational. • down: The controller is shut down.
other-MC-status-numeric	string	Numeric equivalents for other-MC-status-numeric values. • 0: Up • 1: Down
pfuStatus	string	Shows whether PFU is running on the system. • Running • Idle
supported-locales	string	Supported display languages: English, Spanish, French, German, Italian, Japanese, Dutch, Chinese-Simplified, Chinese-Traditional, Korean.
current-node-wwn	string	Storage system WWNN.

Embedded basetypes

- redundancy
- unhealthy-component

system-parameters-table

Properties

Table 60 system-parameters-table properties

Name	Type	Description
`ulp-enabled`	string	Shows `true` to indicate that the system is using ULP, 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 vdisk 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 ALUA extensions, in SPC-3, to negotiate paths with aware host systems. Unaware host systems see all paths as being equal.
`profiles-enabled`	string	Shows whether host profiles are enabled, which determines whether LUN 0 can be assigned to volume mappings. • `false`: Host profiles are disabled.
`max-ports`	uint32	Number of host-interface ports in the controller enclosure.
`max-drives`	uint32	Number of disks that the system supports.
`max-volumes`	uint32	Number of volumes that the system supports.
`max-vdisks`	uint32	Number of vdisks that the system supports.
`max-luns`	uint32	Number of LUNs that the system supports.
`max-owned-arrays-per-controller`	uint32	Number of vdisks that each controller supports.
`max-capi-arrays`	uint32	Same as `max-vdisks`.
`max-chunk-size`	uint32	Maximum chunk size for vdisks: 512 KB.
`min-chunk-size`	uint32	Minimum chunk size for vdisks: 16 KB.
`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.
`metadata-size`	uint32	Amount of metadata, in blocks, stored on each disk.
`local-controller`	string	Controller you are currently logged in to. • `A`: Controller A. • `B`: Controller B.
`local-controller-numeric`	string	Numeric equivalents for `local-controller` values. • `0`: B • `1`: A
`serial-number`	string	Last five digits of the midplane serial number.
`external-targetid-control`	string	Not used.
`external-targetid-control-numeric`	string	Not used.
`lan-heartbeat`	string	Not used.

Table 60 system-parameters-table properties (continued)

Name	Type	Description
lan-heartbeat-numeric	string	Not used.
ip-address-mode	string	• `CAPI_TWO_IP_ADDRESSES_MODE`: Dual controller system has a unique IP address for each controller. • `CAPI_ONE_IP_ADDRESS_MODE`: Dual controller system has the same IP address for both controllers, only one active at a time.
ip-address-mode-numeric	string	Numeric equivalents for `lan-heartbeat` values. • `0`: CAPI_TWO_IP_ADDRESSES_MODE • `1`: CAPI_ONE_IP_ADDRESS_MODE
debug-flags	uint32	For use by service personnel.
enclosure-flags	uint32	For internal use only.
num-global-spares	uint32	Number of global-spare disks defined in the storage system.
dynamic-spare-rescan-rate	uint32	Interval at which the system is scanned for disks automatically designated as spares, if the dynamic spares feature is enabled.
performance-tuning-flags	string	For internal use only.
performance-tuning-flags-numeric	string	Numeric equivalents for `performance-tuning` values. • `0`: Disabled • `1`: Enabled
min-backing-store-size	uint32	Not used.

tasks

Properties

Table 61 tasks properties

Name	Type	Description
name	string	Task name.
type	string	Type of operation this task performs. • `EnableDSD` • `DisableDSD`
status	string	Task status. • `Uninitialized`: Task is not yet ready to run. • `Ready`: Task is ready to run. • `Active`: Task is running. • `Error`: Task has an error. • `Invalid`: Task is invalid.
state	string	Current step of the task. • For an `EnableDSD` or `DisableDSD` task: Start
error-message	string	Message if an error occurred while processing the task, or blank.
associated-vdisk-serial	string	Serial number of vdisk associated with task.

Embedded basetypes

- sas-port
- snmp-parameters
- volume-names

time-settings-table

Properties

Table 62 time-settings-table properties

Name	Type	Description
date-time	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds* (UTC), reported by the controller being accessed.
date-time-numeric	string	Unformatted date-time value.
time-zone-offset	string	The system's time zone as an offset in hours and minutes from UTC. This is shown only if NTP is enabled.
ntp-state	string	Shows whether NTP is in use. • activated: NTP is enabled. • deactivated: NTP is disabled.
ntp-address	string	NTP server IP address, or 0.0.0.0 if not set.

unhealthy-component

Properties

Table 63 unhealthy-component properties

Name	Type	Description
component-type	string	Component type. • super-cap: supercapacitor pack • MC: MC • port: Host port • controller: Controller module • expansion module: Expansion module • PSU: PSU • disk: Disk slot • enclosure: Enclosure • vdisk: Vdisk
component-type-numeric	string	Numeric equivalents for component-type values. • 0: super-cap • 1: MC • 2: port • 3: controller • 4: expansion module • 5: PSU • 6: disk • 7: enclosure • 8: vdisk
component-id	string	Component identifier, such as A for controller A.
basetype	string	Component basetype.
primary-key	string	Durable ID of the component.
health	string	Component health. • OK • Degraded • Fault • Unknown • N/A
health-numeric	string	Numeric equivalents for health values. • 0: OK • 1: Degraded • 2: Fault • 3: Unknown • 4: N/A
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

unwritable-cache

Properties

Table 64 unwritable-cache properties

Name	Type	Description
`unwritable-a-` `percentage`	uint8	Total percentage of cache memory used for unwritable data in controller A.
`unwritable-b-` `percentage`	uint8	Total percentage of cache memory used for unwritable data in controller B.

users

Properties

Table 65 users properties

Name	Type	Description
username	string	User name.
roles	string	• monitor: View-only access to selected user interfaces. • manage: Modify access to selected user interfaces.
user-type	string	The user's level of technical expertise: Standard, Advanced, or Diagnostic. This parameter does not affect access to the commands.
user-type-numeric	string	Numeric equivalents for user-type values. • 1: Novice • 2: Standard • 3: Advanced • 4: Diagnostic
user-locale	string	Display language for this user.
user-locale-numeric	string	Numeric equivalents for user-locale values. • 0: English • 1: Spanish • 2: French • 3: German • 4: Italian • 5: Japanese • 6: Netherlands • 7: Simplified Chinese • 8: Traditional Chinese • 9: Korean
interface-access-WBI	string	• x: User can use the WBI. • (blank): User cannot access this interface.
interface-access-CLI	string	• x: User can use the CLI. • (blank): User cannot access this interface.
interface-access-FTP	string	• x: User can use the FTP interface. • (blank): User cannot access this interface.
interface-access-SMIS	string	• x: User can use the SMI-S interface. • (blank): User cannot access this interface.
interface-access-SNMP	string	• U: The user can access the SNMPv3 interface and view the MIB. • T: The user can access the SNMPv3 interface and receive trap notifications. • (blank): User cannot access this interface.
storage-size-base	uint8	The base for entry and display of storage-space sizes: • 2: Sizes are shown as powers of 2, using 1024 as a divisor for each magnitude. • 10: Sizes are shown as powers of 10, using 1000 as a divisor for each magnitude. Operating systems usually show volume size in base 2. Disk drives usually show size in base 10. Memory (RAM and ROM) size is always shown in base 2.
storage-size-precision	uint8	The number of decimal places (1–10) for display of storage-space sizes.

Table 65 users properties (continued)

Name	Type	Description
storage-size-units	string	The unit for display of storage-space sizes. • `auto`: Lets the system determine the proper unit for a size. • `MB`: Megabytes. • `GB`: Gigabytes. • `TB`: Terabytes. Based on the precision setting, if the selected unit is too large to meaningfully display a size, the system uses a smaller unit for that size. For example, if units is set to TB, precision is set to 1, and base is set to 10, the size 0.11709TB is instead shown as 117.1 GB.
storage-size-units-numeric	string	Numeric equivalents for `storage-size-units` values. • `0`: auto • `1`: MB • `2`: GB • `3`: TB
temperature-scale	string	• `Celsius`: Use the Celsius scale to display temperature values. • `Fahrenheit`: Use the Fahrenheit scale to display temperature values.
temperature-scale-numeric	string	Numeric equivalents for `temperature-scale` values. • `0`: Fahrenheit • `1`: Celsius
timeout	uint32	Time in seconds that the session can be idle before it automatically ends. Valid values are 120–43200 seconds (2–720 minutes).
ui-refresh	uint16	User-interface refresh rate, which is 30 seconds.
authentication-type	string	For an SNMPv3 user, this specifies whether to use a security authentication protocol. Authentication uses the user password. • `none`: No authentication. • `MD5`: MD5 authentication. • `SHA`: SHA authentication.
authentication-type-numeric	string	Numeric equivalents for `authentication-type` values. • `0`: none • `1`: MD5 • `2`: SHA
privacy-type	string	For an SNMPv3 user, this specifies whether to use a security encryption protocol. This parameter requires the `privacy-password` property and the `authentication-type` property. • `none`: No encryption. • `DES` • `AES`
privacy-type-numeric	string	Numeric equivalents for `privacy-type` values. • `0`: none • `1`: DES • `2`: AES
password	string	User password. For a standard user the password is represented by eight asterisks. For an SNMPv3 user this is the authentication password; it is shown in clear text for reference when configuring users in the corresponding management application.

Table 65 users properties (continued)

Name	Type	Description
privacy-password	string	Encryption password for an SNMPv3 user whose privacy type is set to `DES` or `AES`. The password is shown in clear text for reference when configuring users in the corresponding management application.
trap-destination	string	For an SNMPv3 user whose `interface-access-SNMP` property is set to `snmptarget`, this specifies the IP address of the host that will receive SNMP traps.

vdisk-hist-statistics

Properties

Table 66 vdisk-hist-statistics properties

Name	Type	Description
`total-data-transferred`	string	Total amount of data read and written since the last sampling time.
`total-data-transferred-numeric`	uint64	Unformatted `total-data-transferred` value.
`data-read`	string	Amount of data read since the last sampling time.
`data-read-numeric`	uint64	Unformatted `data-read` value.
`data-written`	string	Amount of data written since the last sampling time.
`data-written-numeric`	uint64	Unformatted `data-written` value.
`total-bytes-per-second`	string	Data transfer rate, in bytes/s, since the last sampling time. This is the sum of `read-bytes-per-second` and `write-bytes-per-second`.
`total-bytes-per-second-numeric`	uint64	Unformatted `total-bytes-per-second` value.
`read-bytes-per-second`	string	Data transfer rate, in bytes/s, for read operations since the last sampling time.
`read-bytes-per-second-numeric`	uint64	Unformatted `read-bytes-per-second` value.
`write-bytes-per-second`	string	Data transfer rate, in bytes/s, for write operations since the last sampling time.
`write-bytes-per-second-numeric`	uint64	Unformatted `write-bytes-per-second` value.
`sample-time`	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds*, when the data sample was taken.
`sample-time-numeric`	uint32	Unformatted `sample-time` value.

vdisk-statistics

Properties

Table 67 vdisk-statistics properties

Name	Type	Description
name	string	Vdisk name.
serial-number	string	Vdisk serial number.
bytes-per-second	string	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
bytes-per-second-numeric	string	Unformatted `bytes-per-second` value.
iops	uint32	IOPS 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	string	Amount of data read since these statistics were last reset or since the controller was restarted.
data-read-numeric	string	Unformatted `data-read` value.
data-written	string	Amount of data written since these statistics were last reset or since the controller was restarted.
data-written-numeric	string	Unformatted `data-written` value.
avg-rsp-time	string	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	string	Average response time in microseconds for all read operations, calculated over the interval since these statistics were last requested or reset.
avg-write-rsp-time	string	Average response time in microseconds for all write operations, calculated over the interval since these statistics were last requested or reset.
reset-time	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when these statistics were last reset, either by a user or by a controller restart.
reset-time-numeric	string	Unformatted `reset-time` value.
start-sample-time	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling started for the `iops` and `bytes-per-second` values.
start-sample-time-numeric	string	Unformatted `start-sample-time` value.
stop-sample-time	string	Date and time, in the format *year-month-day hour:minutes:seconds*, when sampling stopped for the `iops` and `bytes-per-second` values.
stop-sample-time-numeric	string	Unformatted `stop-sample-time` value.

versions

Properties

Table 68 versions properties

Name	Type	Description
sc-cpu-type	string	SC processor type.
bundle-version	string	Firmware bundle version.
build-date	string	Firmware bundle build date.
sc-fw	string	SC firmware version.
sc-baselevel	string	SC firmware base level.
sc-memory	string	SC memory-controller FPGA firmware version.
sc-loader	string	SC loader firmware version.
capi-version	string	CAPI version.
mc-fw	string	MC firmware version.
mc-loader	string	MC loader firmware version.
ec-fw	string	EC firmware version.
pld-rev	string	CPLD firmware 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	uint8	MRC version for SC boot Flash. The value is 0, which means "not applicable."

virtual-disk-summary

Properties

Table 69 virtual-disk-summary properties

Name	Type	Description
name	string	Vdisk name.
serial-number	string	Vdisk serial number.

Embedded basetypes

- vdisk-hist-statistics

virtual-disks

Properties

Table 70 virtual-disks properties

Name	Type	Description
name	string	Vdisk name.
size	string	Vdisk capacity, formatted to use the current base, precision, and units.
size-numeric	string	Unformatted `size` value in 512-byte blocks.
freespace	string	Amount of free space in the vdisk, formatted to use the current base, precision, and units.
freespace-numeric	string	Unformatted `freespace` value in 512-byte blocks.
owner	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. • `A`: Controller A. • `B`: Controller B.
owner-numeric	string	Numeric equivalents for `owner` values. • `0`: B • `1`: A
preferred-owner	string	Controller that owns the vdisk and its volumes during normal operation. • `A`: Controller A. • `B`: Controller B.
preferred-owner-numeric	string	Numeric equivalents for `preferred-owner` values. • `0`: B • `1`: A
raidtype	string	Vdisk RAID level. • `NRAID` • `RAID0` • `RAID1` • `RAID3` • `RAID5` • `RAID6` • `RAID10` • `RAID50`
raidtype-numeric	string	Numeric equivalents for `raidtype` values. • `0`: RAID0 • `1`: RAID1 • `3`: RAID3 • `5`: RAID5 • `6`: NRAID • `8`: RAID50 • `10`: RAID10 • `11`: RAID6
diskcount	uint16	Number of disks in the vdisk.
sparecount	uint16	Number of spare disks assigned to the vdisk.

Table 70 virtual-disks properties (continued)

Name	Type	Description
chunksize	string	• For RAID levels except NRAID, RAID1, and RAID50, the configured chunk size for the vdisk. • For NRAID and RAID1, chunk size has no meaning and is therefore shown as not applicable (N/A). • For RAID50, the vdisk chunk size calculated as: *configured-chunk-size* x (*subvdisk-members* - 1). For a vdisk configured to use 32 KB chunk size and 4-disk subvdisks, the value would be 96k (32 KB x 3).
status	string	Vdisk status. • CRIT: Critical. The vdisk is online but isn't fault tolerant because some of its disks are down. • FTDN: Fault tolerant with down disks. The vdisk is online and fault tolerant, but some of its disks are down. • FTOL: Fault tolerant and online. • OFFL: Offline. Either the vdisk is using offline initialization, or its disks are down and data may be lost. • QTCR: Quarantined critical. The vdisk is offline and quarantined because at least one disk is missing; however, the vdisk could be accessed. For instance, one disk is missing from a mirror or RAID5. • QTDN: Quarantined with down disks. The vdisk is offline and quarantined because at least one disk is missing; however, the vdisk could be accessed and would be fault tolerant. For instance, one disk is missing from a RAID6. • QTOF: Quarantined offline. The vdisk is offline and quarantined because multiple disks are missing and user data is incomplete. • STOP: The vdisk is stopped. • UP: The vdisk is online and does not have fault-tolerant attributes. • UNKN: Unknown.
status-numeric	string	Numeric equivalents for status values. • 0: FTOL • 1: FTDN • 2: CRIT • 3: OFFL • 4: QTCR • 5: QTOF • 6: QTDN • 7: STOP • 250: UP • *other*: UNKN
lun	uint32	Not used.
min-drive-size	string	Minimum disk size that this vdisk can use, formatted to use the current base, precision, and units.
min-drive-size-numeric	string	Unformatted min-drive-size value in 512-byte blocks.
create-date	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds* (UTC), when the vdisk was created.
create-date-numeric	string	Unformatted create-date value.
cache-read-ahead	blocks	Not used.
cache-read-ahead-numeric	string	Not used.

Table 70 virtual-disks properties (continued)

Name	Type	Description
cache-flush-period	uint32	Not used.
read-ahead-enabled	string	Not used.
read-ahead-enabled-numeric	string	Not used.
write-back-enabled	string	Not used.
write-back-enabled-numeric	string	Not used.
number-of-reads	uint32	Number of read operations since these statistics were last reset or since the controller was restarted.
number-of-writes	uint32	Number of write operations since these statistics were last reset or since the controller was restarted.
total-sectors-read	uint32	Total sectors read.
total-sectors-written	uint32	Total sectors written.
job-running	string	Same as current-job.
current-job	string	Job running on the vdisk, if any. • (blank): No job is running. • DRSC: The disk is being scrubbed. • EXPD: The vdisk is being expanded. • INIT: The vdisk is initializing. • RCON: The vdisk is being reconstructed. • VRFY: The vdisk is being verified. • VRSC: The vdisk is being scrubbed.
current-job-numeric	string	Numeric equivalents for current-job values. • 0: (blank) • 2: INIT • 3: RCON • 4: VRFY • 5: EXPD • 6: VRSC • 7: DRSC
current-job-completion	string	• 0%–99%: Percent complete of running job. • (blank): No job is running.
target-id	uint32	Not used.
num-array-partitions	uint32	Number of volumes in the vdisk.
largest-free-partition-space	string	The largest contiguous space in which a volume can be created. The value is formatted to use the current base, precision, and units.
largest-free-partition-space-numeric	string	Unformatted largest-free-partition-space value in 512-byte blocks.

Table 70 virtual-disks properties (continued)

Name	Type	Description
num-drives-per-low-level-array	uint8	• For a RAID10 or RAID50 vdisk, the number of disks in each sub-vdisk. • For other RAID levels, 1.
num-expansion-partitions	uint8	Not used.
num-partition-segments	uint8	Number of free segments available for expansion of volumes.
new-partition-lba	string	Maximum number of 512-byte blocks that could be allocated to a newly created volume. The value is formatted to use the current base, precision, and units. Expanding a volume in the same vdisk will reduce this amount.
new-partition-lba-numeric	string	Unformatted new-partition-lba value in 512-byte blocks.
array-drive-type	string	Type of disk used in the vdisk. • SAS: Dual-port SAS.
array-drive-type-numeric	string	Numeric equivalents for array-drive-type values. • 4: SAS • 8: sSAS
is-job-auto-abortable	string	• false: The current job must be manually aborted before you can delete the vdisk. • true: The current job will automatically abort if you delete the vdisk.
is-job-auto-abortable-numeric	string	• 0: false • 1: true
serial-number	string	Vdisk serial number.
blocks	uint64	Unformatted size value in 512-byte blocks.
disk-dsd-enable-vdisk	string	• Disabled: DSD is disabled for the vdisk. • Enabled - all spinning: DSD is enabled for the vdisk. • Partial spin-down: DSD is enabled for the vdisk and its disks are partially spun down to conserve power. • Full spin-down: DSD is enabled for the vdisk and its disks are fully spun down to conserve power.
disk-dsd-enable-vdisk-numeric	string	• 0: Disabled • 1: Enabled - all spinning • 2: Partial spin-down • 3: Full spin-down
disk-dsd-delay-vdisk	uint32	The period of inactivity after which the vdisk's disks and dedicated spares automatically spin down, from 1–360 minutes. DSD is enabled by a value in this range, or is disabled by the value 0.
total-data-transferred	bytes	Total amount of data read and written since the last sampling time.
total-data-transferred-numeric	uint64	Unformatted total-data-transferred value.
total-bytes-per-sec	bytes	Data transfer rate, in bytes/s, since the last sampling time.
total-bytes-per-sec-numeric	uint64	Unformatted total-bytes-per-second value.

Table 70 virtual-disks properties (continued)

Name	Type	Description
health	string	• OK • Degraded • Fault • Unknown
health-numeric	string	Numeric equivalents for health values. • 0: OK • 1: Degraded • 2: Fault • 3: Unknown
health-reason	string	If Health is not OK, the reason for the health state.
health-recommendation	string	If Health is not OK, the recommended actions to take to resolve the health issue.

Embedded basetypes

• unhealthy-component

volume-names

Properties

Table 71 volume-names properties

Name	Type	Description
volume-name	string	Volume name.
serial-number	string	Volume serial number.

volume-reservations

Properties

Table 72 volume-reservations properties

Name	Type	Description
volume-name	string	Volume name.
serial-number	string	Volume serial number.
reservation-active	string	• `Free`: The volume is not reserved. • `Reserved`: The volume has been reserved by a host.
reservation-active-numeric	string	Numeric equivalents for `reservation-active` values. • `0`: Free • `1`: Reserved
host-id	string	Host WWPN.
port	string	Controller ID and port number.
reserve-type	string	The reservation type. • `Undefined`: The volume has no persistent reservations. • `Write Exclusive`: Write commands are only allowed for a single reservation holder. • `Exclusive Access`: Certain access (read, write) commands are only allowed for a single reservation holder. • `Write Exclusive - Registrants Only`: Write commands are only allowed for registered hosts. There is a single reservation holder. • `Exclusive Access - Registrants Only`: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder. • `Write Exclusive - All Registrants`: Write commands are only allowed for registered hosts. There is a single reservation holder. • `Exclusive Access - All Registrants`: Certain access (read, write) commands are only allowed for registered hosts. There is a single reservation holder.
reserve-type-numeric	string	Numeric equivalents for `reserve-type` values. • `0`: Undefined • `1`: Write Exclusive • `3`: Exclusive Access • `5`: Write Exclusive - Registrants Only • `6`: Exclusive Access - Registrants Only • `7`: Write Exclusive - All Registrants • `8`: Exclusive Access - All Registrants

volumes

Properties

Table 73 volumes properties

Name	Type	Description
`durable-id`	string	For internal use.
`virtual-disk-name`	string	Vdisk name
`volume-name`	string	Volume name.
`size`	string	Volume capacity, formatted to use the current base, precision, and units.
`total-size`	string	Not used.
`allocated-size`	string	Not used.
`size-numeric`	string	Unformatted `size` value in 512-byte blocks.
`preferred-owner`	string	Controller that owns the volume during normal operation. • `A`: Controller A. • `B`: Controller B.
`preferred-owner-numeric`	string	Numeric equivalents for `preferred-owner` values. • `0`: B • `1`: A
`owner`	string	Either the preferred owner during normal operation or the partner controller when the preferred owner is offline. • `A`: Controller A. • `B`: Controller B.
`owner-numeric`	string	Numeric equivalents for `owner` values. • `0`: B • `1`: A
`serial-number`	string	Volume serial number.
`write-policy`	string	• `write-back`: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput. • `write-through`: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.
`write-policy-numeric`	string	Numeric equivalents for `write-policy` values. • `0`: write-through • `1`: write-back

Table 73 volumes properties (continued)

Name	Type	Description
cache-optimization	string	• standard: Optimizes cache for both sequential and random reads. Appropriate for applications that read and write small files in random order, such as transaction-based and database update applications. • no-mirror: When this mode is enabled, each controller stops mirroring its cache metadata to the partner controller. This improves write I/O response time but at the risk of losing data during a failover. ULP behavior is not affected, with the exception that during failover any write data in cache will be lost. • atomic-write: This mode guarantees that if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
cache-optimization-numeric	string	Numeric equivalents for cache-optimization values. • 0: standard • 2: no-mirror • 3: atomic-write
read-ahead-size	string	The volume's read-ahead cache setting. • Disabled: Read-ahead caching is disabled. • Default: One chunk for the first access in a sequential read and one stripe for all subsequent accesses. • Maximum: Maximum read-ahead size calculated by the controller. • 64 KB, 128 KB, 256 KB, 512 KB, 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, 32 MB: Size selected by a user.
read-ahead-size-numeric	string	Numeric equivalents for read-ahead-size values. • -1: Default • 0: Disabled • 65536: 64 KB • 131072: 128 KB • 262144: 256 KB • 524288: 512 KB • 1048576: 1 MB • 2097152: 2 MB • 4194304: 4 MB • 8388608: 8 MB • 16777216: 16 MB • 33554432: 32 MB • -2147483648: Maximum
volume-type	string	• standard: Standard (typical) volume.
volume-type-numeric	string	Numeric equivalents for volume-type values. • 0: standard • 4: standard
volume-class	string	• standard: Standard (typical) volume
volume-class-numeric	string	Numeric equivalents for volume-class values. • 0: standard • 3: Proxy

Table 73 volumes properties (continued)

Name	Type	Description
profile-preference	string	Not used.
volume-qualifier	string	Special qualifier for volume. • N/A
volume-qualifier-numeric	string	Numeric equivalents for `health` values. • `0`: N/A
blocks	uint64	Unformatted `size` value in 512-byte blocks.
capabilities	string	For internal use only.
volume-parent	string	Parent volume serial number.
attributes	string	Blank
virtual-disk-serial	string	Vdisk serial number.
volume-description	string	Blank by default.
wwn	string	Volume serial number.
progress	string	Not used.
container-name	string	Vdisk name.
container-serial	string	Vdisk serial number.
health	string	• `OK` • `Degraded` • `Fault` • `Unknown`
health-numeric	string	Numeric equivalents for `health` values. • `0`: OK • `1`: Degraded • `2`: Fault • `3`: Unknown
health-reason	string	If Health is not `OK`, the reason for the health state.
health-recommendation	string	If Health is not `OK`, the recommended actions to take to resolve the health issue.

See also

• volume-names

volume-statistics

Properties

Table 74 volume-statistics properties

Name	Type	Description
`volume-name`	string	Volume name.
`serial-number`	string	Volume serial number.
`bytes-per-second`	string	Data transfer rate calculated over the interval since these statistics were last requested or reset. This value will be zero if it has not been requested or reset since a controller restart.
`bytes-per-second-numeric`	string	Unformatted `bytes-per-second` value.
`iops`	uint32	IOPS 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`	string	Amount of data read since these statistics were last reset or since the controller was restarted.
`data-read-numeric`	string	Unformatted `data-read` value.
`data-written`	string	Amount of data written since these statistics were last reset or since the controller was restarted.
`data-written-numeric`	string	Unformatted `data-written` value.
`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	Number of times flush from cache to disk is not a full stripe.
`full-stripe-write-destages`	uint64	Number of times flush from cache to disk is a full stripe.
`read-ahead-operations`	uint64	Number of read pre-fetch or anticipatory-read operations.
`write-cache-space`	uint16	Cache size used on behalf of this volume.
`write-cache-percent`	uint32	Percentage of cache used on behalf of this volume.
`reset-time`	string	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.
`reset-time-numeric`	string	Unformatted `reset-time` value.

Table 74 volume-statistics properties (continued)

Name	Type	Description
`start-sample-time`	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds*, when sampling started for the `iops` and `bytes-per-second` values.
`start-sample-time-numeric`	string	Unformatted `start-sample-time` value.
`stop-sample-time`	string	Date and time, in the format *year-month-day hour*:*minutes*:*seconds*, when sampling stopped for the `iops` and `bytes-per-second` values.
`stop-sample-time-numeric`	string	Unformatted `stop-sample-time` value.

volume-view

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Table 75 volume-view properties

Name	Type	Description
`durable-id`	string	For internal use.
`volume-serial`	string	Volume serial number.
`volume-name`	string	Volume name.

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- volume-view-mappings

volume-view-mappings

Properties

Table 76 volume-view-mappings properties

Name	Type	Description
parent-id	string	For internal use only.
mapped-id	string	For internal use only.
ports	string	• Controller host ports that the mapping applies to. • Blank if not mapped or mapped as no-access.
lun	string	• LUN that identifies the volume to a host. • Blank if not mapped or mapped as no-access.
access	string	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.
port-wwn	string	WWPN.
nickname	string	• Host nickname. • Blank if not set or for all other hosts.
host-profile	string	• Standard: The host allows LUN 0 to be assigned to a mapping.

Glossary

Additional Sense Code/Additional Sense Code Qualifier	See ASC/ASCQ.
Advanced Encryption Standard	See AES.
AES	Advanced Encryption Standard. A specification for the encryption of data using a symmetric-key algorithm.
ALUA	Asymmetric Logical Unit Access.
array	See storage system
ASC/ASCQ	Additional Sense Code/Additional Sense Code Qualifier. Information on sense data returned by a SCSI device.
atomic write	A mode that guarantees if a failure (such as I/O being aborted or a controller failure) interrupts a data transfer between a host and the storage system, controller cache will contain either all the old data or all the new data, not a mix of old and new data. This option has a slight performance cost because it maintains a secondary copy of data in cache so that if a data transfer is not completed, the old cache data can be restored.
auto-write-through	See AWT.
available disk	A disk that is not being used in a vdisk, is not configured as a spare, and is not in the leftover state. It is available to be configured as a part of a vdisk or as a spare. See also compatible disk, dedicated spare, dynamic spare, and global spare.
AWT	Auto-write-through. A setting that specifies when the RAID controller cache mode automatically changes from write-back to write-through.
CAPI	Configuration Application Programming Interface. A proprietary protocol used for communication between the SC and the MC in a controller module. CAPI is always enabled.
chassis	The sheetmetal housing of an enclosure.
chunk size	The amount of contiguous data that is written to a vdisk member before moving to the next member of the vdisk.
compatible disk	A disk that can be used to replace a failed member disk of a vdisk because it both has enough capacity and is of the same type (SAS SSD, enterprise SAS, or midline SAS) as the disk that failed. See also available disk, dedicated spare, dynamic spare, and global spare.
complex programmable logic device	See CPLD.
Configuration Application Programming Interface	See CAPI
controller A (or B)	A short way of referring to controller module A (or B).
controller enclosure	An enclosure that contains one or two controller modules.
controller module	A FRU that contains the following subsystems and devices: an SC processor; an MC processor; a SAS expander and an EC processor; management interfaces; cache protected by a supercapacitor pack and nonvolatile memory (CompactFlash); host, expansion, network, and service ports; and midplane connectivity. In a controller enclosure, the upper controller module is designated *A* and the lower one is designated *B*.
Coordinated Universal Time	See UTC.

CPLD	Complex programmable logic device. An electronic component used to build reconfigurable digital circuits. It can replace large numbers of logic gates.
CRC	Cyclic Redundancy Check. A mathematical algorithm that, when implemented in software or hardware, can be used to detect errors in data.
Cyclic Redundancy Check	See CRC.
DAS	Direct Attach Storage. A dedicated storage device that connects directly to a host without the use of a switch.
Data Encryption Standard	See DES.
dedicated spare	A disk that is reserved for use by a specific vdisk to replace a failed disk. See also available disk, compatible disk, dynamic spare, and global spare.
default mapping	Host-access settings that are configured when a volume is created, and that apply to all hosts that are not explicitly mapped to that volume using different settings. See also explicit mapping and masking.
DES	Data Encryption Standard. An algorithm for the encryption of electronic data.
DHCP	Dynamic Host Configuration Protocol. A network configuration protocol for hosts on IP networks.
Direct Attach Storage	See DAS.
drive enclosure	An enclosure that contains one or two expansion modules. Drive enclosures can be connected to a controller enclosure to provide additional storage capacity.
drive spin down	See DSD.
DSD	Drive spin down. A power-saving feature that monitors disk activity in the storage system and spins down inactive SAS disks based on user-selectable policies.
dual-port disk	A disk that is connected to both controllers so its data path is fault-tolerant.
Dynamic Host Configuration Protocol	See DHCP.
dynamic spare	An available disk that is automatically assigned, if the dynamic spares option is enabled, to replace a failed disk in a vdisk. See also available disk, compatible disk, dedicated spare, and global spare.
EC	Expander Controller. A processor, located in the SAS expander in each controller module and expansion module, that controls the SAS expander and provides SES functionality. See also EMP, MC, and SC.
EMP	Enclosure management processor. An EC subsystem that provides SES data such as temperature, PSU and fan status, and the presence or absence of disks.
enclosure	A physical storage device that contains disk drives and other FRUs.
enclosure management processor	See EMP.
Expander Controller	See EC.
expansion enclosure	See drive enclosure.
expansion module	A FRU that contains the following subsystems and devices: a SAS expander and EC processor; host, expansion, and service ports; and midplane connectivity. In a drive enclosure, the upper expansion module is designated *A* and the lower one is designated *B*.
explicit mapping	Access settings for a host to a volume that override the volume's default. See also default mapping and masking.
failback	See recovery.
failover	In an active-active configuration, failover is the act of temporarily transferring ownership of controller resources from an offline controller to its partner controller, which remains operational. The resources include volumes, cache data, host ID information, and LUNs and WWNs. See also Host, LUN, recovery, volume, and WWN.

FC-AL	Fibre Channel Arbitrated Loop. The FC topology in which devices are connected in a one-way loop.
Fibre Channel Arbitrated Loop	See FC-AL.
field-programmable gate array	See FPGA.
field-replaceable unit	See FRU.
FPGA	Field-programmable gate array. An integrated circuit designed to be configured after manufacturing.
FRU	Field-replaceable unit. A part that can be removed and replaced by the user or support technician without having to send the product to a repair facility.
global spare	A compatible disk that is reserved for use by any vdisk to replace a failed disk. See also compatible disk and vdisk. See also available disk, compatible disk, dedicated spare, and dynamic spare.
HBA	Host bus adapter. A device that facilitates I/O processing and physical connectivity between a host and the storage system.
host	An external port that the storage system is connected to. The external port may be a port in an I/O adapter in a server, or a port in a network switch. Product interfaces use the terms host and initiator interchangeably.
host port	A port on a controller module that interfaces to a host computer, either directly or through a network switch.
host bus adapter	See HBA.
initiator	See host.
I/O Manager	A MIB-specific term for a controller module.
I/O module	See IOM.
IOM	I/O module. An IOM can be either a controller module or an expansion module.
JBOD	"Just a bunch of disks." See also drive enclosure.
large form factor	See LFF.
LBA	Logical Block Address. The address used for specifying the location of a block of data.
leftover	The state of a disk that the system has excluded from a vdisk because the timestamp in the disks's metadata is older than the timestamp of other disks in the vdisk, or because the disk was not detected during a rescan. A leftover disk cannot be used in another vdisk 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. A type of disk drive.
LIP	Loop Initialization Primitive. An FC primitive used to determine the loop ID for a controller.
Logical Block Address	See LBA.
Logical Unit Number	See LUN.
loop	FC-AL topology.
Loop Initialization Primitive	See LIP.
LUN	Logical Unit Number. A number that identifies a mapped Volume to a host.
MAC Address	Media Access Control Address. A unique identifier assigned to network interfaces for communication on a network.
Management Controller	See MC.
Management Information Base	See MIB.

map/mapping	Settings that specify whether a volume is presented as a storage device to a host, and how the host can access the volume. Mapping settings include an access type (read-write, read-only, or no access), controller host ports through which initiators may access the volume, and a LUN that identifies the volume to the host. See also default mapping, explicit mapping, and masking.
masking	A volume-mapping setting that specifies no access to that volume by hosts. See also default mapping, explicit mapping, and map/mapping.
MC	Management Controller. A processor located in a controller module that is responsible for human-computer interfaces and computer-computer interfaces, including the WBI, CLI, and FTP interfaces, and interacts with the SC. See also EC and SC.
Media Access Control Address	See MAC Address.
Memory reference code	See MRC.
metadata	Data in the first sectors of a disk drive that stores all disk-, vdisk-, and volume-specific information including vdisk membership or spare ID, vdisk ownership, volumes in the vdisk, host mapping of volumes, and results of the last media scrub.
MIB	Management Information Base. A database used for managing the entities in SNMP.
mount	To enable access to a volume from a host OS.
MRC	Memory reference code.
network port	An Ethernet port on a controller module through which its MC is connected to the network.
network time protocol	See NTP.
NTP	Network time protocol.
object identifier	See OID.
OID	Object Identifier. A number assigned to devices in a network for identification purposes.
orphan data	See unwritable cache data.
Partner Firmware Upgrade	See PFU.
PCBA	Printed circuit board assembly. A printed circuit board populated with electronic components.
persistent group reservations	See PGR.
PFU	Partner Firmware Upgrade. The automatic update of the partner controller when the user updates firmware on one controller.
PGR	Persistent group reservations.
PHY	One of two hardware components that form a physical connection between devices in a SAS network that enables transmission of data.
physical layer	See PHY.
point-to-point	The FC topology where two ports are directly connected.
POST	Power-On Self Test. Tests that run immediately after a device is powered on.
Power-on Self Test	See POST.
Power Supply Unit	See PSU.
printed circuit board assembly	See PCBA.
PSU	Power Supply Unit. The power supply FRU.
RAID head	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.

remote syslog support	See syslog.
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 and MC.
SCSI Enclosure Services	See SES.
secure hash algorithm	See SHA.
secure shell	See SSH.
Self-Monitoring Analysis and Reporting Technology	See SMART.
SES	SCSI Enclosure Services. The protocol that allows the initiator to communicate with the enclosure using SCSI commands.
SFF	Small form factor. A type of disk drive.
SHA	Secure Hash Algorithm. A cryptographic hash function.
shelf	See enclosure.
small form factor	See SFF.
SMART	Self-Monitoring Analysis and Reporting Technology. A monitoring system for disk drives that monitors reliability indicators for the purpose of anticipating disk failures and reporting those potential failures.
SMI-S	Storage Management Initiative - Specification. The SNIA standard that enables interoperable management of storage networks and storage devices.
SSH	Secure Shell. A network protocol for secure data communication.
Storage Controller	See SC.
Storage Management Console	The web application that is embedded in each controller module and is the primary management interface for the storage system.
Storage Management Initiative - Specification	See SMI-S.
storage system	A controller enclosure with at least one connected drive enclosure. Product documentation and interfaces use the terms storage system and system interchangeably.
syslog	Remote syslog support. A configuration that, when enabled, sends selected event messages to the syslog on a remote system.
UCS Transformation Format - 8-bit	See UTF-8.
ULP	Unified LUN Presentation. A RAID controller feature that enables a host to access mapped volumes through either controller's host ports. ULP incorporates ALUA extensions.
Unified LUN Presentation	See ULP.
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. Unwritable cache data is also called orphan data.
UTC	Coordinated universal time. The primary time standard by which the world regulates clocks and time. It replaces Greenwich Mean Time.
UTF-8	UCS transformation format - 8-bit. A variable-width encoding that can represent every character in the Unicode character set used for the CLI and WBI interfaces.
vdisk	A virtual disk comprised of the capacity of one or more physical disks. The number of disks that a vdisk can contain is determined by its RAID level.
virtual disk	See vdisk.
volume	A portion of the capacity of a vdisk that can be presented as a storage device to a host.

web-based interface/web-browser interface	See WBI.
WBI	Web-based interface/web-browser interface. The primary interface for managing the system. A user can enable the use of HTTP, HTTPS for increased security, or both.
World Wide Name	See WWN.
World Wide Node Name	See WWNN.
World Wide Port Name	See WWPN.
WWN	World Wide Name. A globally unique 64-bit number that identifies a device used in storage technology.
WWNN	World Wide Node Name. A globally unique 64-bit number that identifies a node.
WWPN	World Wide Port Name. A globally unique 64-bit number that identifies a port.

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