

# HP StorageWorks

## 2000 Family Modular Smart Array

### CLI reference guide

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# About This Guide

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## Intended Audience

This guide is intended for use by system administrators who are experienced with the following:

- Direct attach storage (DAS) or storage area network (SAN) management
- Network administration
- Storage system configuration

## Prerequisites

Prerequisites for installing and configuring this product include familiarity with:

- Servers and computer networks
- Fibre Channel, iSCSI, Serial Attached SCSI (SAS), and Ethernet protocols

# Document Conventions

Typeface	Meaning	Examples
<i>AaBbCc123</i>	Book title, new term, or emphasized word	See the <i>user guide</i> A virtual disk ( <i>vdisk</i> ) can ... You <i>must</i> ...
AaBbCc123	Directory or file name, value, command, or on-screen output	The default file name is <code>store.logs</code> The default user name is <code>manage</code> Type <code>exit</code>
<b>AaBbCc123</b>	Text you type, contrasted with on-screen output	<b># set password</b> Enter new password:
<i>AaBbCc123</i>	Variable text you replace with an actual value	Use the format <i>user@domain</i>
[ ]	Brackets indicate that a parameter is optional.	<code>show disks [disks]</code>
[...]	Brackets containing an ellipsis indicates that the preceding parameter can be entered again, with a different value.	<code>set awt trigger</code> <code>enable disable [...]</code>
	A separator indicates that only one of the parameters or values separated by this character can be specified.	<code>base 2 10</code>

# HP Technical Support

Telephone numbers for worldwide technical support are listed on the HP support website: <http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

## Customer Self Repair

HP customer self repair (CSR) programs allow you to repair your HP StorageWorks product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider. For North America, see the CSR website:

<http://www.hp.com/go/selfrepair>

## Product Warranties

For information about HP StorageWorks product warranties, see the warranty information website:

<http://www.hp.com/go/storagewarranty>

# Subscription Service

HP strongly recommends that customers sign up online using the Subscriber's choice website: <http://www.hp.com/go/e-updates>.

Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.

## HP Websites

For other product information, see the following HP websites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- [http://www.hp.com/service\\_locator](http://www.hp.com/service_locator)
- <http://www.hp.com/support/manuals>
- <http://www.hp.com/support/downloads>

## Documentation Feedback

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To make comments and suggestions about product documentation, please send a message to [storagedocs.feedback@hp.com](mailto:storagedocs.feedback@hp.com). All submissions become the property of HP.

# Using the CLI

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This chapter introduces the HP StorageWorks MSA2000 Family command-line interface (CLI) and includes the following topics:

- “Accessing the CLI” on page 15
- “Operation Modes” on page 16
- “Command Syntax” on page 25
- “Command Completion, Editing, and History” on page 28
- “Viewing Command Help” on page 29
- “Size of Devices and Logical Units” on page 29
- “Event Log” on page 30

## Accessing the CLI

The CLI software embedded in controller modules enables you to configure, monitor, and manage a storage system out of band.

You can access the CLI in two ways:

- By using a terminal emulator on a management host that is directly connected to a controller module’s serial CLI port. See the *user guide* for information about setting management port IP addresses using the CLI.
- 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 Ethernet port.

The default usernames and passwords are:

<b>Access Level</b>	<b>Username</b>	<b>Password</b>
Monitor – to monitor system status	monitor	!monitor
Manage – to monitor and manage the system	manage	!manage

# Operation Modes

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. This single-operation mode is known as *interactive mode*.

The following example shows interactively starting a telnet session, logging into the CLI, executing a command to show free (available) disks, and exiting the CLI:

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

product
System Name: Test
System Location: Lab
Version: version

# show disks free
ID Serial#                Vendor   Rev.  State  Type  Size(GB)  Rate(Gb/s)  SP
-----
3  3KN0Z0BZ00007626NM4F  SEAGATE 0003  AVAIL  SAS   146       3.0
6  VDK41BT4CVLPNE        ATA      A9BA  AVAIL  SATA  250       3.0
7  3KN0Z6PD00007626NLV5  SEAGATE 0003  AVAIL  SAS   146       1.5
10 3KN0Z09500007626NM28  SEAGATE 0003  AVAIL  SAS   146       3.0
-----

# exit
```

CLI commands can also be scripted using a telnet client like Expect or a Perl library. Scripts can use interactive mode to execute single commands to emulate a *single-command mode*.

The following example shows the Perl Expect script `showfree.exp` that starts a telnet session, logs into the CLI, executes a command to show free disks, and exits the CLI:

```
#!/usr/bin/expect
set login [lindex $argv 1]
set password [lindex $argv 2]
set host [lindex $argv 3]
set command [lindex $argv 4]
spawn telnet $host

expect "Login:"
send "$login\r"
expect "Password:"
send "$password\r"
send "$command\r"
send "exit"
expect eof
```

The following shows a possible result of executing this script:

```
$.:/showfree.exp monitor !monitor 172.22.4.245 "show disks free"
```

```
Login: monitor
```

```
Password: *****
```

```
product
```

```
System Name: Test
```

```
System Location: Lab
```

```
Version: version
```

```
# show disks free
```

ID	Serial#	Vendor	Rev.	State	Type	Size(GB)	Rate(Gb/s)	SP
3	3KN0Z0BZ00007626NM4F	SEAGATE	0003	AVAIL	SAS	146	3.0	
6	VDK41BT4CVLPNE	ATA	A9BA	AVAIL	SATA	250	3.0	
7	3KN0Z6PD00007626NLV5	SEAGATE	0003	AVAIL	SAS	146	1.5	
10	3KN0Z09500007626NM28	SEAGATE	0003	AVAIL	SAS	146	3.0	

```
# exit
```

The example below and continuing on the next page shows how to construct a script using a Perl library for telnet communication.

```
use Net::Telnet;
$mVer = "v.072006";
$mLine = "=====";
$mStr = "Management Controller System Cloning Utility";
$nLine = "\n";
$cliDumpFile = "get_config_dump.txt";
$space = ' ';
$username = "";
$password = "";

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_comamnds == 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);
}
```

The example shows a Perl script for logging in. `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. Once the user has been logged in, other commands can be sent to the CLI.

The command below provides better scripting support. The first argument sets the output format to XML, which allows easier parsing. The second argument disables the paging mode that pauses for each full screen of command output.

```
$telnet->cmd("set cli-parameters api 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 ]");  
}
```

## Using the XML API

You can set the CLI output to either `console` or `api` using the `set cli-parameters` command. When set to `api`, the output is returned in XML. You can use an XML parser such `XML::Parser` in Perl to process the XML output and store this information as objects.

An updated Document Type Definition (DTD) is available with each update of the firmware.

The XML parser should use the DTD version that corresponds to the firmware level to ensure that the DTD is validated. By obtaining the latest DTD for validation, the parser will be forward compatible.

# DTD

The following is Revision 1 of the DTD. Elements and attributes are described in the table on the following page.

```
<!ATTLIST OBJECT
  oid ID #REQUIRED
  name CDATA #IMPLIED
  basetype CDATA #IMPLIED
>

<!-- Property definition -->
<!ELEMENT PROPERTY (#PCDATA)>
<!ATTLIST PROPERTY
  display-name CDATA #IMPLIED
  draw (true|false) #IMPLIED
  size CDATA #IMPLIED
  type (string|uint8|uint16|uint32|uint64|int8|int16|int32|int64|bool|enum)
#IMPLIED
  key (true|false) #IMPLIED
  name CDATA #REQUIRED
>

<!-- Composition, P is the part component, G is the grouping component -->
<!ELEMENT COMP EMPTY>
<!ATTLIST COMP
  P IDREF #REQUIRED
  G IDREF #REQUIRED
>

<!-- Simple Association, A and B are the oids of the Objects -->
<!ELEMENT ASC EMPTY>
<!ATTLIST ASC
  A IDREF #REQUIRED
  B IDREF #REQUIRED
>
```

Elements and attributes of the DTD are described in the following table.

Element	Description and Attributes
RESPONSE	<p>The RESPONSE is the top level XML object. The request attributes contain the details of the request that was sent. The RESPONSE is a container for objects that are returned as part of the request.</p> <p>All commands have a status object as part of the RESPONSE which provides a message and return code. A return code of 0 indicates that the command was successful. Any other return code is an error code.</p>
OBJECT	<p>The OBJECT element is a container for properties. Each OBJECT also has attributes which describe the OBJECT characteristics.</p> <ul style="list-style-type: none"><li>• <code>oid</code> (Object Identifier) - A unique number per request which identifies the OBJECT within a response. This number is used as a reference in associations that the response may contain.</li><li>• <code>name</code> - The class name of the object.</li><li>• <code>basetype</code> - The generic class name of the object. This is used to distinguish between differing types of objects within a response. A response can contain a number of volumes all of which may be of different classes (standard volumes, snap-pools, snapshots, etc.). The response also contains a status object. The <code>basetype</code> indicates which object is a volume and which object is a status object.</li></ul>
PROPERTY	<p>The PROPERTY element provides the detailed information for each OBJECT. The element value is the actual data content to be used. The attributes provide further details on how to interpret the data.</p> <ul style="list-style-type: none"><li>• <code>display-name</code> - The suggested label to use in a user interface for the data value.</li><li>• <code>raw</code> - Indicates whether or not a value should be displayed to a user. If this value is <code>false</code>, the value might apply only to a programmatic interface which can use the value for calculations.</li><li>• <code>size</code> - The number of columns to use to display the value.</li><li>• <code>type</code> - The type that the data should be interpreted as.</li><li>• <code>key</code> - Indicates whether or not this values can be used as a key to other commands.</li><li>• <code>name</code> - The name of the property. The name attribute is used for unique identification within an object.</li></ul>
COMP	<p>The composition element gives the association between a grouping object and a part of object. This provides a description of the hierarchy of the objects that are part of the response.</p> <ul style="list-style-type: none"><li>• <code>P</code> - The part component oid.</li><li>• <code>G</code> - The grouping component oid.</li></ul>

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

## Example

The following example shows the output of the `show schedule-details` command with the output first set to `console` and second set to `api`.

```
# set cli-parameters console
Success: CLI parameter changed successfully

# show schedule-details Sched1
Schedule Details
-----
Schedule Name: Sched1
Schedule Specification: Start 5/01/2007 00:01:00, Only 1st Weekday Of Month
Schedule Status: Ready
Next Time: 5/01/2007 00:01:00
Task To Run: task1
Error Message: none

Task Details
-----
Task Name: task1
Task Type: TakeSnapshot
Task Status: Ready
Task State: Init
Master Volume Name: mv1
Master Volume Serial: 00c0ff0a43010048f9ca2d4601000000
Snapshot Prefix: ss
Retention Count: 3
Last Snapshot Created: none
Error Message: none

Snapshot Name          Snapshot Serial
-----
ss_S0003                00c0ff0a43010048f9ca2d4601000000
```

```

# set cli-parameters api
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RESPONSE request="cli-parameters">
<OBJECT name="status" oid="1">
    <PROPERTY name="success" type="string" size="77" draw="true" display-name=
"Success">CL
I parameter changed successfully</PROPERTY>
    <PROPERTY name="return-code" type="int32" size="5" draw="false" display-
name="Return C
ode">0</PROPERTY>
</OBJECT>
</RESPONSE>

#show schedule-details Sched1

<?xml version="1.0"?>
<!DOCTYPE RESPONSE SYSTEM "DHXML.dtd">
<RESPONSE>
    <OBJECT basetype="schedule" name="schedule" oid="1">
        <PROPERTY name="name" key="true" type="string" size="32" draw="true"
display-name="Schedule Name">Sched1</PROPERTY>
        <PROPERTY name="schedule-specification" type="string" size="170" draw=
"true" display-name="Schedule Specification">Start 5/01/2007 00:01:00, Only 1st
Weekday Of Month</PROPERTY>
        <PROPERTY name="status" type="string" size="20" draw="true" display-
name="Schedule Status">Ready</PROPERTY>
        <PROPERTY name="next-time" type="string" size="32" draw="true" display-
name="Next Time">5/01/2007 00:01:00</PROPERTY>
        <PROPERTY name="task-to-run" type="string" size="32" draw="true"
display-name="Task To Run">task1</PROPERTY>
        <PROPERTY name="error-message" type="string" size="100" draw="true"
display-name="Error Message">none</PROPERTY>
    </OBJECT>
    <COMP G="1" P="2" />
    <OBJECT basetype="task" name="task" oid="2">
        <PROPERTY name="name" key="true" type="string" size="32" draw="true"
display-name="Task Name">task1</PROPERTY>
        <PROPERTY name="type" type="string" size="32" draw="true" display-name=
"Task Type">TakeSnapshot</PROPERTY>
        <PROPERTY name="status" type="string" size="10" draw="true" display-
name="Task Status">Ready</PROPERTY>
        <PROPERTY name="state" type="string" size="15" draw="true" display-name=
"Task State">Init</PROPERTY>
        <PROPERTY name="master-volume-name" type="string" size="32" draw="true"
display-name="Master Volume Name">mv1</PROPERTY>

```

```
<PROPERTY name="master-volume-serial" type="string" size="32" draw="true"
display-name="Master Volume
Serial">00c0ff0a43010048f9ca2d4601000000</PROPERTY>
  <PROPERTY name="snapshot-prefix" type="string" size="14" draw="true"
display-name="Snapshot Prefix">ss</PROPERTY>
  <PROPERTY name="retention-count" type="string" size="5" draw="true"
display-name="Retention Count">3</PROPERTY>
  <PROPERTY name="last-created" type="string" size="32" draw="true" display-
name="Last Snapshot Created">none</PROPERTY>
  <PROPERTY name="error-message" type="string" size="100" draw="true"
display-name="Error Message">none</PROPERTY>
</OBJECT>
</RESPONSE>
```

# Command Syntax

This section describes syntax rules for CLI commands.

- “Keywords and Parameters” on page 25
- “Disk Drive Syntax” on page 25
- “Virtual Disk Syntax” on page 26
- “Volume Syntax” on page 26
- “Volume Mapping Syntax” on page 27
- “Host Nickname Syntax” on page 27

## Keywords and Parameters

Command keywords must be entered in lowercase. Parameter values can be entered in uppercase and lowercase.

Parameter values that contain non-alphanumeric characters, such as spaces, must be enclosed in quotation marks (“”), which the CLI parses and removes.

## Disk Drive Syntax

The CLI disk-addressing mode parameter controls how drives are identified (see “show cli-parameters” on page 164).

- If set to `enclosure-slot`, drives are identified by a combination of enclosure ID and drive slot number. The first enclosure has ID 0, the second has ID 1, and so on. In each enclosure, slots are numbered 0–11. For example, 1.3 identifies drive 3 in enclosure 1.
- If set to `channel-id`, drives are identified by SCSI ID. The first enclosure has drive IDs 0–11, the second has 16–27, the third has 32–43, and the fourth has 48–59.

You can specify:

- An individual drive. For example, 4 or 0.4.
- A hyphenated range of drives. For example, 4-7 or 0.4-7.
- A comma-separated list of individual drives, ranges, or both (with no spaces). For example, 4,6-9 or 0.4,0.6-9.
- A RAID 10 or 50 virtual disk, with drives in sub-vdisks separated by colons (with no spaces). For example (RAID 50), 0-2:3-5:6,10-11 or 0.0-2:0.3-5:0.6,0.10-11.

## Virtual Disk Syntax

You can specify virtual disks by using:

- **Virtual disk name.** A user-defined, case-sensitive name that can include a maximum of 17 characters, but not comma, quotation mark ("), or backslash. A name that includes a space must be enclosed in quotation marks.

To use a name that the CLI could interpret as an optional parameter, you must specify that parameter before the name parameter.

- **Virtual disk serial number.** A unique 32-digit number that is automatically assigned when a virtual disk is created, and does not change for the life of the virtual disk.
- A list of names or serial numbers separated by commas (with no spaces). Some commands do not support lists. This example specifies a name and a serial number:

```
VD1,00c0ff0a43180048e6dd1c4500000000
```

## Volume Syntax

You can specify volumes by using:

- **Volume name.** A user-defined, case-sensitive name that can include a maximum of 20 characters, but not comma, quotation mark ("), or backslash. A name that includes a space must be enclosed in quotation marks.

To use a name that the CLI could interpret as an optional parameter, you must specify that parameter before the name parameter.

- **Volume serial number.** A unique 32-digit number that is automatically assigned when a volume is created, and does not change for the life of the volume.
- A list of names or serial numbers separated by commas (with no spaces). Most commands do not support lists. This example specifies a serial number and a name:

```
AA43BF501234560987654321FEDCBA,"Vol #1"
```

## Host Nickname Syntax

You can specify a nickname for a host-side port. A nickname is a case-sensitive name that can include a maximum of 15 characters, but not comma, quotation mark ("), or backslash. A name that includes a space must be enclosed in quotation marks. For example, MyHost.

## Volume Mapping Syntax

You can specify the controller host ports and LUN to use in a volume mapping by using the syntax *ports.LUN*.

- *ports* can be a controller host port identifier, a comma-separated list of port identifiers, or a hyphenated range of port identifiers, or a combination of these.
  - For SAS, a port identifier is a controller ID (a, A, b, or B) and port number. Examples:  
a0  
a0-a1  
A0,A1,B0,B1  
A0-A1,B0-B1  
  
Do not mix controller IDs in a range; for example, A0-B1.
  - For FC and iSCSI, a port identifier is a single digit. Specified ports must be located on the controller that owns the volume's virtual disk. Examples:  
0  
0,1  
0-1
- *LUN* is a logical unit number from 0–127 (FC and iSCSI) or 0-255 (SAS only) to assign to the mapping.

Examples:

- On a SAS system, to map controller A ports 0 and 1 with LUN 8, specify:

```
a0-a1.8
```

- On an FC or iSCSI system, to map a volume owned by controller A using its ports 0 and 1 with LUN 8, specify:

```
0-1.8
```

# Command Completion, Editing, and History

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

When using command completion, if you enter too few letters to uniquely identify a keyword, the CLI lists keywords that match the entered string and redisplay the string so you can complete it.

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

---

<b>To</b>	<b>Press</b>
Complete a partially entered keyword	Tab
Get previous command from history	Up Arrow or Ctrl-P
Get next command from history	Down Arrow or Ctrl-N
Move cursor left	Left Arrow or Ctrl-B
Move cursor right	Right Arrow or Ctrl-F
Move back one word	Esc-B
Move forward one word	Esc-F
Move cursor to start of line	Ctrl-A
Move cursor to end of line	Ctrl-E
Transpose current and previous character	Ctrl-T
Delete current character	Delete or Ctrl-D
Delete previous character	Backspace
Delete word up to cursor	Ctrl-W
Delete rest of word	Esc-D
Delete text up to cursor	Ctrl-U
Delete rest of line	Ctrl-K
Convert rest of word to uppercase	Esc-C
Convert rest of word to lowercase	Esc-L
Enter command and redisplay prompt	Ctrl-Z
Refresh input line	Ctrl-L

---

# Viewing Command Help

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

```
# help
```

To view help for a specific command, type either:

```
# help command  
# command ?
```

To view information about the syntax to use for specifying disk drives, virtual disks, volumes, and volume mapping, type:

```
# help syntax
```

## Size of Devices and Logical Units

The size of disk drives and logical units such as virtual disks and volumes are presented in base 2 (binary) format, not base 10 (decimal) format. Table 1-1 shows how sizes are presented in each format.

**Table 1-1** Sizes in Binary and Decimal

Unit	Size in Binary	Size in Decimal
Kbyte	1024 bytes	1000 bytes
Mbyte	1024 Kbyte 1,048,576 bytes	1000 Kbyte 1 million bytes
Gbyte	1024 Mbyte 1,073,741,824 bytes	1000 Mbyte 1 billion bytes
Tbyte	1024 Gbyte 1,099,511,627,776 bytes	1000 Gbyte 1 trillion bytes

To check which format is being used, use “show cli-parameters” on page 164. To change the output format, use “set cli-parameters” on page 118.

# Event Log

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

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

- **Critical.** Events that might affect data integrity or system stability.
- **Warning.** Events that do not affect data integrity.
- **Informational.** Events that show the change of state or configuration changes.

For information about viewing events, see “show events” on page 181.

# Command Categories

---

Commands in this guide are organized alphabetically to make it easy to find a command by name. This chapter helps you find a command within a logical grouping, based on the command's function. A command might be listed in more than one category. For more information about each command, see Chapter 3.

- “CLI and Users” on page 31
- “Virtual Disks and Disk Drives” on page 32
- “Volumes and Mapping” on page 32
- “Snapshots” on page 33
- “Volume Copy (Clone)” on page 33
- “Task Scheduling” on page 33
- “Event Notification” on page 34
- “Configuration and Utilities” on page 34
- “Service Utilities” on page 35

## CLI and Users

- create user
- delete user
- exit
- help; see “Viewing Command Help” on page 29
- set cli-parameters
- set password
- set prompt
- set user
- show cli-parameters
- show users

# Virtual Disks and Disk Drives

- abort create
- abort scrub
- abort verify
- clear disk-metadata
- create vdisk
- delete global-spare
- delete vdisk
- delete vdisk-spare
- expand vdisk
- rescan
- scrub vdisk
- set expander-fault-isolation
- set led
- set vdisk
- set vdisk-spare
- show disks
- show vdisks
- trust
- verify vdisk

# Volumes and Mapping

- create host-wwn-name
- create iscsi-host
- create volume
- delete host-wwn-name
- delete iscsi-host
- delete volume
- expand volume
- map volume
- set cache-parameters
- set host-wwn-name
- set iscsi-host
- set volume
- show cache-parameters
- show host-maps
- show host-wwn-names
- show iscsi-hosts
- show port-wwn
- show volumes

- show volume-maps
- unmap volume

## Snapshots

- convert master-to-std
- convert std-to-master
- create master-volume
- create snap-pool
- create snapshots
- delete all-master-volumes
- delete all-snapshots
- delete master-volume
- delete snap-pool
- delete snapshot
- delete snapshot-write-data
- expand snap-pool
- reset snapshot
- rollback master-volume
- set snap-pool-policy
- set snap-pool-threshold
- show master-volumes
- show snap-pools
- show snapshots

## Volume Copy (Clone)

- abort volumecopy
- show volumecopy-status
- volumecopy

## Task Scheduling

- create schedule
- create task
- delete schedule
- delete task
- show schedules
- show schedule-details
- show tasks
- show task-details

## Event Notification

- clear event
- set snmp-parameters
- show events
- show snmp-parameters

## Configuration and Utilities

- alias
- clear cache
- create chap-record
- delete chap-records
- ping
- reset host-channel-link
- restart
- set auto-write-through-trigger (alias: set awt)
- set chap-record
- set controller-date
- set drive-parameters
- set expander-fault-isolation
- set expander-phy
- set host-parameters
- set host-port-interconnects
- set iscsi-parameters
- set job-parameters
- set led
- set network-parameters
- set password
- set protocols
- set system
- show auto-write-through-trigger
- show channels
- show chap-records
- show configuration
- show controller-date
- show drive-parameters
- show enclosure-status
- show expander-status
- show frus
- show host-parameters
- show host-port-interconnects

- show iscsi-parameters
- show job-parameters
- show license
- show network-parameters
- show ntp-status
- show protocols
- show redundancy-mode
- show shutdown-status
- show sensor-status
- show system
- shutdown
- stty
- versions (alias: show versions)

## Service Utilities

- clear expander-status
- restore defaults
- set debug-log-parameters
- show debug-log
- show debug-log-parameters



# Command Descriptions

---

This chapter describes the commands in alphabetical order. Each command topic includes one or more of the following sections:

- **Description.** The command's purpose and notes about its usage.
- **Input.** The command's syntax and descriptions of its parameters.
- **Output.** A description of information that is displayed by the command.
- **Examples.** One or more examples of the command's usage, if the command has parameters or detailed output.
- **Error Messages.** Descriptions of error messages you might encounter while using the command.
- **Related Commands.** Cross-references to commands that are used with or similar to the command.

## abort create

### Description

Stops the `create vdisk` operation for a virtual disk being initialized online or offline. This command does not revert the system to the state it was in before starting to create the virtual disk; instead, the virtual disk is left in an offline state (status OFFL).

### Input

```
abort create vdisk vdisk
```

---

Parameter	Description
-----------	-------------

---

<i>vdisk</i>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
--------------	---

---

### Example

Abort creating virtual disk VD1.

```
# abort create vdisk VD1
Success: Aborted Creation of Vdisk VD1

# show vdisks
Name ... Stat
---- ... ----
VD1   ... OFFL
-----
```

### Related Commands

- “create vdisk” on page 65
- “set vdisk” on page 153

# abort scrub

## Description

Aborts the `scrub vdisk` operation for specified virtual disks.

## Input

```
abort scrub vdisk vdisks
```

Parameter	Description
<code>vdisk <i>vdisks</i></code>	Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Abort scrubbing virtual disk VD1.

```
# abort scrub vdisk VD1
Info: Scrub aborted on vdisk VD1

Success: Command completed successfully
```

## Related Commands

- “scrub vdisk” on page 106
- “show vdisks” on page 230 (to see where a scrub is in progress)

# abort verify

## Description

Aborts the `verify vdisk` operation for specified virtual disks.

## Input

```
abort verify vdisk vdisks
```

Parameter	Description
<code>vdisk <i>vdisks</i></code>	Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Abort verifying virtual disk VD1.

```
# abort verify vdisk VD1
Info: Verify aborted on vdisk VD1

Success: Command completed successfully
```

## Related Commands

- “show vdisks” on page 230 (to see where a verify is in progress)
- “verify vdisk” on page 246

# abort volumecopy

## Description

Aborts copying a volume. When the abort is complete, the destination volume is deleted.

## Input

```
abort volumecopy volume
```

Parameter	Description
<i>volume</i>	Specifies the name or serial number of either the source or the destination volume. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Abort creating destination volume Copy.

```
# abort volumecopy Copy  
Success: Volume Copy Aborted.
```

## Related Commands

- “show volumecopy-status” on page 233
- “show volumes” on page 237
- “volumecopy” on page 248

# alias

## Description

Shows, creates, or deletes aliases for the current CLI session. An alias is usually a short string that is substituted for a longer string. If both parameters are omitted, existing aliases are shown.

## Input

```
alias [alias] [command-string]
```

Parameter	Description
<i>alias</i>	Optional. Specifies the string to substitute for the command string. An alias that includes a space must be enclosed in quotation marks ("). Aliases are not case sensitive; for example, new alias <i>SS</i> will replace existing alias <i>ss</i> . If the alias exists and the command string parameter is omitted, the alias is deleted.
<i>command-string</i>	Optional. Specifies the command string that the alias substitutes for. A string that includes a space must be enclosed in quotation marks (").

## Output

Shows, in the order aliases were created, each alias and its associated command string.

## Example

Create alias *se3* for a command that shows the last three events.

```
# alias se3 "show events last 3"  
Success: Command completed successfully
```

Show existing aliases.

```
# alias
se3                show events last 3
sd                 show disks
Success: Command completed successfully
```

Run alias se3.

```
# se3
WED OCT 10 16:53:52 2007 [23] #B73748: product SN#00C0FF627005
Controller B INFORMATIONAL: Vdisk creation started. Vdisk: VD3,
SN: 00c0ff6 2701900009f030d4700000000, 2 drive RAID1, Online Init
WED OCT 10 16:42:17 2007 [207] #B73747: product SN#00C0FF627005
Controller B INFORMATIONAL: Vdisk scrub complete, no errors found.
(Vdisk: VD1, SN: 00c0ff6270190000f9d70c4700000000)
WED OCT 10 16:39:44 2007 [310] #B73746: product SN#00C0FF627005
Controller B INFORMATIONAL: Discovery and initialization of
enclosure data has completed following a rescan.
```

# clear cache

## Description

Clears unwritable data in both controllers' cache for a specified volume, or unneeded orphaned data for volumes that are no longer online or that no longer exist.

## Input

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

Parameter	Description
volume <i>volume</i>	Optional. Specifies the volume by its name or serial number. For the syntax to use, see "Volume Syntax" on page 26. 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 the cache in both controllers for volume V1.

```
# clear cache volume V1  
Success: Command completed successfully
```

# clear disk-metadata

## Description

Clears metadata from “leftover” disk drives. Each disk drive contains metadata that the system uses to identify the drive’s owning virtual disk, if any. If the system cannot locate the virtual disk, as when the drive has been moved to a different system, the owning virtual disk is shown as Leftover. You must clear the metadata before you can use the drive in a different virtual disk or as a spare.

If you specify a disk drive that is not available or a leftover, the command will not clear that drive’s metadata.

## Input

```
clear disk-metadata disks
```

Parameter	Description
<i>disks</i>	Specifies the disk drives by a range or list of IDs. For the syntax to use, see “Disk Drive Syntax” on page 25.

## Example

Clear metadata for the first enclosure's first drive, which is *not* part of a virtual disk.

```
# clear disk-metadata 0
Updating drives list...
Info: Drive 0 Metadata Cleared.

Success: Metadata Cleared.
```

Clear metadata for the first enclosure's first drive, which is part of a virtual disk.

```
# clear disk-metadata 0
Updating drives list...
Info: Drive 0 Metadata NOT Cleared.

Error: The specified drive is not an available or leftover drive.
```

# clear event

## Description

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

## Input

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

Parameter	Description
a b both	Optional. Specifies whether to clear the event log for controller A, B, or both. If this parameter is omitted, both event logs are cleared.

## Example

Clear the event log for controller A.

```
# clear event a  
Success: Controller A event log successfully cleared
```

## Related Commands

- “show events” on page 181

# clear expander-status

## Description

---

**Note** – This command should be used only by service technicians, or with the advice of a service technician.

---

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.

## Input

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

---

Parameter	Description
<code>enclosure <i>id</i></code>	Optional. Specifies the enclosure number, as shown by the <code>show expander-status</code> command.

---

## Example

Clear the expander status for the controller enclosure.

```
# clear expander-status enclosure 0  
Success: Cleared Expander Status
```

## Related Commands

- “show expander-status” on page 184
- “set expander-fault-isolation” on page 125
- “set expander-phy” on page 127

## convert master-to-std

### Description

Converts a specified master volume into a standard volume; that is, it disables the volume from accepting snapshots.

You must delete all snapshots that exist for the master volume before converting it to a standard volume; otherwise, the command will fail.

### Input

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

---

### Parameter Description

---

<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
---------------	---

---

### Example

Convert master volume MV1, having no snapshots, to a standard volume.

```
# convert master-to-std MV1
Success: Convert Master to Standard Volume Complete.
```

### Related Commands

- “delete all-snapshots” on page 71
- “show master-volumes” on page 200

# convert std-to-master

## Description

Converts a standard volume to a master volume; that is, it enables the volume for snapshots and associates it with an existing snap pool. The standard volume and the snap pool must be owned by the same controller, though they can be on different virtual disks.

## Input

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

Parameter	Description
<i>volume</i>	Specifies the master volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
<i>snap-pool volume</i>	Specifies the snap-pool volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.

## Example

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

```
# convert std-to-master V1 snap-pool SP1
Success: Convert Standard to Master Volume Complete.
```

## Related Commands

- “show master-volumes” on page 200
- “show snap-pools” on page 216

## create chap-record

### Description

iSCSI only. Creates a record to enable authentication between the originator (initiator) and recipient (target) of a login request when CHAP is enabled. This command is permitted whether or not CHAP is enabled.

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

For a login request from an iSCSI host to a storage system, the host is the originator and the storage system is the recipient.

### Input

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

Parameter	Description
<i>name originator-name</i>	Specifies the originator name, which is typically the originator's IQN. The name is case sensitive and can include a maximum of 223 characters.
<i>secret originator-secret</i>	Specifies the secret that the recipient uses to authenticate the originator. The secret is case sensitive and can include 12–16 characters.
<i>mutual-name recipient-name</i>	Optional; for mutual CHAP only. Specifies the recipient name, which is typically the recipient's IQN. The name is case sensitive and can include a maximum of 223 characters. A storage system's IQN is a controller host-port name without its .a or .b suffix; see the Port-Name field displayed by the <code>show host-parameters</code> command. This parameter and <i>mutual-secret</i> must be set together.
<i>mutual-secret recipient-secret</i>	Optional; for mutual CHAP only. Specifies the secret that the originator uses to authenticate the recipient. The secret is case sensitive and can include 12–16 characters. A storage system's secret is shared by both controllers. This parameter and <i>mutual-name</i> must be set together.

## Example

Create a one-way CHAP record to enable a storage system to authenticate a host initiator having IQN `iqn.1991.05.com.microsoft-swlab-qlc`.

```
# create chap-record name iqn.1991-05.com.microsoft:myHost.domain secret
123456abcDEF
Success: created CHAP record for iqn.1991-05.com.microsoft:myHost.domain
```

## Related Commands

- “delete chap-records” on page 72
- “set chap-record” on page 116
- “show chap-records” on page 162
- “show host-parameters” on page 190
- “show iscsi-parameters” on page 196

## create host-wwn-name

### Description

FC and SAS only. Creates an entry for a host world wide port name (WWPN) and associates a nickname with the entry. This enables you to specify the nickname instead of the WWPN when mapping volumes to hosts.

### Input

```
create host-wwn-name wwn wwpn name
```

Parameter	Description
<i>wwn wwpn</i>	Specifies a 16-hex-digit WWPN that corresponds to an HBA.
<i>name</i>	Specifies a nickname for the HBA. For the syntax to use, see “Host Nickname Syntax” on page 27.

### Example

Create the nickname MyHost for the HBA having WWPN 210000e08b095562.

```
# create host-wwn-name wwn 210000e08b095562 MyHost
Info: Adding hostWnn: 210000e08b095562 and nickName: MyHost

Success: Command completed successfully
```

### Related Commands

- “delete host-wwn-name” on page 74
- “set host-wwn-name” on page 133
- “show host-wwn-names” on page 194

# create iscsi-host

## Description

iSCSI only. Associates a nickname with an iSCSI host initiator's node name. You can then use the nickname when mapping volumes to hosts.

## Input

```
create iscsi-host name name nickname
```

Parameter	Description
name <i>name</i>	Specifies an iSCSI host initiator's node name. This is typically the initiator's IQN (iSCSI Qualified Name). This must not be an existing node name, as displayed with the <code>show iscsi-hosts</code> command; it must be one that you get from some other source of information. To add or change a nickname for an existing node name, use <code>set iscsi-host</code> .
<i>nickname</i>	Specifies a nickname for the iSCSI host initiator. For the syntax to use, see "Host Nickname Syntax" on page 27.

## Example

Create the nickname `myHost` for the iSCSI host initiator with the node name `iqn.1991-05.com.microsoft:myHost.domain`.

```
# create iscsi-host name iqn.1991-05.com.microsoft:myHost.domain  
myHost  
Success: adding iSCSI host done
```

## Related Commands

- "delete iscsi-host" on page 75
- "set iscsi-host" on page 134
- "show iscsi-hosts" on page 195

## create master-volume

### Description

Creates a volume on a specified virtual disk, enables the volume for snapshots, and associates it with an existing snap pool. The volume and snap pool must be owned by the same controller.

### Input

```
create master-volume vdisk vdisk size sizeMB|GB|TB
snap-pool volume [lun LUN] name
```

Parameter	Description
<code>vdisk <i>vdisk</i></code>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
<code>size <i>size</i>MB GB TB</code>	Specifies the volume size in MB (Mbyte), GB (Gbyte), or TB (Tbyte). The size uses base 10 (multiples of 1000) or base 2 (multiples of 1024); to see the current base setting, type <code>show cli-parameters</code> .
<code>snap-pool <i>volume</i></code>	Specifies the snap pool volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
<code>lun <i>LUN</i></code>	Optional. Specifies a logical unit number to assign to the new master volume. If this parameter is omitted, no LUN is assigned.
<code><i>name</i></code>	Specifies a name for the new master volume. For the syntax to use, see “Volume Syntax” on page 26.

### Example

Create the 1-Gbyte master volume MV1 on virtual disk VD1, and associates it with snap pool SP1.

```
# create master-volume vdisk VD1 size 1GB snap-pool SP1 MV1
Success: Master Volume Created.
```

## **Related Commands**

- “delete master-volume” on page 76
- “show master-volumes” on page 200
- “show snap-pools” on page 216
- “show vdisks” on page 230

# create schedule

## Description

Schedules a task to run automatically.

## Input

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

Parameter	Description
<i>sname</i>	Specifies a name for the new schedule, using a maximum of 32 characters and no quotation mark (") or backslash (\) characters. Names are case sensitive.
schedule-specification " <i>specification</i> "	<p>Specifies when the task will run the first time, optional conditions defining when the task will recur and expire. You can use a comma between conditions.</p> <ul style="list-style-type: none"><li>start <i>mm/dd/yyyy hh:mm</i> [AM PM] If AM PM is not specified, a 24 hour clock is used. If you also use the between condition, below, the start time must be in the between range.</li></ul> <p>Optional specifications:</p> <ul style="list-style-type: none"><li>every # minutes hours days months years</li><li>between <i>hh:mm</i> [AM PM] and <i>hh:mm</i> [AM PM]</li><li>only any first second third fourth fifth last #st #nd #rd #th   weekday weekend day  Sunday Monday Tuesday  Wednesday Thursday Friday  Saturday of year month January February  March April  May June July August September October  November December</li><li>count #</li><li>expires <i>mm/dd/yyyy hh:mm</i> [AM PM]</li></ul>
task-name <i>tname</i>	Specifies the name of the task to run. The name is case sensitive.

## Example

Create schedule Sched1 that runs Task1 for the first time on March 1, 2007; runs daily between midnight and 1:00 AM; and runs for the last time in the morning of January 1, 2008.

```
# create schedule Sched1 schedule-specification "start 3/1/2007
00:01 AM, every 1 days, between 12:00 AM and 1:00 AM, expires
1/1/2008 1:00 AM" task-name Task1
```

```
Success: Schedule created
```

Create schedule Sched2 that runs Task2 for the first time on March 1, 2007, and runs only on the first weekday of each month, with no expiration.

```
# create schedule Sched2 schedule-specification "start 3/1/2007
00:01 only first weekday of month" task-name Task2
```

```
Success: Schedule created
```

## Related Commands

- “delete schedule” on page 77
- “show schedules” on page 212
- “show task-details” on page 223
- “show tasks” on page 227

# create snap-pool

## Description

Creates a snap pool volume to use for snapshot data. A snap pool is an internal volume only and cannot be assigned a LUN.

## Input

```
create snap-pool vdisk vdisk size sizeMB|GB|TB name
```

Parameter	Description
<i>vdisk vdisk</i>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
<i>size sizeMB GB TB</i>	Specifies the volume size in MB (Mbyte), GB (Gbyte), or TB (Tbyte). The size uses base 10 (multiples of 1000) or base 2 (multiples of 1024); to see the current base setting, type <code>show cli-parameters</code> . For information about estimating snap-pool size, see help for the WBI’s Create Snap-Pool page.
<i>name</i>	Specifies a name for the new snap pool volume. For the syntax to use, see “Volume Syntax” on page 26.

## Example

Create the 10-Gbyte snap pool SP1 on virtual disk VD1.

```
# create snap-pool vdisk VD1 size 10GB SP1
Success: Snap-pool Created.
```

## Related Commands

- “delete snap-pool” on page 78
- “show snap-pools” on page 216
- “show vdisks” on page 230

# create snapshots

## Description

Creates a named snapshot of each specified master volume.

## Input

```
create snapshots master-volumes volumes snap-names
```

Parameter	Description
<i>master-volumes volumes</i>	Specifies a comma-separated list of volumes by their names or serial numbers. For the syntax to use, see “Volume Syntax” on page 26.
<i>snap-names</i>	Specifies a comma-separated list of names for the resulting snapshot volumes. For the syntax to use, see “Volume Syntax” on page 26.

## Example

Create snapshot SS1 of master volume MV1, and snapshot SS2 of master volume MV2.

```
# create snapshots master-volumes MV1,MV2 SS1,SS2  
Success: Snapshot(s) Created.
```

## Related Commands

- “delete snapshot” on page 79
- “show master-volumes” on page 200
- “show snapshots” on page 218

## create task

### Description

Creates a task that can be scheduled. You can create a task to take a snapshot of a master volume, to copy a snapshot or a master volume to a new standard volume, or to reset a snapshot.



---

**Caution** – Before scheduling a reset snapshot task, consider that if the snapshot is mounted to a host operating system, the snapshot must be unmounted before the reset is performed; leaving it mounted can cause data corruption. You should create a scheduled job on the host to unmount the snapshot prior to resetting the snapshot.

---

### Input

To create a task to take a snapshot:

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

To create a task to reset a snapshot:

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

To create a task to copy a volume:

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

---

### Parameter

### Description

*name*

Specifies a name for the new task, using a maximum of 32 characters and no quotation mark (") or backslash (\) characters. Names are case sensitive.

---

Parameter	Description
type TakeSnapshot   ResetSnapshot   VolumeCopy	Specifies the task. <ul style="list-style-type: none"> <li>• TakeSnapshot: Takes a snapshot of a specified master volume.</li> <li>• ResetSnapshot: Deletes the data in the snapshot and resets it to the current data in the associated master volume. The snapshot's name and other volume characteristics are not changed.</li> <li>• VolumeCopy: Copies a snapshot or a master volume to a new standard volume. The command creates the destination volume you specify, which must be in a vdisk owned by the same controller as the source volume.</li> </ul>
master-volume <i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see "Volume Syntax" on page 26.
snapshot-prefix <i>prefix</i>	Label to identify snapshots created by this task. Snapshot names have the format <i>pref_S#</i> , where # increments from 0001 to 9999 before rolling over.
retention-count #	Number of snapshots with this prefix to retain. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.
snapshot-volume <i>volume</i>	Specifies the snapshot volume by its name or serial number. For the syntax to use, see "Volume Syntax" on page 26.
source-volume <i>volume</i>	Specifies the master volume by its name or serial number. For the syntax to use, see "Volume Syntax" on page 26.
dest-vdisk <i>vdisk</i>	Specifies the destination virtual disk by name or serial number. For the syntax to use, see "Volume Syntax" on page 26.
dest-prefix <i>prefix</i>	Label to identify the volume copy created by this task. Copy names have the format <i>prefix_V#</i> , where # increments from 0001 to 9999 before rolling over.

Parameter	Description
modified-snapshot yes no	<p>Optional. Specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot; it is ignored if the source volume is a master volume.</p> <ul style="list-style-type: none"> <li>• yes: Include modified snapshot data.</li> <li>• no: Exclude modified snapshot data.</li> </ul> <p>If this parameter is omitted for a snapshot, modified snapshot data is excluded.</p>

## Example

Create task Task1 that takes a snapshot of master volume VD1\_V1 and retains only the latest four snapshots with the prefix VD1\_V1, e.g., VD1\_V1\_S0001.

```
# create task Task1 type TakeSnapshot master-volume VD1_V1
snapshot-prefix VD1_V1 retention-count 4
Success: Task created
```

Create task Task2 that resets snapshot VD1\_S0001.

```
# create task Task2 type ResetSnapshot snapshot-volume VD1_S0001
Success: Task created
```

Create task Task3 that copies volume VD1\_V1 to virtual disk VD2 with the name C\_V0001.

```
# create task Task3 type VolumeCopy source-volume VD1_V1
dest-vdisk VD2 dest-prefix C modified-snapshot yes
Success: Task created
```

## Related Commands

- “create schedule” on page 56
- “delete task” on page 81
- “show schedule-details” on page 210
- “show task-details” on page 223
- “show tasks” on page 227
- “show volumes” on page 237

# create user

## Description

Creates a new user profile. When you enter the command, the system prompts you to enter a case-sensitive password, which can include a maximum of 19 characters except backslash (\), quotation mark ("), or spaces. The system supports 13 user profiles.

## Input

```
create user name [level monitor|manage] [type standard|advanced  
|diagnostic] [interfaces interfaces]
```

Parameter	Description
<i>name</i>	Unique name that can include a maximum of 19 alphanumeric characters. Names are case sensitive.
level monitor manage	Optional. Specifies whether the user has monitor (view-only) or manage (modify) access for user interfaces. The default is monitor.
type standard advanced  diagnostic	Optional. Specifies the user's level of technical expertise, to control access to functionality in the WBI. <ul style="list-style-type: none"><li>• standard: Enables access to standard administrative functions. This is the default for monitor users.</li><li>• advanced: Enables access to standard and advanced functions. This is the default for manage users.</li><li>• diagnostic: Enables access to standard, advanced, and troubleshooting functions. This is the default for users of the CLI.</li></ul>
interfaces <i>interfaces</i>	Optional. Specifies the interfaces that the user can access. Multiple values must be separated by a comma with no spaces. If this parameter is omitted, the defaults are cli and wbi. <ul style="list-style-type: none"><li>• cli: Command-line interface.</li><li>• wbi: Web-browser interface.</li><li>• ftp: File transfer protocol interface.</li><li>• none: No interfaces.</li></ul>

## Example

Create an advanced manage user who can use the web and FTP interfaces.

```
# create user level manage interfaces wbi,ftp jsmith
Enter Password for new user jsmith:*****
Re-enter Password:*****
Info: User Type not specified, defaulting to Advanced.

Success: New user created
```

## Related Commands

- “delete user” on page 82
- “set user” on page 151
- “show users” on page 228

# create vdisk

## Description

Creates a virtual disk using the specified RAID level, disk drives, and optional vdisk spares. All disks used in a virtual disk and its spares must be either SAS or SATA; mixing disk types is not supported. The following table specifies the number of disks supported for each virtual disk type, as determined by its RAID level.

**Table 3-1** Number of Disk Drives Required for Each RAID Level

RAID Level	Minimum–Maximum Number of Disk Drives
NRAID (non-RAID)	1
0	2–16
1	2
3	3–16
5	3–16
6	4–16
10	4–16
50	6–32

## Input

```
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]  
[mode online|offline] name
```

Parameter	Description
level nraid raid0 r0 raid1 r1 raid3 r3 raid5 r5 raid6 r6 raid10 r10 raid50 r50	Specifies the RAID level.
disks <i>disks</i>	Specifies a range or list of disk-drive IDs. RAID 10 requires a minimum of two RAID-1 sub-vdisks each having two drives. RAID 50 requires a minimum of two RAID-5 sub-vdisks each having three drives. For the syntax to use, see “Disk Drive Syntax” on page 25.

Parameter	Description
<code>assigned-to a b auto</code>	Optional. Specifies the controller to own the virtual disk. To have the system automatically load-balance virtual disks between controllers, use <code>auto</code> or omit this parameter.
<code>spare disks</code>	Optional. Specifies up to four vdisk spares to assign to a RAID 1, 3, 5, 6, 10, or 50 virtual disk. For the syntax to use, see “Disk Drive Syntax” on page 25.
<code>chunk-size 16k 32k 64k</code>	Optional. Specifies the chunk size in Kbyte. The default is 64k.
<code>mode online offline</code>	Optional. Specifies whether the virtual disk is initialized online or offline. <ul style="list-style-type: none"> <li>• <code>online</code> – Enables you to use the virtual disk immediately after creating it while it is initializing. Because <code>online</code> uses the verify method to create the virtual disk, it takes longer to complete initializing than <code>offline</code>. This option is the default.</li> <li>• <code>offline</code> – You must wait for the virtual disk initialization process to finish before using the virtual disk; however, <code>offline</code> takes less time to complete initializing than <code>online</code>. At the time of creation, a virtual disk using <code>offline</code> initialization can have either one volume or none. If you want the virtual disk to have more than one volume, create the virtual disk with no volumes and then add volumes after initialization is complete.</li> </ul>
<code>name</code>	Specifies a name for the new virtual disk. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Create the RAID-1 virtual disk VD1 using two disk drives in the controller enclosure.

```
# create vdisk level raid1 disks 1,3 VD1
Success: Vdisk created.
```

Create the RAID-50 virtual disk VD2 having three RAID-5 sub-vdisks, each having three disk drives.

```
# create vdisk level r50 disks 1-3:4-6:7-9 VD2
Success: Vdisk created.
```

## Related Commands

- “abort create” on page 38
- “delete vdisk” on page 83
- “set vdisk” on page 153
- “show disks” on page 174
- “show vdisks” on page 230

## create volume

### Description

Creates a volume on a virtual disk. This command enables you to specify a size and name for the volume, and map it to hosts.

### Input

```
create volume vdisk vdisk size sizeMB|GB|TB [mapping mapping] name
```

Parameter	Description
<i>vdisk</i> <i>vdisk</i>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
size <i>size</i> MB GB TB	Specifies the volume size in MB (Mbyte), GB (Gbyte), or TB (Tbyte). The size uses base 10 (multiples of 1000) or base 2 (multiples of 1024); to see the current base setting, type <code>show cli-parameters</code> .
<i>mapping</i> <i>mapping</i>	Optional. Specifies the host-to-volume mapping to use for all hosts that are not explicitly mapped (called the default mapping). For the syntax to use, see “Volume Mapping Syntax” on page 27. If this argument is omitted, the volume is unmapped and its LUN is set to None. (You can add or remove mappings by using the <code>map volume</code> and <code>unmap volume</code> commands.)
<i>name</i>	Specifies a name for the volume. For the syntax to use, see “Volume Syntax” on page 26.

## Example

On a SAS system, create the 10-Gbyte volume V1 on virtual disk VD1, and map it to ports A0 and B0 using LUN 12.

```
# create volume vdisk VD1 size 10GB mapping a0,b0.12 V1
Success: volume created and mapped successfully
```

On an FC or iSCSI system, create the 10-Gbyte volume V1 on virtual disk VD1, and map it to ports 0 and 1 using LUN 12. The ports are on the controller that owns the virtual disk.

```
# create volume vdisk VD1 size 10GB mapping 0-1.12 V1
Success: volume created and mapped successfully
```

## Related Commands

- “delete volume” on page 86
- “map volume” on page 94
- “set volume” on page 155
- “show vdisks” on page 230
- “show volumes” on page 237
- “unmap volume” on page 244

## delete all-master-volumes

### Description

Deletes all master volumes associated with a snap pool.

---

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

---

### Input

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

---

Parameter	Description
snap-pool <i>volume</i>	Specifies the snap pool volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.

---

### Example

Delete all master volumes associated with snap pool SP1.

```
# delete all-master-volumes snap-pool SP1
Success: All Master Volumes Deleted.
```

### Related Commands

- “delete all-snapshots” on page 71
- “show master-volumes” on page 200
- “show snap-pools” on page 216

# delete all-snapshots

## Description

Deletes all snapshots associated with a specified volume, which can be a snap pool or master volume. All data associated with the snapshots is deleted and associated space in the snap pool is freed for use.

## Input

```
delete all-snapshots volume volume
```

Parameter	Description
volume <i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.

## Example

Delete all snapshots associated with master volume MV1.

```
# delete all-snapshots volume MV1  
Success: All Snapshots Deleted.
```

## Related Commands

- “show snapshots” on page 218
- “show volumes” on page 237

## delete chap-records

### Description

iSCSI only. Deletes a specific originator's CHAP record or all CHAP records. This command is permitted whether or not CHAP is enabled.

### Input

To delete the CHAP record for a specific originator:

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

```
delete chap-records all
```

To delete all CHAP records:

Parameter	Description
name <i>originator-name</i>	Specifies the originator name, which is typically the originator's IQN. The name is case sensitive and can include a maximum of 223 characters.
all	Delete all CHAP records in the database.

### Example

Delete the CHAP record for a specific originator.

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

### Related Commands

- “create chap-record” on page 50
- “set chap-record” on page 116
- “show chap-records” on page 162
- “show host-parameters” on page 190

# delete global-spare

## Description

Removes one or more disk drives from the pool of global spares.

## Input

```
delete global-spare disks disks
```

Parameter	Description
<code>disks <i>disks</i></code>	Specifies the disk drives to remove. For the syntax to use, see “Disk Drive Syntax” on page 25.

## Example

Remove the global spare having ID 5 in the controller enclosure.

```
# delete global-spare disks 0.5
Info: Disk 0.5 unconfigured as a Global Spare.

Success: Command completed successfully
```

## Related Commands

- “show disks” on page 174

## delete host-wwn-name

### Description

FC and SAS only. Deletes the nickname associated with a host world wide port name (WWPN).

### Input

```
delete host-wwn-name host
```

Parameter	Description
<i>host</i>	Specifies the HBA's nickname or 16-hex-digit WWPN. For the nickname syntax to use, see "Host Nickname Syntax" on page 27.

### Example

Delete the nickname MyHost.

```
# delete host-wwn-name MyHost  
Success: Deleted MyHost
```

### Related Commands

- "set host-wwn-name" on page 133
- "show host-wwn-names" on page 194

# delete iscsi-host

## Description

iSCSI only. Deletes the nickname associated with an iSCSI host initiator's node name.

## Input

```
delete iscsi-host host
```

Parameter	Description
<i>host</i>	Specifies an iSCSI host initiator's node name, or an existing nickname. For the nickname syntax to use, see “Host Nickname Syntax” on page 27.

## Example

Delete the iSCSI host initiator nickname myHost.

```
# delete iscsi-host myHost  
Success: Deleted myHost
```

## Related Commands

- “create iscsi-host” on page 53
- “set iscsi-host” on page 134
- “show iscsi-hosts” on page 195

## delete master-volume

### Description

Deletes a master volume. Alias of `delete volume`.

---

**Note** – You must delete all snapshots that exist for the master volume before you can delete it.

---

### Input

```
delete master-volume volume
```

---

### Parameter Description

---

<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
---------------	---

---

### Example

Delete master volume MV1.

```
# delete master-volume MV1  
Success: Master Volume Deleted.
```

### Related Commands

- “delete all-snapshots” on page 71
- “show master-volumes” on page 200

# delete schedule

## Description

Deletes a specified task schedule.

## Input

```
delete schedule schedule
```

Parameter	Description
<i>schedule</i>	Specifies the schedule name.

## Example

Delete schedule Sched1.

```
# delete schedule Sched1  
Success: Schedule Deleted
```

## Related Commands

- “show schedule-details” on page 210
- “show schedules” on page 212
- “show task-details” on page 223
- “show tasks” on page 227

# delete snap-pool

## Description

Deletes a snap pool.

---

**Note** – You must disassociate all master volumes from the snap pool before you can delete it.

---

## Input

```
delete snap-pool volume
```

---

Parameter	Description
-----------	-------------

---

<i>volume</i>	Specifies the snap pool volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
---------------	---

---

## Example

Delete snap pool SP1.

```
# delete snap-pool SP1
Success: Snap-pool Deleted.
```

## Related Commands

- “show master-volumes” on page 200
- “show snap-pools” on page 216

# delete snapshot

## Description

Deletes a snapshot volume. All data uniquely associated with the snapshot is deleted and associated space in the snap pool is freed for use.

## Input

```
delete snapshot volume
```

Parameter	Description
<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, “Volume Syntax” on page 26.

## Example

Delete snapshot SS1.

```
# delete snapshot SS1  
Success: Snapshot Deleted.
```

## Related Commands

- “delete snapshot-write-data” on page 80
- “show snapshots” on page 218

# delete snapshot-write-data

## Description

Deletes the modified portion of a snapshot volume. This reverts the snapshot to the state when it was first taken.

## Input

```
delete snapshot-write-data volume
```

Parameter	Description
<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, “Volume Syntax” on page 26.

## Example

Delete modified data from snapshot SS1.

```
# delete snapshot-write-data SS1  
Success: Snapshot Write Data Deleted.
```

## Related Commands

- “delete snapshot” on page 79
- “show snapshots” on page 218

# delete task

## Description

Deletes a specified task. If the task is scheduled, you must delete the schedule first.

## Input

```
delete task task
```

Parameter	Description
<i>task</i>	Specifies the task name.

## Example

Delete task Task1.

```
# delete task Task1  
Success: Task Deleted
```

## Related Commands

- “delete schedule” on page 77
- “show schedule-details” on page 210
- “show schedules” on page 212
- “show task-details” on page 223
- “show tasks” on page 227

## delete user

### Description

Deletes a user profile. By default a confirmation prompt appears, which requires a yes or no response. You can delete any user including the default users.

### Input

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

Parameter	Description
<i>name</i>	Specifies the user profile to delete. Names are case sensitive.
<i>noprompt</i>	Optional. Suppresses the confirmation prompt.

### Example

Delete user jsmith.

```
# delete user jsmith
Are you sure? yes
Success: User jsmith deleted.
```

### Related Commands

- “create user” on page 63
- “set user” on page 151
- “show users” on page 228

# delete vdisk

## Description

Deletes one or more virtual disks, disassociates all disk drives that are assigned to the virtual disks, and unmaps all volumes of the virtual disks from all host ports.



---

**Caution** – Deleting a virtual disk will delete all data on that virtual disk.

---

---

**Note** – You cannot delete a virtual disk that contains a snap pool associated with a master volume on another virtual disk. You cannot delete a virtual disk that is reconstructing.

---

## Input

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

---

### Parameter

### Description

<i>vdisks</i>	Specifies the virtual disks to delete. For the syntax to use, “Virtual Disk Syntax” on page 26.
prompt yes no	Optional. Specifies an automatic response to the prompt that appears if a utility is running on the vdisk: <ul style="list-style-type: none"><li>• yes: Stops the utility and enables the deletion to proceed</li><li>• no: Prevents the deletion from proceeding</li></ul> If this parameter is omitted, you must manually reply to the prompt.

---

## Example

Delete a virtual disk.

```
# delete vdisk VD1
Please wait - Vdisk is being deleted.
Info: Deleted vdisk VD1

Success: Command completed successfully
```

## **Related Commands**

- “show master-volumes” on page 200
- “show vdisks” on page 230

# delete vdisk-spare

## Description

Removes one or more spare disk drives that are assigned to a specified virtual disk.

## Input

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

Parameter	Description
<i>disks disks</i>	Specifies the vdisk spares to remove. For the syntax to use, see “Disk Drive Syntax” on page 25.
<i>vdisk</i>	Specifies the virtual disk to remove the spare from. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Remove the vdisk spare having ID 5 in the controller enclosure from virtual disk VD1.

```
# delete vdisk-spare disks 0.5 VD1
Info: Vdisk-spare 0.5 deleted from Vdisk VD1

Success: Command completed successfully
```

## Related Commands

- “show disks” on page 174
- “show vdisks” on page 230

# delete volume

## Description

Deletes a volume.

## Input

```
delete volume volume
```

Parameter	Description
<i>volume</i>	Specifies the volume to delete. For the syntax to use, see “Volume Syntax” on page 26.

## Example

Delete volume V1.

```
# delete volume V1  
Success: deleted volume V1
```

## Related Commands

- “show volumes” on page 237

# exit

## Description

Logs off and exits the CLI session.

## Syntax

```
exit
```

# expand snap-pool

## Description

Expands a snap-pool volume by a specified size. Expansion is restricted to the available space on the virtual disk that hosts the volume. If insufficient space is available for expansion on the virtual disk, first expand the virtual disk by using `expand vdisk`.

## Input

To expand a volume by a specific size:

```
expand volume volume size sizeMB|GB|TB
```

To expand a volume to the maximum size:

```
expand volume volume size max
```

Parameter	Description
<i>volume</i>	Specifies the volume to expand. For the syntax to use, “Volume Syntax” on page 26.
size <i>size</i> MB GB TB	Specifies the amount of space to add to the volume in MB (Mbyte), GB (Gbyte), or TB (Tbyte). The size uses base 10 (multiples of 1000) or base 2 (multiples of 1024); to see the current base setting, type <code>show cli-parameters</code> .
size max	Expands the volume to fill the available space on the virtual disk.

## Example

Expand SP1 by 100 Gbyte.

```
# expand volume SP1 size 100GB  
Success: Snap-pool Expansion Started.
```

## **Related Commands**

- “expand vdisk” on page 90
- “show snap-pools” on page 216
- “show vdisks” on page 230
- “show volumes” on page 237

## expand vdisk

### Description

Adds disk drives to a virtual disk. The expansion capability for each supported RAID level is as follows.

**Table 3-2** Virtual Disk Expansion by RAID Level

RAID Level	Expansion Capability	Maximum Drives
NRAID (non-RAID)	Cannot expand.	1
0, 3, 5, 6	You can add 1–4 drives at a time.	16
1	Cannot expand.	2
10	You can add 2 or 4 drives at a time.	16
50	You can expand the virtual disk, one RAID 5 sub- <i>vdisk</i> at a time. The added RAID 5 sub- <i>vdisk</i> must contain the same number of drives as each original sub- <i>vdisk</i> .	32



**Caution** – Virtual disk expansion cannot be stopped and can take days to complete, depending on drive type, RAID level, and other factors.

### Input

```
expand vdisk vdisk disks disks
```

Parameter	Description
<i>vdisk</i>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
<i>disks disks</i>	Specifies the disk drives. For the syntax to use, see “Disk Drive Syntax” on page 25.

## Example

Expand virtual disk VD1 to include the disk drive having ID 11 in the controller enclosure.

```
# expand vdisk VD1 disks 0.11
```

## Related Commands

- “show disks” on page 174
- “show vdisks” on page 230

# expand volume

## Description

Expands a standard volume or snap-pool volume by a specified size. Expansion is restricted to the available space on the virtual disk that hosts the volume. If insufficient space is available for expansion on the virtual disk, first expand the virtual disk by using `expand vdisk`.

---

**Note** – To expand a master volume:

1. Delete all of its snapshots by using `delete all-snapshots`.
  2. Convert it to a standard volume by using `convert master-to-std`.
  3. Expand the standard volume by using `expand volume`.
  4. Convert the expanded volume to a master volume by using `convert std-to-master`.
- 

## Input

To expand a volume by a specific size:

```
expand volume volume size sizeMB|GB|TB
```

To expand a volume to the maximum size:

```
expand volume volume size max
```

---

Parameter	Description
<i>volume</i>	Specifies the volume to expand. For the syntax to use, “Volume Syntax” on page 26.
size <i>size</i> MB GB TB	Specifies the amount of space to add to the volume in MB (Mbyte), GB (Gbyte), or TB (Tbyte). The size uses base 10 (multiples of 1000) or base 2 (multiples of 1024); to see the current base setting, type <code>show cli-parameters</code> .
size max	Expands the volume to fill the available space on the virtual disk.

---

## Example

Expand V1 by 100 Gbyte.

```
# expand volume V1 size 100GB  
Success: expanded volume V1
```

## Related Commands

- “expand vdisk” on page 90
- “show snap-pools” on page 216
- “show vdisks” on page 230
- “show volumes” on page 237

## map volume

### Description

Creates a mapping whose settings override a volume's default mapping.

When a volume is created, it has a *default mapping* that 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. By default, this mapping presents no LUN and allows no access for all hosts through all ports. The default mapping's LUN value is referred to as the volume's *default LUN*.

Use this command to create 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 at all.

### Input

```
map volume volume [ [lun LUN] | [mapping ports.LUN] ] [host host]
[access read-write|rw|read-only|ro|none]
```

Parameter	Description
<i>volume</i>	Specifies the volume to map. For the syntax to use, see “Volume Syntax” on page 26.
<i>lun LUN</i>	Optional if the <i>access</i> parameter is set to <i>none</i> . Specifies the LUN to assign to the mapping on all ports. If this parameter is omitted, the default LUN is presented. You cannot use both this parameter and the <i>mapping</i> parameter.
<i>mapping ports.LUN</i>	Optional; unused if the <i>access</i> parameter is set to <i>none</i> . Specifies the ports through which hosts can access the volume, and the LUN to assign to the mapping. If not all ports are specified, the unspecified ports are automatically mapped to no access. For the syntax to use, see “Volume Mapping Syntax” on page 27. You cannot use both this parameter and the <i>lun</i> parameter.

Parameter	Description
<code>host host</code>	Optional. For FC and SAS, this specifies the host's nickname or 16-hex-digit WWPN. For iSCSI, this specifies the iSCSI host initiator's node name (typically the IQN) or nickname. For the nickname syntax to use, see "Host Nickname Syntax" on page 27. If this parameter is omitted, the mapping applies to the all-hosts mapping and applies to all hosts that are not explicitly mapped.
<code>access read-write rw  read-only ro  none</code>	Optional. Specifies the access permission available to hosts connected to the controller for this volume: read-write (rw), read-only (ro), or none. When a volume is mapped with no access, the volume is masked. The default is read-write. If this parameter is omitted, either the lun parameter or the mapping parameter must be specified.

### Example

On a SAS system, map volume V1 on ports A0 and B0 with LUN 10 and read-write access for all hosts that are not explicitly mapped.

```
# map volume V1 mapping a0,b0.10
Success: volume mapped successfully
```

On an FC or iSCSI system, map volume V1 on port 1 with LUN 5 and read-write access for all hosts that are not explicitly mapped. The port is on the controller that owns the volume's virtual disk.

```
# map volume V1 mapping 1.5
Success: volume mapped successfully
```

On an FC or iSCSI system, map volume V2 on ports 0 and 1 with LUN 2 and read-only access for host MyHost. The ports are on the controller that owns the volume's virtual disk.

```
# map volume V2 mapping 0-1.2 host MyHost access ro
Success: volume mapped successfully
```

## **Related Commands**

- “show host-maps” on page 188
- “show host-wwn-names” on page 194
- “show iscsi-hosts” on page 195
- “show volume-maps” on page 235
- “show volumes” on page 237
- “unmap volume” on page 244

# 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.

## Input

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

Parameter	Description
<i>host-address</i>	Specifies the remote host's IP address in dotted decimal form.
<i>count</i>	Optional. Specifies the number of packets to send. The default is 4 packets. You should use a small count because the command cannot be interrupted.

## Example

Send two packets to the remote computer at 10.0.0.1.

```
# ping 10.0.0.1 2
Info: Pinging 10.0.0.1 with 2 packets.

Success: remote computer responded with 2 packets.
```

# rescan

## Description

This command forces rediscovery of attached disk drives and enclosures. If both Storage Controllers are online, it also forces re-evaluation of the enclosure IDs of attached drive enclosures, so that IDs are assigned 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 drives are inserted or removed; the controllers do this automatically. When drives are inserted they are detected after a short delay, which allows the drives to spin up.

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

## Input

```
rescan
```

## Example

Scan for device changes and re-evaluate enclosure IDs.

```
# rescan  
Success: Command completed successfully
```

# reset host-channel-link

## Description

FC only. For a system using loop (FC-AL) topology, this command issues a loop initialization primitive (LIP) for specified controller ports.

## Input

```
reset host-channel-link channel channels [controller a|b|both]
```

Parameter	Description
channel <i>channels</i>	Specifies a host port number or a comma-separated list of host port numbers such as 0,1.
controller a b both	Optional. Specifies whether to issue the LIP from controller A, controller B, or both. If this parameter is omitted, the default is the current controller.

## Example

Reset the link on controller A port 0.

```
# reset host-channel-link channel 0 controller a
Success: Reset Host Channel Link(s) on channel(s) 0 from
controller(s) a.
```

## Related Commands

- “show channels” on page 159

# reset snapshot

## Description

Deletes the data in a snapshot and resets it to the current data in the associated master volume. The snapshot's volume characteristics are not changed. The command prompts you to unmount the snapshot from the host operating system before performing the reset; leaving it mounted can cause data corruption.



---

**Caution** – All data represented by the snapshot as it exists prior to issuing this command is lost.

---

## Input

```
reset snapshot volume [prompt yes|no]
```

---

Parameter	Description
<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
<i>prompt yes no</i>	Optional. Specifies an automatic response to the unmount prompt that either enables the reset to proceed or prevents the reset from proceeding: <ul style="list-style-type: none"><li>• <i>yes</i>: Enables the reset to proceed</li><li>• <i>no</i>: Prevents the reset from proceeding</li></ul> If this parameter is omitted, you must reply to the prompt.

---

## Example

Reset snapshot SS1.

```
# reset snapshot SS1
Leaving the snapshot mounted during reset on any operating system
can result in data corruption. Is the snapshot un-mounted from all
operating systems? yes
Success: Snapshot Reset Complete.
```

## Related Commands

- “show snapshots” on page 218

# restart

## Description

Restarts the Storage Controller or Management Controller in either or both controller modules.

If you restart a Storage Controller, it attempts to shut down with a proper failover sequence, which includes stopping all I/O operations and flushing the write cache to disk, and then the controller restarts. The Management Controllers are not restarted so they can provide status information to external interfaces.

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



---

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

---

## Input

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

---

Parameter	Description
-----------	-------------

---

sc mc	Specifies the controller to restart: <ul style="list-style-type: none"><li>• sc: Storage Controller</li><li>• mc: Management Controller</li></ul>
-------	---

a b both	Specifies whether to restart controller A, controller B, or both.
----------	---

noprompt	Optional. Suppresses the confirmation prompt.
----------	---

---

## Output

Messages are displayed when the controllers are shut down, when failover is initiated, and when the controllers have restarted.

## Example

Restart the Management Controller 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 Local MC A...
```

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

```
# restart sc b
Success: SC B restarted.
```

## Related Commands

- “shutdown” on page 240

# restore defaults

## Description

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Restores the manufacturer's default configuration to the controllers. When the command informs you that the configuration has been restored, you must restart the controllers for the changes to take effect. After restarting the controllers, hosts might not be able to access volumes until you re-map them.



---

**Caution** – This command changes how the system operates and might require some reconfiguration to restore host access to volumes.

---

## Input

```
restore defaults [noprompt]
```

---

Parameter	Description
-----------	-------------

---

<code>noprompt</code>	Optional. Suppresses the confirmation prompt.
-----------------------	---

---

## Related Commands

- “map volume” on page 94
- “restart” on page 101
- “show host-maps” on page 188

# rollback master-volume

## Description

Rolls back (reverts) the data on a master volume to the data that exists in a specified snapshot. You can choose whether to include modified write data from the snapshot in the rollback. You must unmount the master volume from the host operating system before using this command. The command will prompt you to ensure the master volume is unmounted before proceeding.



---

**Caution** – All data that differs between the master volume and the snapshot is lost. Create a snapshot of the master volume as it currently exists before performing a rollback.

---

## Input

```
rollback master-volume volume snapshot volume [modifiedsnapshot  
yes|no] [prompt yes|no]
```

---

Parameter	Description
<i>volume</i>	Specifies the master volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
snapshot <i>volume</i>	Specifies the snapshot volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
modifiedsnapshot yes no	Optional. Specifies whether to include or exclude modified write data from the snapshot in the rollback. <ul style="list-style-type: none"><li>• yes: Include modified snapshot data.</li><li>• no: Exclude modified snapshot data.</li></ul> If this parameter is omitted, modified snapshot data is excluded.
prompt yes no	Optional. Specifies an automatic response to the unmount prompt that either enables the rollback to proceed or prevents the rollback from proceeding. <ul style="list-style-type: none"><li>• yes: Enable the rollback to proceed</li><li>• no: Prevent the rollback from proceeding</li></ul> If this parameter is omitted, you must reply to the prompt.

---

## Example

Roll back master volume MV1 to snapshot SS1.

```
# rollback master-volume MV1 snapshot SS1
Leaving the master volume mounted when starting a rollback
operation will result in data corruption. The master volume must
be unmounted prior to beginning the rollback operation. The master
volume can be remounted once the rollback has started. Not
unmounting the volume prior to beginning the rollback operation
will result in data corruption.
Is the master volume unmounted from all Operating Systems? yes
Success: Rollback Started.
```

## Related Commands

- “show master-volumes” on page 200
- “show snapshots” on page 218

# scrub vdisk

## Description

For specified RAID 3, 5, 6, and 50 virtual disks, this command verifies all parity blocks. For specified RAID 1 and 10 virtual disks, this command compares the primary and secondary drives. In addition, this command scrubs virtual disk metadata, and stripe and NRAID virtual disks.

When the scrub is complete, an event is logged specifying the number of errors found.

## Input

```
scrub vdisk vdisks
```

Parameter	Description
-----------	-------------

<i>vdisks</i>	Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
---------------	--

## Example

Scrub the disk drives in virtual disk VD1.

```
# scrub vdisk VD1
Info: Scrub started on Vdisk VD1

Success: Command completed successfully
```

## Related Commands

- “abort scrub” on page 39
- “show vdisks” on page 230

# 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. By default, automatic write-back is enabled. Alias: set awt

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

## Input

```
set auto-write-through-trigger [controller-failure
enable|disable] [super-cap-failure enable|disable]
[compact-flash-failure enable|disable] [power-supply-failure
enable|disable] [fan-failure enable|disable]
[temperature-exceeded enable|disable] [partner-notify
enable|disable] [auto-write-back enable|disable]
```

Parameter	Description
controller-failure enable disable	If the cache policy is set to write-back, specify whether the policy automatically changes to write-through when a controller fails.
super-cap-failure enable disable	If the cache policy is set to write-back, specify whether the policy automatically changes to write-through when cache backup power is not fully charged or fails.
compact-flash-failure enable disable	If the cache policy is set to write-back, specify whether the policy automatically changes to write-through when the compact flash fails.
power-supply-failure enable disable	If the cache policy is set to write-back, specify whether the policy automatically changes to write-through when a power supply fails.
fan-failure enable disable	If the cache policy is set to write-back, specify whether the policy automatically changes to write-through when a fan fails.
temperature-exceeded enable disable	Specify whether to force a controller shutdown if a temperature is detected that exceeds system threshold limits.

Parameter	Description
partner-notify enable disable	Specify whether to notify the partner controller that a trigger condition occurred. Enable this option to have the partner also change to write-through mode for better data protection. Disable this option to allow the partner continue using its current caching mode for better performance. The default is Disabled.
auto-write-back enable disable	Specify whether the cache mode automatically changes to write-back after the trigger condition is cleared.

### Example

Enable the controller-failure trigger and disable the partner-notify trigger.

```
# set auto-write-through-trigger controller-failure enable
partner-notify disable
Success: Auto-Write-Through-Trigger parameters have been changed
```

### Related Commands

- “show auto-write-through-trigger” on page 156
- “show events” on page 181

## set awt

Alias for `set auto-write-through-trigger`. See “`set auto-write-through-trigger`” on page 107.

## set cache-parameters

### Description

Sets cache options for a specific volume, or the cache redundancy mode for a dual-controller storage system.

---

**Note** – Only change cache settings if you fully understand how your operating system, application, and HBA move data so that you can adjust the settings accordingly. Be prepared to monitor system performance using the virtual disk statistics and adjust read-ahead size until you find the optimal size for your application.

---

### *Cache Policy*

The cache policy setting for each volume determines when cached data is written to the disk drives. The ability to hold data in cache while it is being written to disk can increase storage device speed during sequential reads.

- 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-back caching is enabled by default.
- 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 cache to write-through cache when certain environmental events occur, such as a fan failure. For details, see “set auto-write-through-trigger” on page 107.

## *Cache Optimization Mode*

Before creating or modifying a volume, determine the appropriate cache optimization mode. The controller supports `super-sequential` optimization mode for sequential I/O and `standard` optimization mode for random I/O.

The cache optimization mode setting for each volume optimizes the cache block size used by the controller:

- For sequential optimization, the cache block size is 128 Kbyte.
- For random optimization, the cache block size is 32 Kbyte.

An appropriate cache block size improves performance when a particular application uses either large or small stripe sizes:

- Video playback, multimedia post-production audio and video editing, and similar applications read and write large files in sequential order.
- Transaction-based and database update applications read and write small files in random order.

Since the cache block size works in conjunction with the default stripe size set by the cache optimization mode for each volume you create, these default stripe sizes are consistent with the cache block size setting. You can, however, specify a different stripe size for any volume at the time you create it. For more information, see “create volume” on page 68.

## *Read-Ahead Size*

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 logical block address (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.

The default read-ahead size, which sets one chunk for the first access in a sequential read and one stripe for all subsequent accesses, works well for most users in most applications. The controllers treat volumes and mirrored virtual disks (RAID 1) internally as if they have a stripe size of 64 Kbyte, even though they are not striped.

## *Independent Cache Performance Mode*

In the storage system's default operating mode, Active-Active, data for volumes configured to use write-back cache is automatically mirrored between the two controllers. Cache redundancy has a slight impact on performance but provides fault tolerance. You can disable cache redundancy, which permits independent cache operation for each controller; this is called independent cache performance mode (ICPM).

The advantage of ICPM is that the two controllers can achieve very high write bandwidth and still use write-back caching. User data is still safely stored in nonvolatile RAM, with backup power provided by super-capacitors should a power failure occur. This feature is useful for high-performance applications that do not require a fault-tolerant environment for operation; that is, where speed is more important than the possibility of data loss due to a drive fault prior to a write completion.

The disadvantage of ICPM is that if a controller fails, the other controller will not be able to fail over (that is, take over I/O processing for the failed controller). If a controller experienced a complete hardware failure, and needed to be replaced, then user data in its write-back cache is lost.



---

**Caution** – Data might be compromised if a RAID controller failure occurs after it has accepted write data, but before that data has reached the disk drives. Do *not* use ICPM in an environment that requires fault tolerance.

---

---

**Note** – Independent cache performance mode disables partner firmware upgrade. Controllers must be upgraded manually.

---

The operating mode applies per storage system, not per volume.

### **Input**

To set cache options for a volume:

```
set cache-parameters volume [write-policy write-back|
write-through] [optimization standard|super-sequential]
[read-ahead-size disable|default|maximum|64KB|128KB|256KB|512KB|
1MB|2MB|4MB|8MB|16MB|32MB]
```

To set the cache redundancy mode for the storage system:

```
set cache-parameters independent enable|disable
```

Parameter	Description
<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
<i>write-policy</i> write-back  write-through	Optional. Sets the cache policy to either: <ul style="list-style-type: none"><li>• <i>write-back</i>: Write-back caching does not wait for data to be completely written to disk before signaling the host that the write is complete. This is the preferred setting for a fault-tolerant environment because it improves the performance of write operations and throughput.</li><li>• <i>write-through</i>: Write-through caching significantly impacts performance by waiting for data to be completely written to disk before signaling the host that the write is complete. Use this setting only when operating in an environment with low or no fault tolerance.</li></ul>
<i>optimization</i> standard  super-sequential	Optional. Sets the cache optimization mode to either: <ul style="list-style-type: none"><li>• <i>standard</i>: Used for applications that read and write small files in random order, such as transaction-based and database update applications. Sets the cache block size to 32 Kbyte.</li><li>• <i>super-sequential</i>: Used for applications that read and write large files in sequential order, such as video playback and multimedia post-production video and audio editing applications. Sets the cache block size to 128 Kbyte</li></ul>

Parameter	Description
read-ahead-size disable   default   maximum   64KB   128KB   256KB   512KB   1MB   2MB   4MB   8MB   16MB   32MB	<p data-bbox="725 204 1225 265">Optional. Controls the use and size of read-ahead cache:</p> <ul data-bbox="725 274 1225 1204" style="list-style-type: none"> <li data-bbox="725 274 1225 560">• <b>disable:</b> Turns off read-ahead cache. This is useful if the host is triggering read ahead for what are random accesses. This can happen if the host breaks up the random I/O into two smaller reads, triggering read ahead. You can use the volume statistics read histogram to determine what size accesses the host is doing.</li> <li data-bbox="725 569 1225 812">• <b>default:</b> Sets one chunk for the first access in a sequential read and one stripe for all subsequent accesses. The size of the chunk is based on the chunk size used when you created the virtual disk (the default is 64 KB). Non-RAID and RAID 1 virtual disks are considered to have a stripe size of 64 KB.</li> <li data-bbox="725 821 1225 1064">• <b>maximum:</b> Allows the controller to dynamically calculate the maximum read-ahead cache size for the volume. For example, if a single volume exists, this setting enables the controller to use nearly half the memory for read-ahead cache. Only use Maximum when disk drive latencies must be absorbed by cache.</li> <li data-bbox="725 1072 1225 1204">• <b>64KB, 128KB, 256KB, 512KB, 1MB, 2MB, 4MB, 8MB, 16MB, or 32MB:</b> Sets the amount of data to read first, and the same amount is read for all read-ahead accesses.</li> </ul>

Parameter	Description
<code>independent enable disable</code>	Sets the cache redundancy mode for a dual-controller storage system. <code>enable</code> sets the storage system's operation mode to Independent Cache Performance Mode. When this mode is enabled, controller failover is disabled and write-back cache is not mirrored to the partner controller. This results in improved write performance but at a risk of loss of unwritten data if a controller failure occurs while there is data in the controller's cache memory. Independent mode is disabled by default.

### Example

Set the cache policy and cache optimization mode for volume V1.

```
# set cache-parameters V1 write-policy write-back optimization
super-sequential
Success: Cache Parameters changed successfully
```

### Related Commands

- “show cache-parameters” on page 157
- “show volumes” on page 237

## set chap-record

### Description

iSCSI only. Changes the CHAP record for a specific originator. This command is permitted whether or not CHAP is enabled.

### Input

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

Parameter	Description
<i>name originator-name</i>	Specifies the originator name, which is typically the originator's IQN. The name is case sensitive and can include a maximum of 223 characters.
<i>secret originator-secret</i>	Optional. Specifies the secret that the recipient uses to authenticate the originator. The secret is case sensitive and can include 12–16 characters.
<i>mutual-name recipient-name</i>	Optional; for mutual CHAP only. Specifies the recipient name, which is typically the recipient's IQN. The name is case sensitive and can include a maximum of 223 characters. A storage system's IQN is a controller host-port name without its .a or .b suffix; see the Port-Name field displayed by the <code>show host-parameters</code> command. This parameter and <code>mutual-secret</code> must be set together.
<i>mutual-secret recipient-secret</i>	Optional; for mutual CHAP only. Specifies the secret that the originator uses to authenticate the recipient. The secret is case sensitive and can include 12–16 characters. A storage system's secret is shared by both controllers. This parameter and <code>mutual-name</code> must be set together.

### Example

For mutual CHAP, add a recipient name and secret to a CHAP record.

```
# set chap-record name iqn.1991-05.com.microsoft:myHost.domain  
mutual-name iqn.1995-03.com.acme:01.storage.00c0ffd6000a mutual-  
secret ABCdef123456
```

## **Related Commands**

- “create chap-record” on page 50
- “delete chap-records” on page 72
- “show chap-records” on page 162
- “show host-parameters” on page 190
- “show iscsi-parameters” on page 196

## set cli-parameters

### Description

Sets the CLI timeout, the output characteristics of the show commands, and the way that the system handles some errors.

If you are accessing the CLI through the Ethernet 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.

### Input

```
set cli-parameters [console|api] [base 2|10] [pager enabled|on  
|disabled|off] [timeout #] [disk-addressing enclosure-slot  
|channel-id]
```

Parameter	Description
console api	Optional. Enables show commands to be shown as human-readable console output or as XML output. console is the default. api outputs XML.
base 2 10	Optional. Specifies whether capacities are calculated and shown in base 2 or base 10: <ul style="list-style-type: none"><li>base 2: Sizes are represented as powers of two and 1024 is used as a divisor for each magnitude.</li><li>base 10: Sizes are represented as powers of ten and 1000 is used as a divisor for each magnitude. Disk-drive vendors typically use base 10 for their indication of capacity. This is the default.</li></ul>
pager enabled on disabled off	Optional. Specifies whether to halt output after each full screen to wait for keyboard input. This is enabled by default.
timeout #	Optional. Sets the timeout value for the login session. Valid values are 10–9999 seconds; the default is 1800 seconds (30 minutes).

Parameter	Description
disk-addressing enclosure-slot  channel-id	<p>Optional. Sets the format in which drive IDs are shown and must be specified.</p> <ul style="list-style-type: none"> <li>• <code>enclosure-slot</code>: Drives are shown, and must be specified, with the format <i>enclosure-ID.drive-slot-number</i>. This is the default. For example, the first drive in the second enclosure (enclosure ID 1) has address 1.0.</li> <li>• <code>channel-id</code>: Drives are shown, and must be specified, by SCSI ID. For example, the first drive in the second enclosure has address 16.</li> </ul>

### Example

Set CLI to use a 30-second timeout, base 2, and no paging.

```
# set cli-parameters timeout 30 base 2 pager disabled
Success: CLI parameter changed successfully
```

### Related Commands

- “show cli-parameters” on page 164

## set controller-date

### Description

Sets the date and time of the Management Controller and then updates the date and time for each RAID controller.

### Input

```
set controller-date jan|feb|mar|apr|may|jun|jul|aug|sep|oct
|nov|dec day hh:mm:ss year time-zone [ntp enabled|disabled]
[ntpaddress IP-address]
```

Parameter	Description
jan feb mar apr may jun  jul aug sep oct nov dec	Specifies the month.
day	Specifies the day number (1–31).
hh:mm:ss	Specifies the hour on a 24-hour clock (0–23), the minute (0–59), and the seconds (0–59).
year	Specifies the year as a four-digit number.
time-zone	Specifies the system's time zone based on an offset from Universal Time (UT) in hours. For information about time-zone offsets, see <a href="http://wikipedia.org">http://wikipedia.org</a> .
ntp enabled disabled	Optional. Enables use of Network Time Protocol (NTP). If an NTP server is available, the controller's time is synchronized with the server. When enabling NTP you must specify all the parameters but only the <code>ntpaddress</code> and <code>time-zone</code> parameters must be set accurately; the other parameters are ignored.
ntpaddress IP-address	Optional. Specifies the network address of an available NTP server. If specified, the controller queries this server to get the current time and date. If 255.255.255.255 is set instead of a specific NTP server IP address, the controller listens for time messages from an NTP server set to broadcast mode.

## Example

Set the controller date to 1:45 PM on September 22, 2007 in the U.S. Mountain time zone (GMT -07:00).

```
# set controller-date sep 22 13:45:0 2007 -7
Success: Command completed successfully
```

Enable NTP using a specified time-zone offset and NTP server address.

```
# set controller-date sep 22 13:45:0 2007 -7 ntp enabled ntpaddress
69.10.36.3
Success: Command completed successfully
```

## Related Commands

- “show controller-date” on page 168

# set debug-log-parameters

## Description

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Sets the types of debug messages to include in the Storage Controller debug log. If multiple types are specified, use spaces to separate them and enclose the list in quotation marks (").

## Input

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

---

Parameter	Description
<i>message-type+ -</i>	<p>Specifies one of the following message types, followed by a plus (+) to enable or a minus (-) to disable inclusion in the log:</p> <ul style="list-style-type: none"><li>• <i>awt</i>: Auto-write-through feature debug messages</li><li>• <i>bkcfg</i>: Internal configuration debug messages</li><li>• <i>cache</i>: Cache debug messages</li><li>• <i>cap1</i>: Internal CAPI debug messages</li><li>• <i>cap12</i>: Internal CAPI tracing debug messages</li><li>• <i>disk</i>: Disk interface debug messages</li><li>• <i>dms</i>: Snapshot feature debug messages</li><li>• <i>emp</i>: Enclosure Management Processor debug messages</li><li>• <i>fca</i>: FC only. I/O interface driver debug messages (standard)</li><li>• <i>fcB</i>: FC only. I/O interface driver debug messages (resource counts)</li><li>• <i>fcc</i>: FC only. I/O interface driver debug messages (upper layer, verbose)</li><li>• <i>fcd</i>: FC only. I/O interface driver debug messages (lower layer, verbose)</li><li>• <i>fo</i>: Failover/recovery debug messages</li><li>• <i>fruid</i>: FRU ID debug messages</li><li>• <i>host</i>: Host interface debug messages</li></ul>

---

Parameter	Description
	<ul style="list-style-type: none"> <li>• <code>ioa</code>: iSCSI and SAS only. I/O interface driver debug messages (standard)</li> <li>• <code>iob</code>: iSCSI and SAS only. I/O interface driver debug messages (resource counts)</li> <li>• <code>ioc</code>: iSCSI and SAS only. I/O interface driver debug messages (upper layer, verbose)</li> <li>• <code>ioid</code>: iSCSI and SAS only. I/O interface driver debug messages (lower layer, verbose)</li> <li>• <code>mem</code>: Internal memory debug messages</li> <li>• <code>misc</code>: Internal debug messages</li> <li>• <code>msg</code>: Inter-controller message debug messages</li> <li>• <code>mui</code>: Internal service interface debug messages</li> <li>• <code>raid</code>: RAID debug messages</li> <li>• <code>rcm</code>: Removable-component manager debug messages</li> <li>• <code>res2s</code>: Internal debug messages</li> </ul>

### Example

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

```
# set debug-log-parameters "raid+ cache+ emp-"
Success: debug log parameters changed
```

### Related Commands

- “show debug-log-parameters” on page 172
- “show debug-log” on page 169

## set drive-parameters

### Description

Selects a global disk Self-Monitoring Analysis and Reporting Technology (SMART) setting. Disk drives equipped with this technology can alert the controller of impending drive failures. Changes to the SMART setting take effect after a rescan or a controller reboot.

### Input

```
set drive-parameters smart enabled|disabled|detect-only
```

Parameter	Description
smart enabled disabled detect-only	Enables or disables SMART monitoring for all disk drives in the storage system. Each drive added after detect-only is set retains its SMART setting. SMART is enabled by default.

### Example

Enable SMART.

```
# set drive-parameters smart enabled
Success: Command completed successfully
```

### Related Commands

- “show drive-parameters” on page 177

# set expander-fault-isolation

## Description

---

**Note** – This command should be used only by service technicians, or with the advice of a service technician.

---

By default, the Expander Controller in each I/O module performs fault-isolation analysis of SAS expander PHY statistics. When one or more error counters for a specific PHY exceed the built-in thresholds, the PHY is disabled to maintain storage system operation.

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

---

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

---

## Input

```
set expander-fault-isolation wwn enclosure-wwn controller
a|b|both enable|disable
```

---

Parameter	Description
<code>wwn <i>enclosure-wwn</i></code>	Specifies the port WWN (WWPN) of the enclosure containing the Expander Controller whose setting you want to change. To determine the WWPN, use the <code>show enclosure-status</code> command.
<code>controller a b both</code>	Specifies the I/O module containing the Expander Controller whose setting you want to change: A, B, or both.
<code>enable disable</code>	Specifies whether to enable or disable PHY fault isolation.

---

## Example

Disable PHY fault isolation for Expander Controller A in an enclosure.

```
# set expander-fault-isolation wwn 500C0FF00A408A3C controller a
disable
Success: Disabled expander fault isolation.
```

Re-enable PHY fault isolation for Expander Controller A in the same enclosure.

```
# set expander-fault-isolation wwn 500C0FF00A408A3C controller a
enable
Success: Enabled expander fault isolation.
```

## Related Commands

- “set expander-phy” on page 127
- “show enclosure-status” on page 178
- “show expander-status” on page 184

# set expander-phy

## Description

---

**Note** – This command should be used only by service technicians, or with the advice of a service technician.

---

Disables (isolates) or enables a specific PHY.

## Input

```
set expander-phy wwn enclosure-wwn controller a|b|both
index phy-index enable|disable
```

---

Parameter	Description
wwn enclosure-wwn	Specifies the port WWN (WWPN) of the enclosure containing the PHY to enable or disable. To determine the WWPN, use the show enclosure-status command.
controller a b both	Specifies the I/O module containing the PHY to enable or disable: A, B, or both.
index phy-number	Specifies the logical PHY number. To determine the PHY number, use the show expander-status command. Starting at zero, count down to the PHY's entry.
enable disable	Specifies whether to enable or disable the specified PHY.

---

## Example

Disable the first egress PHY in both controllers in an enclosure, after determining the PHY index; then verify the PHY's status.

```
# show expander-status
Encl Phy  Type      Status
-----
0      0      DRIVE     OK      <= Index 0
0      1      DRIVE     OK
0      2      DRIVE     OK
0      3      DRIVE     OK
0      4      DRIVE     OK
0      5      DRIVE     OK
0      6      DRIVE     OK
0      7      DRIVE     OK
0      8      DRIVE     OK
0      9      DRIVE     OK
0     10      DRIVE     OK
0     11      DRIVE     OK
0      0      INTER-EXP OK      <= Index 12
0      1      INTER-EXP OK
0      2      INTER-EXP OK
0      3      INTER-EXP OK
0      0      SC        OK
0      1      SC        OK
0      2      SC        OK
0      3      SC        OK
0      0      EGRESS    Error   <= Index 20
...

# set expander-phy wwn 500C0FF00A408A3C controller both index 20
disable
Success: Disabled Phy #20.

# show expander-status
...
0      0      EGRESS    Disabled
...
```

## Related Commands

- “set expander-fault-isolation” on page 125
- “show enclosure-status” on page 178
- “show expander-status” on page 184

# set global-spare

## Description

Designates spare disk drives that can be used by any virtual disk. Sets the disk drive status to `global-spare`. For the command to succeed, you must specify disk drives that are large enough to protect existing virtual disks. You can designate a maximum of eight global spares for the system.

## Input

```
set global-spare disks disks
```

Parameter	Description
<code>disks <i>disks</i></code>	Specifies the disk drives. For the syntax to use, see “Disk Drive Syntax” on page 25.

## Example

Designate the disk drive having ID 5 in the controller enclosure as a global spare.

```
# set global-spare disks 0.5
Info: Disk 0.5 configured as a Global Spare.

Success: Command completed successfully
```

## Related Commands

- “delete global-spare” on page 73
- “show disks” on page 174

## set host-parameters

### Description

FC and iSCSI only. Sets parameters for communication between controllers and hosts. The new settings take effect without restarting the controllers.

### Input

```
set host-parameters [controller a|b|both] [speed speed] [channel #|all] [fibre-connection-mode loop|point-to-point] [IP address] [netmask address] [gateway address] [noprompt]
```

Parameter	Description
controller a b both	Optional. Specifies whether to apply the settings to controller A, B, or both. Required if either <code>speed</code> or <code>fibre-connection-mode</code> is specified.
speed <i>speed</i>	Optional. FC only. Sets the link speed in Gbit/sec. When host port interconnects are enabled, the speed is also changed for interconnected port on the other controller. Valid values are 2g and 4g.
channel # all	Optional. Specifies a host port number. If this parameter is omitted, all host ports on the specified controllers are affected.
fibre-connection-mode loop point-to-point	Optional. FC only. Sets the topology for the specified channels on the specified controllers to either: <ul style="list-style-type: none"><li>• <code>loop</code>: Fibre Channel-Arbitrated Loop (public or private).</li><li>• <code>point-to-point</code>: Fibre Channel point-to-point. Point-to-point topology is only valid and allowed when port interconnects are disabled (using <code>set host-port-interconnects</code>).</li></ul>
noprompt	Optional. Specifies an automatic response to the confirmation prompt that enables the operation to proceed. If this parameter is omitted, you must reply to the prompt.

## Example

For an FC storage system, set the link speed to 2 Gbit/sec for controller A port 1 and for controller B port 0.

```
# set host-parameters controller a speed 2g channel 1
WARNING: You have requested a change on host channel parameters.
This change will take effect immediately. If the link speed is
changed, your current link may go down. If the topology is changed
between 'loop' and 'point-to-point', you may not be able to use
dual ID mode for failover and your ability to access LUNs from some
hosts will be limited. Are you sure? yes
```

For an FC storage system, set the topology of controller A host ports to loop.

```
# set host-parameters channel all fibre-connection-mode loop
controller a
WARNING: You have requested a change on host channel parameters.
This change will take effect immediately. If the link speed is
changed, your current link may go down. If the topology is changed
between 'loop' and 'point-to-point', you may not be able to use
dual ID mode for failover and your ability to access LUNs from some
hosts will be limited. Are you sure? yes
```

For an iSCSI storage system, set the port IP address, netmask, and gateway for controller A port 0.

```
# set host-parameters channel 0 ip 192.168.0.10 netmask
255.255.255.0 gateway 192.168.0.1 controller a
Success: iSCSI host parameters changed successfully.
```

## Related Commands

- “show host-parameters” on page 190
- “show host-port-interconnects” on page 193

## set host-port-interconnects

### Description

FC direct-attach mode only. Enables or disables the internal connection between controller host port pairs. In a dual-controller system, each host port on controller A is connected to a peer host port on controller B. When the connection between peer host ports is enabled, it forms an FC-AL loop. This command affects the connections between all host port pairs.

In order to enable the connections, the `fibre-connection-mode` host parameter must be set to `loop` for all ports.

### Input

```
set host-port-interconnects enable|disable
```

### Example

Enable the connections between all host port pairs.

```
# set host-port-interconnects enable
Success: Command completed successfully
```

### Related Commands

- “show host-parameters” on page 190
- “show host-port-interconnects” on page 193

# set host-wwn-name

## Description

FC and SAS only. Sets the nickname of an HBA entry for a host world wide port name (WWPN).

## Input

```
set host-wwn-name host host new-nickname
```

Parameter	Description
<i>host</i> <i>host</i>	Specifies an existing 16-hex-digit WWPN or an existing port nickname. For the nickname syntax to use, see “Host Nickname Syntax” on page 27.
<i>new-nickname</i>	Specifies a new nickname for the port. For the nickname syntax to use, see “Host Nickname Syntax” on page 27.

## Example

Create the nickname MyHost for the HBA having WWPN 100000A0B8040BAC.

```
# set host-wwn-name host 100000A0B8040BAC MyHost  
Success: Command completed successfully
```

Change the nickname MyHost to AppServer.

```
# set host-wwn-name host MyHost AppServer  
Success: Command completed successfully
```

## Related Commands

- “create host-wwn-name” on page 52
- “delete host-wwn-name” on page 74
- “show host-wwn-names” on page 194

## set iscsi-host

### Description

iSCSI only. Sets the nickname associated with an iSCSI host initiator's node name.

### Input

```
set iscsi-host host host new-nickname
```

Parameter	Description
<i>host host</i>	Specifies an iSCSI host initiator's node name or an existing nickname. For the nickname syntax to use, see "Host Nickname Syntax" on page 27.
<i>new-nickname</i>	Specifies a new nickname for the iSCSI host initiator. For the nickname syntax to use, see "Host Nickname Syntax" on page 27.

### Example

Change the nickname myHost to AppServer.

```
# set iscsi-host host myHost AppServer
```

### Related Commands

- "create iscsi-host" on page 53
- "delete iscsi-host" on page 75
- "show iscsi-hosts" on page 195

# set iscsi-parameters

## Description

iSCSI only. Changes system-wide iSCSI parameters.

## Input

```
set iscsi-parameters [chap enabled|disabled] [jumbo-frame
enabled|disabled] [speed auto|1g] [isns enabled|disabled]
[isns-ip iSNS-IP] [isns-alt-ip iSNS-IP]
```

Parameter	Description
chap enabled disabled	Enables or disables use of Challenge Handshake Authentication Protocol. Disabled by default.
jumbo-frame enabled disabled	Enables or disables support for jumbo frames. Disabled by default. A normal frame can contain 1500 bytes whereas a jumbo frame can contain a maximum of 9000 bytes for larger data transfers.
speed auto 1g	Sets the host port link speed either to <code>auto</code> , which allows the system to negotiate the proper speed, or to 1 Gbit/sec (1g). The default is <code>auto</code> .
isns enabled disabled	Enables or disables registration with a specified Internet Storage Name Service server, which provides name-to-IP-address mapping. Disabled by default.
isns-ip <i>iSNS-IP</i>	Specifies the IP address of an iSNS server. The default address is all zeroes.
isns-alt-ip <i>iSNS-IP</i>	Optional. Specifies the IP address of an alternate iSNS server, which can be on a different subnet. The default address is all zeroes.

## Example

For a storage system whose host ports are connected to different subnets, enable CHAP, specify the IP address of the iSNS server on each subnet, and enable registration with either server.

```
# set iscsi-parameters chap enabled isns enabled isns-ip
10.10.10.93 isns-alt-ip 10.11.10.90
```

## **Related Commands**

- “show iscsi-parameters” on page 196

# set job-parameters

## Description

Sets parameters for background scrub, partner firmware upgrade, and other jobs.

## Input

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

Parameter	Description
background-scrub enabled on disabled off	Optional. Controls whether vdisks are checked for disk drive defects to ensure system health.
partner-firmware-upgrade enabled on disabled off	Optional. Controls whether versions of firmware components are monitored and automatically updated on the partner controller.
utility-priority low medium high	Optional. Sets the priority at which jobs run with respect to I/O operations competing for the system's processors. This affects virtual disk verification and reconstruction, but not background scrub.

## Example

Enable background scrubbing of virtual disks and disable partner firmware upgrade.

```
# set job-parameters background-scrub on partner-firmware-upgrade
off
Info: Set Job-Parameters Background-Scrub on.

Info: Set Job-Parameters Partner-Firmware-Upgrade off.

Success: Command completed successfully
```

## Related Commands

- “show job-parameters” on page 198

# set led

## Description

Changes the state of drive module or enclosure LEDs to help you locate devices. For LED descriptions, see the *user guide*.

## Input

```
set led disk|enclosure ID on|off
```

Parameter	Description
disk <i>ID</i>	Specifies a disk drive number. For the syntax to use, see “Disk Drive Syntax” on page 25.
enclosure <i>ID</i>	Specifies the enclosure number, where 0 represents the controller enclosure and the number increments for each attached drive enclosure.
on off	Specifies to set or unset the LED.

## Example

Identify drive module 5 in the controller enclosure.

```
# set led disk 0.5 on
Success: Enabling identification LED for disk 0.5...
```

Stop identifying the controller enclosure.

```
# set led enclosure 0 off
Success: Disabling identification LED for enclosure 0...
```

# set network-parameters

## Description

Sets IP values for controller module Ethernet management ports. IP values can be set dynamically using Dynamic Host Configuration Protocol (DHCP) for both controllers, or manually (statically) for each controller.

If DCHP is enabled, manually setting an IP value for either controller disables DHCP for both controllers.

## Input

To set both controllers' IP values dynamically:

```
set network-parameters dhcp
```

To set a controller's IP values manually:

```
set network-parameters [ip address] [netmask netmask]  
[gateway gateway] [controller a|b]
```

Parameter	Description
dhcp	Specifies to use DHCP to set both controllers' IP values.
ip address	Optional. Specifies an IP address.
netmask netmask	Optional. Specifies an IP subnet mask.
gateway gateway	Optional. Specifies a gateway IP address.
controller a b	Optional. Specifies whether to apply the settings to controller A or B. If this parameter is omitted, settings are applied to the controller being accessed.

## Example

Use DHCP to set Ethernet management port IP values.

```
# set network-parameters dhcp
```

Manually set Ethernet management 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: Network parameters have been changed
```

### Related Commands

- “show network-parameters” on page 202

# set password

## Description

Sets a user's password for system interfaces (such as the CLI). The command prompts you to enter and re-enter the new password. A password can include a maximum of 19 characters except backslash (\), quotation mark ("), or spaces. The password is case sensitive.

## Input

```
set password [user]
```

---

Parameter	Description
-----------	-------------

---

<i>user</i>	Optional. Specifies the login name of the user to set the password for. If this argument is omitted, this command affects the logged-in user's password.
-------------	--

---

## Example

Change the password of the default user, monitor.

```
# set password monitor
Enter new password:****
Verify new password:****
Info: Changing password for user: monitor

Success: Password set
```

# set prompt

## Description

Sets the prompt for the current CLI session.

## Input

```
set prompt prompt
```

Parameter	Description
<i>prompt</i>	Specifies the new prompt string, which can include 0–7 characters. A string that includes a space must be enclosed in quotation marks (").

## Output

Command line with new prompt.

## Example

Set the prompt to CLI> followed by a space .

```
# set prompt "CLI> "  
Success: Command completed successfully  
CLI>
```

## set protocols

### Description

Enables or disables management services and protocols.

### Input

```
set protocols [capi enabled|disabled] [debug enabled|disabled]
[ftp enabled|disabled] [http enabled|disabled]
[https enabled|disabled] [service enabled|disabled]
[ses enabled|disabled] [smis enabled|disabled]
[snmp enabled|disabled] [ssh enabled|disabled]
[telnet enabled|disabled]
```

Parameter	Description
capi enabled disabled	Optional. Enables or disables the in-band CAPI management interface.
debug enabled disabled	Optional. Enables or disables Telnet debug port 4048.
ftp enabled disabled	Optional. Enables or disables the expert interface for updating firmware.
http enabled disabled	Optional. Enables or disables the standard WBI web server.
https enabled disabled	Optional. Enables or disables the secure WBI web server.
service enabled disabled	Optional. Enables or disables Telnet service port 1023.
ses enabled disabled	Optional. Enables or disables the in-band SCSI Enclosure Management Services interface.
smis enabled disabled	Optional. Enables or disables the Storage Management Initiative Specification interface.
snmp enabled disabled	Optional. Enables or disables the Simple Network Management Protocol interface.
ssh enabled disabled	Optional. Enables or disables the secure shell CLI.
telnet enabled disabled	Optional. Enables or disables the standard CLI.

## Example

Disable unsecure HTTP connections and enable FTP.

```
# set protocols http disabled ftp enabled
Info: Setting HTTP to disabled

Info: Setting FTP to enabled

Success: Committed Out-Of-Band protocol changes.
```

## Related Commands

- “show protocols” on page 207

# set snap-pool-policy

## Description

Sets the recovery policy that determines the action taken when a specified snap pool's error and critical threshold levels are reached. The policy for the warning threshold is preset to `notifyonly`. A snap pool's default error policy is `deleteoldestsnapshot` and default critical policy is `deletesnapshots`.

## Input

```
set snap-pool-policy volume [error autoexpand
|deleteoldestsnapshot|deletesnapshots|haltwrites|nochange
|notifyonly] [critical deleteoldestsnapshot|deletesnapshots
|haltwrites|nochange] [autoexpansionsize sizeMB|GB|TB]
```

Parameter	Description
<code>volume</code>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
<code>error</code> <code>autoexpand</code> <code> deleteoldestsnapshot</code> <code> deletesnapshots haltwrites</code> <code> notifyonly nochange</code>	Optional. Specifies the recovery policy to invoke when the error threshold level of snap-pool usage is reached. <ul style="list-style-type: none"><li>• <code>autoexpand</code>: Automatically expand the snap pool using the <code>autoexpansionsize</code> value.</li><li>• <code>deleteoldestsnapshot</code>: Delete the oldest snapshot in the snap pool.</li><li>• <code>deletesnapshots</code>: Delete all snapshots in the snap pool.</li><li>• <code>haltwrites</code>: Halt writes to the snap pool.</li><li>• <code>notifyonly</code>: Generates an event to notify the administrator.</li><li>• <code>nochange</code>: Take no action.</li></ul>
<code>critical</code> <code>deleteoldestsnapshot</code> <code> deletesnapshots haltwrites</code> <code> nochange</code>	Optional. Specifies the recovery policy to invoke when the critical threshold level of snap-pool usage is reached.

Parameter	Description
autoexpansionsize sizeMB   GB   TB	Specifies the increment in MB (Mbyte), GB (Gbyte), or TB (Tbyte) by which the snap pool will be automatically expanded when the threshold level is reached. The size uses base 10 (multiples of 1000) or base 2 (multiples of 1024); to see the current base setting, use <code>show cli-parameters</code> .

### Example

Set the error policy to autoexpand and the automatic expansion size to 10 GB for snap pool SP1.

```
# set snap-pool-policy SP1 error autoexpand autoexpansionsize 10GB
Success: Snap-pool Policy Changed.
```

### Related Commands

- “set snap-pool-threshold” on page 147
- “show snap-pools” on page 216

# set snap-pool-threshold

## Description

Sets the percentages of snap-pool space used that trigger the warning and error threshold policies. Three threshold levels are defined:

- **Warning.** This first threshold indicates that snap-pool space is moderately full. When exceeded, an event is generated to warn the administrator.
- **Error.** This second threshold indicates that the snap pool is getting full and unless corrective action is taken, snapshot data loss is probable. When exceeded, an event is generated to warn the administrator and the associated snap-pool policy is triggered.
- **Critical.** This third threshold indicates that the snap pool is nearly full and that data loss is imminent. When exceeded, an event is generate to alert the administrator and the associated snap-pool policy is triggered. This threshold is preset to 99%.

## Input

```
set snap-pool-threshold volume [warning #] [error #]
```

Parameter	Description
volume	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
warning #%	Specifies the percent of snap-pool space used that triggers the warning threshold policy. This value must be less than the error threshold value.
error #%	Specifies the percent of snap-pool space used that triggers the error threshold policy. This value must be less than 99%.

## Example

Set the warning and error thresholds for snap pool SP1.

```
# set snap-pool-threshold SP1 warning 60% error 85%  
Success: Snap-pool Threshold Changed.
```

## **Related Commands**

- “set snap-pool-policy” on page 145
- “show snap-pools” on page 216

# set snmp-parameters

## Description

Configures SNMP notification of events.

## Input

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

Parameter	Description
enable crit warn info none	Optional. Sets the level of trap notification: <ul style="list-style-type: none"><li>• crit: Sends critical events only.</li><li>• warn: Sends all critical events and warnings.</li><li>• info: Sends all events.</li><li>• none: All events are excluded from trap notification and traps are disabled.</li></ul>
add-trap-host address	Optional. Specifies the IP address of a destination host to send traps to. Three trap hosts can be set.
del-trap-host address	Optional. Deletes a trap destination host.
read-community string	Optional. Sets an alphanumeric community string for read-only access.
write-community string	Optional. Sets an alphanumeric community string for write access.

## 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: SNMP parameters changed.
```

## Related Commands

- “show snmp-parameters” on page 220

# set system

## Description

Sets the name, contact person, location, and description for a system. Each value can include a maximum of 79 characters except quotation mark (") or backslash (\). If the value contains a space, enclose the value in quotation marks.

## Input

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

Parameter	Description
<code>name value</code>	Specifies the system's name.
<code>contact value</code>	Specifies the system's contact person.
<code>location value</code>	Specifies the system's location.
<code>info value</code>	Specifies information about the system.

## Example

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

```
# set system name Test contact "J. Doe"
```

## Related Commands

- “show system” on page 222

# set user

## Description

Changes a user's level, type, and interface access. To change a user's password, use `set password`.

## Input

```
set user name [level monitor|manage] [type standard|advanced  
|diagnostic] [interfaces interfaces]
```

Parameter	Description
<i>name</i>	Specifies the user profile to change. Names are case sensitive.
level <i>monitor manage</i>	Optional. Specifies whether the user has <i>monitor</i> (view-only) or <i>manage</i> (modify) access for user interfaces. The default is <i>monitor</i> .
type standard advanced  diagnostic	Optional. Specifies the user's level of technical expertise, to control access to functionality in the WBI. <ul style="list-style-type: none"><li>• <i>standard</i>: Enables access to standard administrative functions. This is the default for <i>monitor</i> users.</li><li>• <i>advanced</i>: Enables access to standard and advanced functions. This is the default for <i>manage</i> users in the WBI.</li><li>• <i>diagnostic</i>: Enables access to standard, advanced, and troubleshooting functions. This is the default for <i>manage</i> users in the CLI.</li></ul>
interfaces <i>interfaces</i>	Optional. Specifies the interfaces that the user can access. Multiple values must be separated by a comma with no spaces. If this parameter is omitted, the defaults are <i>cli</i> and <i>wbi</i> . <ul style="list-style-type: none"><li>• <i>cli</i>: Command-line interface.</li><li>• <i>wbi</i>: Web-browser interface.</li><li>• <i>ftp</i>: File transfer protocol interface.</li><li>• <i>none</i>: No interfaces.</li></ul>

## Example

Change a user's type and interface access.

```
# set user type advanced interfaces wbi,cli jsmith
Success: User-Type set to advanced.

Success: Command completed successfully
```

## Related Commands

- “create user” on page 63
- “delete user” on page 82
- “set password” on page 141
- “show users” on page 228

# set vdisk

## Description

Sets the name and owning controller for an existing virtual disk.



---

**Caution** – If you change the ownership of a virtual disk whose volumes are mapped to hosts, the assigned LUNs become invalid and hosts lose access to the volumes. After changing ownership, you must reassign the LUNs and, depending on the host operating system, either rescan or restart to detect the LUN changes.

---

## Input

```
set vdisk vdisk [name new-name] [owner a|b]
```

---

Parameter	Description
<i>vdisk</i>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
name <i>new-name</i>	Optional. Specifies a new name for the virtual disk. For the syntax to use, see “Virtual Disk Syntax” on page 26.
owner a b	Optional. Sets the owner of the virtual disk to controller A or B.

---

## Example

Rename virtual disk VD1 and reassign its ownership.

```
# set vdisk VD1 name VD2 owner a
Success: Command completed successfully
```

## Related Commands

- “show vdisks” on page 230

## set vdisk-spare

### Description

Designates spare disk drives that can be used by a specific virtual disk, and sets the disk drive status to `VDISK SP`. A vdisk spare can be assigned to RAID 1, 3, 5, 6, 10, and 50 virtual disks, and must have enough capacity to replace the smallest disk drive in the virtual disk.

### Input

```
set vdisk-spare disks disks vdisk
```

Parameter	Description
<code>disks <i>disks</i></code>	Specifies up to four disk drives. For the syntax to use, see “Disk Drive Syntax” on page 25.
<code><i>vdisk</i></code>	Specifies the virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.

### Example

Designate the disk drive having ID 5 in the controller enclosure as a vdisk spare for virtual disk VD1.

```
# set vdisk-spare disks 0.5 VD1
Info: Disk 0.5 added to VD1.

Success: Command completed successfully
```

### Related Commands

- “show disks” on page 174
- “show vdisks” on page 230

# set volume

## Description

Changes the name of a volume.

## Input

```
set volume volume name new-name
```

Parameter	Description
<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
name <i>new-name</i>	Specifies a new name for the volume. For the syntax to use, see “Volume Syntax” on page 26.

## Example

Rename volume V1 to V2.

```
# set volume V1 name V2  
Success: volume set successfully
```

## Related Commands

- “show volumes” on page 237
- “show host-maps” on page 188
- “show volume-maps” on page 235

# 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

## Input

```
show auto-write-through-trigger
```

## Output

Shows whether each trigger is enabled or disabled.

## Example

Show the system's trigger settings.

```
# show auto-write-through-trigger
Controller Failure      : Disabled
SuperCap Failure       : Enabled
Compact Flash Failure  : Enabled
Power Supply Failure   : Disabled
Fan Failure            : Disabled
Temperature Exceeded   : Disabled
Partner Notify         : Disabled
Auto Write Back        : Enabled
```

## Related Commands

- “set auto-write-through-trigger” on page 107

# show cache-parameters

## Description

Shows cache settings for the storage system and optionally for a specified volume.

## Input

```
show cache-parameters [volume]
```

Parameter	Description
-----------	-------------

<i>volume</i>	Optional. Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26. If this parameter is not specified, the volume-specific data is not displayed.
---------------	--

## Output

Field	Description
Operation Mode	The operation mode, also called the “redundancy mode.” <ul style="list-style-type: none"><li>• Active-Active ULP: SAS only. Both controllers are active using ULP (Unified LUN Provisioning), which means 128 LUNs are available for mapping volumes.</li><li>• Active-Active: FC and iSCSI only. Both controllers are active, and each has 128 LUNs for mapping volumes owned by that controller only.</li><li>• Independent Cache Performance Mode: Cache mirroring and failover between controllers is disabled, which results in improved write performance but at a risk of loss of unwritten data if a controller failure occurs while there is data in the controller’s cache memory.</li><li>• Single-Controller: There is only a single controller in the enclosure.</li></ul>
Controller ID Write-back Status	For each controller, shows whether write-back caching is enabled or disabled
Volume Serial	If a volume is specified, its serial number
Volume Name	If a volume is specified, its name

Field	Description
Write Mode	If a volume is specified, its cache policy, either write-back or write-through
Optimization	If a volume is specified, its cache optimization mode, either standard (random) or super-sequential
Read Ahead Size	If a volume is specified, its read-ahead cache setting

## Example

On a SAS system, show the cache parameters for the system and for volume V1.

```
# show cache-parameters V1
Cache Parameters
-----
Operation Mode: Active-Active ULP
Controller A Write-back Status: Enabled
Controller B Write-back Status: Enabled

Volume Serial   : 00c0ff0a906b0000dcaa834701000000
Volume Name     : V1
Write Mode      : write-back
Optimization    : standard
Read Ahead Size: Default
```

On an FC or iSCSI system, show system-wide cache parameters only.

```
# show cache-parameters
Cache Parameters
-----
Operation Mode: Active-Active
Controller A Write-back Status: Enabled
Controller B Write-back Status: Enabled
```

## Related Commands

- “set cache-parameters” on page 110
- “show volumes” on page 237

# show channels

## Description

Shows information about host and expansion ports on both controllers.

## Input

```
show channels
```

## Output

Field	Description
Ctrlr	Controller ID
Ch	Port number
Type	<ul style="list-style-type: none"><li>• Host: Host port</li><li>• Drive: Expansion port</li></ul>
Media	<ul style="list-style-type: none"><li>• FC (P) : Fibre Channel Point-to-Point</li><li>• FC (L) : Fibre Channel-Arbitrated Loop</li><li>• FC (-) : Not applicable</li><li>• SAS: Serial Attached SCSI</li><li>• iSCSI: Internet SCSI</li></ul>
Topo (C)	FC or SAS only. Configured topology
Speed (A)	Actual host-port link speed. Blank if not applicable
Speed (C)	FC or SAS only. Configured host-port link speed: <ul style="list-style-type: none"><li>• FC: 2G or 4G (Gbit/sec)</li><li>• SAS: 3G (Gbit/sec)</li><li>• Blank if not applicable</li></ul>
Status	Whether the port is operational (Up) or not (Down)
PID	FC or SAS only. Primary ID, or blank if not applicable
SID	FC or SAS only. Secondary ID, or blank if not applicable

## Example

Show port information for a dual-controller SAS storage system.

```
# show channels
Ctrlr Ch Type Media Topo(C) Speed(A) Speed(C) Status PID SID
-----
A 0 Host SAS Direct Down N/A N/A
A 1 Host SAS Direct Down N/A N/A
A 0 Drive SAS Up N/A N/A
B 0 Host SAS Direct Down N/A N/A
B 1 Host SAS Direct Down N/A N/A
B 0 Drive SAS Up N/A N/A
-----
```

Show port information for a dual-controller FC storage system.

```
# show channels
Ctrlr Ch Type Media Topo(C) Speed(A) Speed(C) Status PID SID
-----
A 0 Host FC(L) Loop 2G 2G Up 0
A 1 Host FC(L) Loop 2G 2G Up 2
A 0 Drive SAS Up
B 0 Host FC(L) Loop 2G 2G Up 0
B 1 Host FC(L) Loop 2G 2G Up 1
B 0 Drive SAS Up
-----
```

Show port information for a dual-controller iSCSI storage system.

```
# show channels
Ctrlr Ch Type Media Speed(A) Status IP-Ver PIP
MAC
-----
A 0 Host iSCSI 1Gb Up IPv4 10.11.10.4
A8:A5:00:00:00:09
A 1 Host iSCSI 1Gb Up IPv4 10.10.10.5
A8:A5:00:00:00:08
A 0 Drive SAS Up N/A N/A
N/A
B 0 Host iSCSI 1Gb Up IPv4 10.11.10.2
00:C0:FF:0A:8A:53
B 1 Host iSCSI 1Gb Up IPv4 10.10.10.3
00:C0:FF:0A:8A:52
B 0 Drive SAS Up N/A N/A
N/A
-----
```

### Related Commands

- “set host-parameters” on page 130

## show chap-records

### Description

iSCSI only. Shows the CHAP records for a specific originator, or all CHAP records if no originator is specified. This command is permitted whether or not CHAP is enabled.

### Input

```
show chap-records [name originator-name]
```

Parameter	Description
<code>name <i>originator-name</i></code>	Optional. Specifies the originator name, which is typically the originator's IQN. The name is case sensitive and can include a maximum of 223 characters. If this parameter is omitted, the command displays CHAP records for all originators.

### Output

Field	Description
Name	The originator name
Secret	The secret that the recipient uses to authenticate the originator
Mutual CHAP Name	For mutual CHAP, the recipient name
Mutual CHAP Secret	For mutual CHAP, the secret that the originator uses to authenticate the recipient

## Example

Show the CHAP record for a specific host initiator.

```
# show chap-records name iqn.1991-05.com.microsoft:myHost.domain
CHAP Record(s)
-----
Name: iqn.1991-05.com.microsoft:myHost.domain
Secret: 123456abcDEF
Mutual CHAP Name: iqn.1995-03.com.acme:01.storage.00c0ffd6000a
Mutual CHAP Secret: ABCdef123456
```

## Related Commands

- “create chap-record” on page 50
- “delete chap-records” on page 72
- “set chap-record” on page 116
- “show host-parameters” on page 190

## show cli-parameters

### Description

Shows the current CLI settings.

### Input

```
show cli-parameters
```

### Output

Field	Description
Timeout	Timeout value, in seconds, for the login session.
Output Format	<ul style="list-style-type: none"><li>• <code>console</code>: Output is shown in human-readable console format.</li><li>• <code>api</code>: Output is shown in XML format.</li></ul>
Base	<ul style="list-style-type: none"><li>• <code>2</code>: Capacities are shown in base 2, which uses 1024 as a divisor.</li><li>• <code>10</code>: Capacities are shown in base 10, which uses 1000 as a divisor.</li></ul>
Pager	<ul style="list-style-type: none"><li>• <code>enabled</code>: Pager feature is enabled, which halts output after each full screen until keyboard input is detected.</li><li>• <code>disable</code>: Pager feature is disabled.</li></ul>
Disk Addressing Mode	Controls the format in which drive IDs are shown and must be specified: <ul style="list-style-type: none"><li>• <code>enclosure-slot</code>: Drives are shown, and must be specified, with the format <code>enclosure-ID.drive-slot-number</code>. For example, the first drive in the second enclosure (enclosure ID 1) has address 1.0.</li><li>• <code>channel-id</code>: Drives are shown, and must be specified, by SCSI ID. For example, the first drive in the second enclosure has address 16.</li></ul>

## Example

Show current CLI settings.

```
# show cli-parameters
Timeout: 1800
Output Format: console
Base: 10
Pager: enabled
Disk Addressing Mode: enclosure-slot
```

## Related Commands

- “set cli-parameters” on page 118

# show configuration

## Description

Shows system configuration information.

## Input

```
show configuration
```

## Output

Category	Fields
System information	See “show system” on page 222.
Controller information	<ul style="list-style-type: none"><li>• Serial Number</li><li>• Hardware Version</li><li>• CPLD Version</li><li>• MAC Address</li><li>• Node WWN</li><li>• IP Address</li><li>• IP Subnet Mask</li><li>• IP Gateway</li><li>• Disk Drives Present: Number connected to this controller</li><li>• Virtual Disks: Number owned by this controller</li><li>• Cache Memory Size (MB)</li><li>• Host Channels: Number of host ports</li><li>• Host Bus Type</li><li>• Drive Channels: Number of expansion ports</li><li>• Drive Bus Type</li></ul>
Controller software and hardware versions	See “versions” on page 247.
Host and expansion (drive) port information	See “show channels” on page 159.
Disk drive information	See “show disks” on page 174.
Disk drive information by enclosure	In “show disks” on page 174, see the output of the <code>encl</code> option.

---

<b>Category</b>	<b>Fields</b>
Virtual disk information	See “show vdisks” on page 230.
Enclosure status information, including SCSI Enclosure Services (SES) data	See “show enclosure-status” on page 178.
Field-replaceable unit (FRU) information	See “show frus” on page 186.

---

## show controller-date

### Description

Shows the system's current date and time.

### Input

```
show controller-date
```

### Output

Field	Description
Controller Date	Date and time

### Example

Show the system date and time on an FC or iSCSI system.

```
# show controller-date  
Controller Date: FRI APR 25 10:09:28 2008
```

Show the system date and time on a SAS system.

```
# show controller-date  
Controller Date: 2008-04-25 10:09:28
```

### Related Commands

- “set controller-date” on page 120
- “show ntp-status” on page 204

# show debug-log

## Description

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Shows the debug logs for the Storage Controller (SC), the Management Controller (MC), the semaphore trace, task logs, or all of them. If no parameters are specified, all logs are shown.

## Input

```
show debug-log mc [mc-entries]  
show debug-log sc controller a|b|both region boot|error|debug|all  
show debug-log sem-trace-log [sem-entries]  
show debug-log task-log [task-entries]  
show debug-log [all]
```

---

Parameter	Description
mc	Specifies to show MC debug logs.
<i>mc-entries</i>	Optional. Specifies the number of MC logs to show, which is recommended because debug logs can be very large.
sc	Specifies to show SC logs only.
controller a b both	Specifies whether to show SC debug logs for controller A, B, or both.
region boot error debug all	Specifies the type of SC logs to show: <ul style="list-style-type: none"><li>• boot: Shows only the boot log.</li><li>• error: Shows only error logs recorded for previous SC crash or improper shutdown.</li><li>• debug: Shows only debug logs.</li><li>• all: Shows all logs.</li></ul>
sem-trace-log	Specifies the semaphore trace log.

---

Parameter	Description
<i>sem-entries</i>	Optional. Specifies the number of semaphore log entries to show. If this parameter is omitted, all semaphore log entries are shown.
task-log	Specifies to show the MC task status at the time this command is issued.
<i>task-entries</i>	Optional. Specifies the number of task log entries to show. If this parameter is omitted, all task log entries are shown.
all	Optional. Specifies to show all logs. This is the default if no other parameter is specified, and results in very large output.

## Output

Debug log entries.

## Example

Show all SC and MC logs.

```
# show debug-log all
```

Show 10 MC debug log entries.

```
# show debug-log mc 10
```

Show SC error logs for both controllers.

```
# show debug-log sc controller both region error
```

Show 20 task log entries.

```
# show debug-log task-log 20
```

## **Related Commands**

- “set debug-log-parameters” on page 122
- “show debug-log-parameters” on page 172

# show debug-log-parameters

## Description

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Shows which debug message types are enabled (on) or disabled (off) for inclusion in the Storage Controller debug log.

## Input

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

## Output

---

Field	Description
host	Host interface debug messages
disk	Disk interface debug messages
mem	Internal memory debug messages
fo	Failover/recovery debug messages
msg	Inter-controller message debug messages
fca	FC only. I/O interface driver debug messages (standard)
fc b	FC only. I/O interface driver debug messages (resource counts)
fcc	FC only. I/O interface driver debug messages (upper layer, verbose)
fc d	FC only. I/O interface driver debug messages (lower layer, verbose)
ioa	iSCSI and SAS only. I/O interface driver debug messages (standard)
io b	iSCSI and SAS only. I/O interface driver debug messages (resource counts)
io c	iSCSI and SAS only. I/O interface driver debug messages (upper layer, verbose)
io d	iSCSI and SAS only. I/O interface driver debug messages (lower layer, verbose)
misc	Internal debug messages
rcm	Removable-component manager debug messages

---

---

<b>Field</b>	<b>Description (<i>Continued</i>)</b>
raid	RAID debug messages
cache	Cache debug messages
emp	Enclosure Management Processor debug messages
capi	Internal Configuration API debug messages
mui	Internal service interface debug messages
bkcfg	Internal configuration debug messages
awt	Auto-write-through feature debug messages
res2	Internal debug messages
capi2	Internal Configuration API tracing debug messages
dms	Snapshot feature debug messages
fruid	FRU ID debug messages

---

### **Example**

Show debug log parameters.

```
# show debug-log-parameters
host: off
disk: on
mem: on
...
```

### **Related Commands**

- “set debug-log-parameters” on page 122
- “show debug-log” on page 169

# show disks

## Description

Shows information about disk drives in the controller enclosure and any attached drive enclosures. The `encl` option shows different fields than the other options and shows each slot, whether or not a disk is present. If no parameter is specified, the command shows information for all disk drives.

## Input

```
show disks [disks|free|all|encl|vdisk vdisk]
```

Parameter	Description
<code><i>disks</i> <i>free</i> <i>all</i> <i>encl</i>  <i>vdisk</i> <i>vdisk</i></code>	Optional. Specifies the disk drives to report information about: <ul style="list-style-type: none"><li>• <code><i>disks</i></code>: Specifies the disk drives. For the syntax to use, see “Disk Drive Syntax” on page 25.</li><li>• <code><i>free</i></code>: Shows information for all disk drives that are not assigned (status <code>AVAIL</code>).</li><li>• <code><i>all</i></code>: Shows information for all disk drives.</li><li>• <code><i>encl</i></code>: Show information for all disk drives by enclosure.</li><li>• <code><i>vdisk</i> <i>vdisk</i></code>: Shows information for disk drives in a specified virtual disk. For the syntax to use, see “Virtual Disk Syntax” on page 26.</li></ul>

## Output (Standard)

Field	Description
ID	SCSI ID
Serial#	Disk drive serial number
Vendor	Disk drive vendor
Rev.	Firmware revision number

<b>Field</b>	<b>Description</b>
State	<ul style="list-style-type: none"> <li>• AVAIL: Disk is available for use in a vdisk</li> <li>• GLOBAL SP: Global spare</li> <li>• LEFTOVR: Disk contains metadata but is not part of a vdisk</li> <li>• VDISK: Disk is part of a vdisk</li> <li>• VDISK SP: Disk is a spare assigned to a vdisk</li> </ul> <p>Any jobs running on the disk or its vdisk follow the state value:</p> <ul style="list-style-type: none"> <li>• DRSC: The disk is being scrubbed</li> <li>• EXPD: The vdisk is being expanded</li> <li>• INIT: The vdisk is being initialized</li> <li>• LOWF: A low-level format is in progress</li> <li>• RCON: The vdisk is being reconstructed</li> <li>• VRFY: The vdisk is being verified</li> <li>• VRSC: The vdisk is being scrubbed</li> </ul>
Type	Disk drive type (SAS or SATA)
Size (GB)	Disk drive capacity in Gbyte
Rate (Gb/s)	Data transfer speed in Gbit/second
SP	Shows whether the disk drive is connected to a single port, and which controller owns the port

### **Output (encl Option)**

<b>Field</b>	<b>Description</b>
Status	Disk drive status: Up (operational) or Missing
Encl	Enclosure number where the disk drive is located
Slot	Slot number in the enclosure where the disk drive is located
Vendor	Disk drive vendor
Model	Disk drive model
Serial#	Disk drive serial number
Size (GB)	Disk drive size in Gbyte

## Example

Show information for disk drives 0, 1, and 4 in the first enclosure.

```
# show disks 0.0-1,0.4
ID Serial#           Vendor Rev.   State      Type Size(GB) Rate(Gb/s) SP
-----
0  KRVN03ZAG4ZPPD   ATA    AD1A   AVAIL      SATA 500      3.0
1  KRVN03ZAGA88PD   ATA    AD1A   VDISK      SATA 500      3.0
4  KRVN03ZAG4L22D   ATA    AD1A   VDISK VRSC  SATA 500      3.0
-----
```

Show information about disk drives, where drive 1 is not inserted.

```
# show disks encl
Status Encl Slot Vendor  Model              Serial#             Size(GB)
-----
Up      0    0    ATA    HDS725050KLA360   KRVN03ZAG4ZPPD    500
Missing 0    1
Up      0    2    ATA    HDS725050KLA360   KRVN03ZAGA88PD    500
Up      0    3    ATA    HDS725050KLA360   KRVN03ZAGA8A0D    500
Up      0    4    ATA    HDS725050KLA360   KRVN03ZAG4L22D    500
...
-----
```

## Related Commands

- “show vdisks” on page 230

# show drive-parameters

## Description

Shows the SMART setting.

## Input

```
show drive-parameters
```

## Output

---

Field	Description
SMART	Shows whether SMART is enabled or disabled for all disk drives, or is set to detect-only, which specifies that each new drive inserted in the system retain its current SMART setting.

---

## Example

Show drive parameter settings.

```
# show drive-parameters
Drive Parameters
-----
SMART: Enabled
```

## Related Commands

- “set drive-parameters” on page 124

# show enclosure-status

## Description

Shows the status of system enclosures and their components. For each attached enclosure, the command shows general SCSI Enclosure Services (SES) information followed by component-specific information.

## Input

```
show enclosure-status
```

## Output

General SES fields:

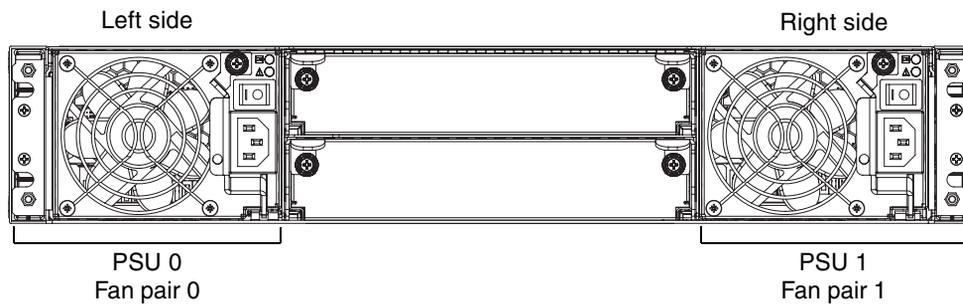
Field	Description
Chassis	Chassis serial number
Vendor	Enclosure vendor name
Product ID	Product model identifier
Rev	Expander Controller version
CPLD	Complex Programmable Logic Device version
WWPN	World wide port name of the SES device reporting the enclosure status
Status	Overall status of the enclosure

Enclosure Component Status fields:

Field	Description
Type	The component type: <ul style="list-style-type: none"><li>• FAN: Cooling fan unit</li><li>• PSU: Power supply unit</li><li>• Temp: Temperature sensor</li><li>• Voltage: Voltage sensor</li><li>• DiskSlot: Disk drive module</li></ul>

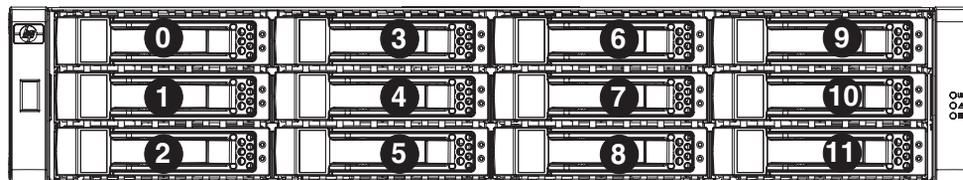
Field	Description
#	Unit ID For the location of each fan and power supply, see Figure 3-1. For the location of each disk slot, see Figure 3-2.
Status	Component status: <ul style="list-style-type: none"> <li>• Absent: Component is not present</li> <li>• Fault: One or more subcomponents has a fault</li> <li>• OK: All subcomponents are operating normally. Temperature status OK indicates that the sensor is working properly, not that the temperature is within an acceptable range.</li> <li>• N/A: Status is not available</li> </ul>
FRU P/N	Part number of the field-replaceable unit (FRU) that contains the component
FRU S/N	Serial number of the FRU that contains the component
Add'l Data	Additional data such as temperature (Celsius), voltage, or slot address

Figure 3-1 shows the location of each fan and power supply, identified by unit ID. Here, left and right are with respect to the back of the enclosure.



**Figure 3-1** Location of Fan and Power Supply Units (PSUs)

Figure 3-2 shows the numbering of disk slots by column from top to bottom.



**Figure 3-2** Drive Module (Disk Slot) Numbering

## Example

Show status information for a single-enclosure system.

```
# show enclosure-status
Chassis          Vendor      Product ID      Rev  CPLD  WWPN          Status
-----
3CL625C401      vendor    product          2042 27  500C0FF02424013C  OK

Type   #   Status   FRU P/N          FRU S/N          Add'l Data
-----
FAN    00  OK       481320-001      3CL625PA01      --
FAN    01  OK       481320-001      3CL626PA02      --
PSU    00  OK       481320-001      3CL625PA01      --
PSU    01  OK       481320-001      3CL626PA02      --
Temp   00  Absent   N/A             N/A
Temp   01  OK       AJ744A          3CL625R2FE      temp=32
Temp   02  OK       481320-001      3CL625PA01      temp=28
Temp   03  OK       481320-001      3CL626PA02      temp=34
Voltage 00  OK       481320-001      3CL625PA01      voltage=12.460V
Voltage 01  OK       481320-001      3CL625PA01      voltage=5.470V
Voltage 02  OK       481320-001      3CL625PA01      voltage=2.740V
Voltage 03  OK       481320-001      3CL626PA02      voltage=12.500V
Voltage 04  OK       481320-001      3CL626PA02      voltage=5.550V
Voltage 05  OK       481320-001      3CL626PA02      voltage=3.580V
DiskSlot 00  OK       481321-001      3CL625C401      addr=0
DiskSlot 01  OK       481321-001      3CL625C401      addr=1
DiskSlot 02  OK       481321-001      3CL625C401      addr=2
DiskSlot 03  OK       481321-001      3CL625C401      addr=3
DiskSlot 04  OK       481321-001      3CL625C401      addr=4
DiskSlot 05  OK       481321-001      3CL625C401      addr=5
DiskSlot 06  OK       481321-001      3CL625C401      addr=6
DiskSlot 07  Critical 481321-001      3CL625C401      addr=7
DiskSlot 08  Critical 481321-001      3CL625C401      addr=8
DiskSlot 09  OK       481321-001      3CL625C401      addr=9
DiskSlot 10  OK       481321-001      3CL625C401      addr=10
DiskSlot 11  Absent   481321-001      3CL625C401      addr=11
-----
```

# show events

## Description

Shows events for an enclosure, including events from each Management Controller and each Storage Controller. A separate set of event numbers is maintained for each controller module. Each event number is prefixed with a letter identifying the controller module 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.

If SNMP is configured, events can be sent to SNMP traps.

## Input

To show a certain number of events:

```
show events [last #] [a|b|both|error]
```

To show events by date:

```
show events [from date] [to date] [a|b|both|error]
```

To show events by ID:

```
show events [from-event ID] [to-event ID] [a|b|both|error]
```

Parameter	Description
<code>last #</code>	Optional. Shows the latest specified number of events. If this parameter is omitted, all events are shown.
<code>from date</code>	Optional. Shows events including and after the specified date and time. Use the format <i>MMDDYYhhmmss</i> , where <i>hh</i> is the hour on a 24-hour clock. For example, 043006235900 represents Apr 30 2006 at 11:59:00 p.m.

Parameter	Description
<code>to date</code>	Optional. Shows events before and including the specified date and time. Use the format <i>MMDDYYhhmmss</i> , where <i>hh</i> is the hour on a 24-hour clock. For example, 043006235900 represents Apr 30 2006 at 11:59:00 p.m. This parameter can be used with either “from” parameter.
<code>from-event ID</code>	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. This parameter can be used with either “to” parameter.
<code>to-event ID</code>	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. This parameter can be used with either “from” parameter.
<code>a b error</code>	Optional. Specifies to filter the event listing: <ul style="list-style-type: none"> <li>• <code>a</code>: Shows events from controller A only</li> <li>• <code>b</code>: Shows events from controller B only</li> <li>• <code>error</code>: Shows all warning and critical events but not informational events</li> </ul>

## Output

Shows the following information for each event:

Field	Description
Timestamp	Day, date, time, and year when the event was logged
Event code	Identifies the type of event and might help service technicians diagnose problems; for example, [181]
Event ID	Event number prefixed by <i>A</i> or <i>B</i> to indicate which controller module logged the event; for example, #A123
Controller ID	Model, serial number, and ID of the controller module that logged the event

---

Field	Description
Severity	<ul style="list-style-type: none"><li>• CRITICAL: Events that might affect data integrity or system stability.</li><li>• WARNING: Events that do not affect data integrity.</li><li>• INFORMATIONAL: Events that show the change of state or configuration changes.</li></ul>
Message	Event-specific message giving details about the event; for example, LAN configuration parameters have been set

---

### Example

Show the last two events.

```
# show events last 2
```

Show the last three warning and critical events.

```
# show events last 3 error
```

Show all events from 11:59:00 p.m. on Apr 30, 2006 through 11:59:00 a.m. on May 2, 2006.

```
# show events from 043006235900 to 050206115900
```

Show a range of events logged by controller A.

```
# show events from-event a100 to-event a123
```

### Example

- “clear event” on page 46
- “set snmp-parameters” on page 149
- “show snmp-parameters” on page 220

# show expander-status

## Description

Shows diagnostic information relating to SAS expander physical channels, known as PHY lanes. For each enclosure, this command shows status information for PHYs in I/O module A and then I/O module B.

## Input

```
show expander-status
```

## Output

Parameter	Description
Encl	Enclosure that contains the SAS expander
Phy	Identifies a PHY's logical location within a group based on the PHY type. Logical IDs are 0–11 for disk PHYs and 0–3 for inter-expander, egress, and ingress PHYs.
Type	<ul style="list-style-type: none"><li>• DRIVE: Communicates between the expander and a disk drive.</li><li>• EGRESS: Communicates between the expander and an expansion port or SAS Out port.</li><li>• INGRESS: (Expansion module only) Communicates between the expander and an expansion port.</li><li>• INTER-EXP: (Controller module only) Communicates between the expander and the partner's expander.</li><li>• SC: (Controller module only) Communicates between the expander and the SC.</li><li>• UNDEFINED: No status information is available.</li><li>• UNUSED: Unused PHY.</li></ul>
Status	<ul style="list-style-type: none"><li>• Disabled: The PHY has been disabled by a user or by the system.</li><li>• Error: The PHY experienced an unrecoverable error condition or received an unsupported PHY status value.</li><li>• OK: The PHY is healthy.</li><li>• Non-critical: Indicates that port is not connected, the port connector is defective, or the PHY at the other end of the connection is disabled.</li><li>• Not used: The module is not installed.</li><li>• Unknown: The status is unknown.</li></ul>

## Example

Show the expander status for all enclosures.

```
# show expander-status
Encl Phy  Type      Status
-----
0      0   DRIVE    OK
0      1   DRIVE    OK
0      2   DRIVE    OK
0      3   DRIVE    OK
0      4   DRIVE    OK
0      5   DRIVE    OK
0      6   DRIVE    OK
0      7   DRIVE    OK
0      8   DRIVE    OK
0      9   DRIVE    OK
0     10   DRIVE    OK
0     11   DRIVE    OK
0      0   INTER-EXP OK
0      1   INTER-EXP OK
0      2   INTER-EXP OK
0      3   INTER-EXP OK
0      0   SC       OK
0      1   SC       OK
0      2   SC       OK
0      3   SC       OK
0      0   EGRESS   OK
0      1   EGRESS   OK
0      2   EGRESS   OK
0      3   EGRESS   OK
-----
```

## Related Commands

- “clear expander-status” on page 47
- “set expander-fault-isolation” on page 125
- “set expander-phy” on page 127

# show frus

## Description

Shows information for all field-replaceable units (FRUs) in the controller enclosure and in any attached drive enclosures. Some information reported is for use by service technicians.

## Input

```
show frus
```

## Output

Field	Description
Name	FRU name: <ul style="list-style-type: none"><li>• CHASSIS_MIDPLANE: 2U chassis and midplane; the metal enclosure and the circuit board to which power and cooling, controller, expansion, and drive modules connect</li><li>• RAID_IOM: Controller module</li><li>• BOD_IOM: Expansion module</li><li>• POWER_SUPPLY: Power and cooling module</li></ul>
Description	FRU description
Part Number	FRU part number
Mid-Plane SN	For the CHASSIS_MIDPLANE FRU, the mid-plane serial number
Serial Number	For the RAID_IOM, BOD_IOM, and POWER_SUPPLY FRUs, the FRU serial number
Revision	FRU revision number
Dash Level	FRU template revision number
FRU Shortname	FRU part number
Mfg Date	Date and time that the FRU was programmed
Mfg Location	Location where the FRU was programmed
Mfg Vendor ID	JEDEC ID of the manufacturer

Field	Description
FRU Location	Location of the FRU in the enclosure, as viewed from the back: <ul style="list-style-type: none"> <li>• MID-PLANE SLOT: Chassis midplane</li> <li>• UPPER IOM SLOT: Controller or expansion module A</li> <li>• LOWER IOM SLOT: Controller or expansion module B</li> <li>• LEFT PSU SLOT: Power-and-cooling module 0</li> <li>• RIGHT PSU SLOT: Power-and-cooling module 1</li> </ul>
Configuration SN	A customer-specific configuration serial number
FRU Status	Component status: <ul style="list-style-type: none"> <li>• Absent: Component is not present</li> <li>• Fault: One or more subcomponents has a fault</li> <li>• OK: All subcomponents are operating normally</li> <li>• N/A: Status is not available</li> </ul>

### Example

This example shows the output for a single FRU.

```
# show frus
Name: CHASSIS_MIDPLANE
Description: SPS-CHASSIS w/midplane
Part Number: 481321-001
Mid-Plane SN: DHSIMIL-06400A408A
Revision: 01
Dash Level:
FRU Shortname: Midplane/Chassis
Mfg Date: FRI SEP 15 13:55:36 2006
Mfg Location: Milpitas California, USA
Mfg Vendor ID: 0x0301
FRU Location: MID-PLANE SLOT
Configuration SN: 3CL640C08A
FRU Status: OK
...
```

## show host-maps

### Description

Shows mapping information for volumes that are mapped to a specified host or to all hosts.

### Input

```
show host-maps [host]
```

---

Parameter	Description
-----------	-------------

---

<i>host</i>	Optional. For FC and SAS this specifies the host's nickname or 16-hex-digit WWPN. For iSCSI this specifies the iSCSI host initiator's node name (typically the IQN) or nickname. For the nickname syntax to use, see "Host Nickname Syntax" on page 27. If this parameter is omitted, mapped volumes for all hosts are shown.
-------------	---

---

### Output

---

Field	Description
WWN	FC and SAS only. Host WWPN.
Name	Host port nickname.
Volume Name	Name of the volume seen by the host.
Volume SN	Serial number of the volume seen by the host.
ID	FC and iSCSI only. An index into a table of port IDs (not the actual port ID). This is always 0.
LUN	LUN used to access the volume.
Access	Host access rights: <ul style="list-style-type: none"><li>• <i>rw</i>: read-write</li><li>• <i>ro</i>: read-only</li><li>• <i>none</i>: no access</li></ul>
Channels	Controller host ports on which this volume is visible.

---

## Example

On a SAS system, show mappings for host Host1.

```
# show host-maps Host1
Host [WWN 100000A0B8040BAC, Name (Host1)] Mapping View:
Volume Name      Volume SN                      LUN Access Channels
-----
V1                00c0ff0a43180048517e054501000000 15  rw      A0,B0
```

On an FC system, show mappings for host Host1.

```
# show host-maps Host1
Host [WWN 100000A0B8040BAC, Name (Host1)] Mapping View:
Volume Name      Volume SN                      ID LUN Access Channels
-----
V1                00c0ff0a43180048517e054501000000 0  15  rw      0,1
```

On an iSCSI system, show mappings for host H1.

```
# show host-maps H1
Host [IQN iqn.1991-05.com.microsoft:myHost1.domain, Name (H1)] Mapping View:
Volume Name      Volume SN                      ID LUN Access Channels
-----
V1                00c0ff0a427d0048466dc04501000000 0  5   rw      0,1
V2                00c0ff0a427d00484f28f54501000000 na na  none  none
```

## Related Commands

- “show host-wwn-names” on page 194
- “show iscsi-hosts” on page 195
- “show volume-maps” on page 235
- “show volumes” on page 237

## show host-parameters

### Description

Shows information about host ports on both controllers.

### Input

```
show host-parameters
```

### Output

Field	Description
Ctlr	Controller ID
Ch	Host port number
Type	<ul style="list-style-type: none"><li>• Host: Host port</li></ul>
Media	<ul style="list-style-type: none"><li>• FC (P) : Fibre Channel Point-to-Point</li><li>• FC (L) : Fibre Channel-Arbitrated Loop</li><li>• SAS: Serial Attached SCSI</li><li>• iSCSI: Internet SCSI</li></ul>
Topo (C)	FC or SAS only. Configured topology
Speed (A)	FC or SAS only. Actual link speed:. Blank if not applicable.
Speed (C)	FC or SAS only. Configured link speed: <ul style="list-style-type: none"><li>• FC: 2G or 4G (Gbit/sec)</li><li>• SAS: 3G (Gbit/sec)</li><li>• Blank if not applicable</li></ul>
Status	Whether the port is operational (Up) or not (Down)

## Example

Show host parameters for a dual-controller FC storage system.

```
# show host-parameters
Ctrlr Ch Type Media Topo(C) Speed(A) Speed(C) Status PID SID
-----
A 0 Host FC(L) Loop 2G 2G Up 0
A 1 Host FC(L) Loop 2G 2G Up 2
B 0 Host FC(L) Loop 2G 2G Up 0
B 1 Host FC(L) Loop 2G 2G Up 1
-----
```

Show host parameters for a dual-controller SAS storage system.

```
# show host-parameters
Ctrlr Ch Type Media Topo(C) Speed(A) Speed(C) Status PID SID
-----
A 0 Host SAS Direct 3GB 3GB Down N/A N/A
A 1 Host SAS Direct 3GB 3GB Healthy N/A N/A
B 0 Host SAS Direct 3GB 3GB Healthy N/A N/A
B 1 Host SAS Direct 3GB 3GB Down N/A N/A
-----
```

Show host parameters for a dual-controller iSCSI storage system.

```
# show host-parameters
Host Parameters
-----
Ctrl: A
Ch: 0
Type: Host
Media: iSCSI
Status: Up
IP-Ver: IPv4
PIP: 10.11.10.4
PIP-Netmask: 255.255.255.0
PIP-Gateway: 0.0.0.0
PIP-Service-Port: 3260
Port-Name: iqn.1995-03.com.acme:01.storage.00c0ffd6000a.a
Target Alias: MySystem.a
...

Ctrl: B
...
Port-Name: iqn.1995-03.com.acme:01.storage.00c0ffd6000a.b
Target Alias: MySystem.b
```

### Related Commands

- “set host-parameters” on page 130

# show host-port-interconnects

## Description

FC only. Shows the status of the internal connection between controller host port pairs.

## Input

```
show host-port-interconnects
```

## Example

Show the status of the host port interconnect.

```
# show host-port-interconnects  
Host Port Interconnect: enabled
```

## Related Commands

- “set host-port-interconnects” on page 132

## show host-wwn-names

### Description

FC and SAS only. Shows the current list of host world wide names (WWNs).

### Input

```
show host-wwn-names
```

### Output

Field	Description
Host-ID/WWN	Host port WWN
Name	Nickname assigned to the host WWN

### Example

Show host WWNs and nicknames assigned to them.

```
# show host-wwn-names
Host-ID/WWN      Name
-----
100000A0B8040BAC Host1
100000A0B8040BAD Host2
-----
```

### Related Commands

- “create host-wwn-name” on page 52
- “delete host-wwn-name” on page 74
- “set host-wwn-name” on page 133

# show iscsi-hosts

## Description

iSCSI only. Shows iSCSI host initiators.

## Input

```
show iscsi-hosts
```

## Output

Field	Description
Host node name/IQN	iSCSI host initiator's node name, typically the IQN. If the host node name exceeds 62 characters and the CLI is in console mode, the node name that is displayed is truncated and a '>' is displayed at the end of the string. If you need to see the full node name, use <code>show host-maps</code> or use the CLI's <code>api</code> mode to view the output in XML format.
Name	iSCSI host initiator's nickname, if any.

## Example

Show iSCSI host initiators.

```
# show iscsi-hosts
Host node name/IQN                               Name
-----
iqn.1991-05.com.microsoft:myHost.domain          myHost
iqn.1991-05.com.microsoft:myLongHost.my-very-long-domain-nam> myLongHostName
-----
```

## Related Commands

- “create iscsi-host” on page 53
- “delete iscsi-host” on page 75
- “set iscsi-host” on page 134

## show iscsi-parameters

### Description

iSCSI only. Shows system-wide iSCSI parameters.

### Input

```
show iscsi-parameters
```

### Output

Field	Description
CHAP	Whether Challenge-Handshake Authentication Protocol is enabled or disabled
Jumbo Frames	Whether jumbo-frame support is enabled or disabled
iSNS	Whether Internet Storage Name Service support is enabled or disabled
iSNS IP address	Address of the iSNS server
iSNS Alternate IP address	Address of the alternate iSNS server
iSCSI Speed	Whether host port link speed is set to auto-negotiate (Auto) or forced to 1 Gbit/sec

### Example

Show system-wide iSCSI parameters.

```
# show iscsi-parameters
iSCSI Parameters
-----
CHAP: Disabled
Jumbo Frames: Disabled
iSNS: Disabled
iSNS IP Address: 000.000.000.000
iSNS Alternate IP Address: 000.000.000.000
iSCSI Speed: Auto
```

## Related Commands

- “set iscsi-parameters” on page 135

## show job-parameters

### Description

Shows parameters for background scrub, partner firmware upgrade, and other jobs.

### Input

```
show job-parameters
```

### Output

Field	Description
Background Scrub	Shows whether disks are automatically checked for disk drive defects to ensure system health.
Partner Firmware Upgrade	Shows whether component firmware versions are monitored and will be automatically upgraded on the partner controller.
Utility Priority	Priority at which jobs (such as vdisk verification and reconstruction but not background scrub) run with respect to I/O operations competing for the system's processors: High, Medium, or Low.

### Example

Show a system's job parameters.

```
# show job parameters
Job Parameters
-----
Background Scrub      : Enabled
Partner Firmware Upgrade: Enabled
Utility Priority      : High
```

### Related Commands

- “set job-parameters” on page 137

# show license

## Description

Shows whether a license key is installed and information about licensed features.

## Input

```
show license
```

## Output

Field	Description
License Key	<ul style="list-style-type: none"><li>• The license key, if a license is installed and valid</li><li>• not installed, if a license is invalid or is not installed</li></ul>
Base Max Snapshots	Number of snapshots allowed without an installed license
Max Snapshots	Number of snapshots allowed by the installed license
Platform Max Snapshots	Number of snapshots that the highest-level license allows on this hardware platform
In-Use Snapshots	Number of existing snapshots
Volume Copy	Shows whether the installed license permits (Enabled) or excludes (Disabled) use of volume copy functions.

## Example

Show information about the installed license.

```
# show license
License Key: 570c8b65899822a37a7acc1fac3c332a
Base Max Snapshots: 0
Max Snapshots: 32
Platform Max Snapshots: 256
In-Use Snapshots: 15
Volume Copy: Enabled
```

# show master-volumes

## Description

Shows information about master volumes associated with a specified controller or snap pool. If no parameters are specified, information about all master volumes is shown.

## Input

```
show master-volumes [controller a|b] [snap-pool volume]
```

Parameter	Description
controller a b	Optional. Only includes master volumes owned by controller A or B.
snap-pool volume	Optional. Only includes master volumes associated with a specified snap pool volume name or serial number. For the syntax to use, see “Volume Syntax” on page 26.

## Output

Field	Description
Vdisk	Virtual disk name
Serial#	Master volume serial number
Name	Master volume name
Size	Total size of the master volume
Status	Indicates whether the master volume is Available or Unavailable
Status-Reason	Shows “---” for Available status, or a reason for Unavailable status: <ul style="list-style-type: none"><li>• MV Not Accessible (master volume is not accessible)</li><li>• SP Not Accessible (snap pool is not accessible)</li><li>• SP Not Found (snap pool is not found)</li><li>• Unknown</li></ul>
Snap-pool Name	Name of the associated snap pool
Snapshots	Number of snapshots that exist for the master volume

Field	Description
Snap Data	Amount of snap-pool space occupied by this master volume for its associated snapshots (preserved and write data)
Rollback	Either the percent complete if rollback is in progress, or “- - -” if rollback is not in progress

### Example

Show information about master volumes associated with snap pool SP1.

```
# show master-volumes snap-pool SP1
Vdisk Serial#           Name  Size  Status
  Status-Reason      Snap-pool Name  Snapshots  Snap Data  Rollback
-----
VD1      00c0ff0a43180048acc3134501000000  MV1    10.0GB  Unavailable
  SP Not Accessible  SP1           1         0B      - - -
-----
```

### Related Commands

- “convert master-to-std” on page 48
- “convert std-to-master” on page 49
- “delete all-master-volumes” on page 70
- “delete master-volume” on page 76
- “rollback master-volume” on page 104

# show network-parameters

## Description

Shows the network settings for each RAID controller.

## Input

```
show network-parameters
```

## Output

Field	Description
IP Address	Controller IP address
Gateway	Controller gateway
Subnet Mask	Controller subnet mask
MAC Address	Controller's unique Media Access Control address
Addressing Mode	<ul style="list-style-type: none"><li>• Manual: Network settings set manually (statically)</li><li>• DHCP: DHCP used to set network parameters</li></ul>

## 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

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
```

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

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
```

### Related Commands

- “set network-parameters” on page 139

## show ntp-status

### Description

Shows the status of the use of Network Time Protocol (NTP) in the system.

### Input

```
show ntp-status
```

### Output

The output first indicates whether use of NTP is enabled (*activated*). If activated, the client task becomes present. Before activation and after successful deactivation the status of the client task is not applicable (*n/a*). The configured IP address of an NTP server, if any, is displayed. If the system has received a time message from an NTP server, the time of that contact is displayed.

---

Field	Description
Status	<ul style="list-style-type: none"><li>• <i>activated</i>: NTP is enabled</li><li>• <i>deactivated</i>: NTP is disabled</li></ul>
Client Task Status	<ul style="list-style-type: none"><li>• <i>n/a</i>: NTP is disabled</li><li>• <i>present</i>: NTP is enabled and the client task is active</li><li>• <i>missing</i>: NTP is enabled but the client task is in an interim state</li></ul>
NTP Server Address	NTP server IP address, if set
Last Server Contact	Date and time, in UT, of the last message received from the NTP server, if any

---

## Example

Show NTP status for the system.

```
# show ntp-status
NTP Status
-----
Status           : activated
Client Task Status : present
NTP Server Address : 69.10.36.3
Last Server Contact: 2007-12-04 16:24:42
```

## Related Commands

- “set controller-date” on page 120

## show port-wwn

### Description

FC and SAS only. Shows the world wide port name (WWPN) for each host port.

### Input

```
show port-wwn
```

### Output

Field	Description
CTRL	Controller ID
CH	Host port number
WWPN	World wide port name

### Example

Show a SAS system's port WWNs, which differ in the fourteenth digit.

```
# show port-wwn
CTRL CH WWPN
-----
A    0  500C0FF0A408A000
A    1  500C0FF0A408A100
B    0  500C0FF0A408A200
B    1  500C0FF0A408A300
-----
```

Show an FC system's port WWNs, which differ in the second and fourth digits.

```
# show port-wwn
CTRL CH WWPN
-----
A    0  207000C0FF242866
A    1  217000C0FF242866
B    0  207800C0FF242866
B    1  217800C0FF242866
-----
```

# show protocols

## Description

Shows which management services and protocols are enabled or disabled.

## Input

```
show protocols
```

## Output

Status of each protocol.

## 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 (SMIS)  : Enabled
File Transfer Protocol          (FTP)    : Disabled
Simple Network Management Protocol (SNMP)   : Enabled
Service Interface               (Service): Disabled
Service Debug                   (Debug)  : Disabled
Inband SES Management           (SES)    : Disabled
Inband CAPI Management          (CAPI)   : Disabled
```

## Related Commands

- “set protocols” on page 143

# show redundancy-mode

## Description

Shows the redundancy status of the system.

## Input

```
show redundancy-mode
```

## Output

Field	Description
Redundancy Mode	<p>The redundancy mode, also called the “operation mode.”</p> <ul style="list-style-type: none"><li>• <b>Active-Active ULP:</b> SAS only. Both controllers are active using ULP (Unified LUN Provisioning), which means 128 LUNs are available for mapping volumes.</li><li>• <b>Active-Active:</b> FC and iSCSI only. Both controllers are active, and each has 128 LUNs for mapping volumes owned by that controller only.</li><li>• <b>Independent Cache Performance Mode:</b> Cache mirroring and failover between controllers is disabled, which results in improved write performance but at a risk of loss of unwritten data if a controller failure occurs while there is data in the controller’s cache memory.</li><li>• <b>Single-Controller:</b> There is only one controller in the enclosure.</li></ul>
Redundancy Status	<ul style="list-style-type: none"><li>• <b>Redundant:</b> Both controllers are operational.</li><li>• <b>Operational but not redundant:</b> In active-active mode, one controller is operational and the other is offline. In single-controller mode, the controller is operational.</li><li>• <b>Redundant with independent cache:</b> Both controllers are operational with cache mirroring disabled.</li></ul>
Controller ID Status	<ul style="list-style-type: none"><li>• <b>Operational:</b> The controller is operational.</li><li>• <b>Down:</b> The controller is installed but not operational.</li><li>• <b>Not Installed:</b> The controller is not installed.</li></ul>

Field	Description
Controller ID	• Controller module serial number
Serial Number	• Not Available: The controller is down or not installed.

### Example

Show the redundancy status of an operational dual-controller SAS system.

```
# show redundancy-mode
System Redundancy
-----
Redundancy Mode           : Active-Active ULP
Redundancy Status        : Redundant
Controller A Status      : Operational
Controller A Serial Number: 00C0FF0A4318
Controller B Status      : Operational
Controller B Serial Number: 00C0FF0A4326
```

Show the redundancy status of an operational dual-controller FC system with one controller offline.

```
# show redundancy-mode
System Redundancy
-----
Redundancy Mode           : Active-Active
Redundancy Status        : Operational but not redundant
Controller A Status      : Down
Controller A Serial Number: Not Available
Controller B Status      : Operational
Controller B Serial Number: 00C0FF0A4326
```

Show the redundancy status of an operational single-controller system.

```
# show redundancy-mode
System Redundancy
-----
Redundancy Mode           : Single Controller
Redundancy Status        : Operational but not redundant
Controller A Status      : Operational
Controller A Serial Number: 00C0FF0A4318
Controller B Status      : Not Installed
Controller B Serial Number: Not Available
```

## show schedule-details

### Description

Shows information about a specified task schedule.

### Input

```
show schedule-details schedule
```

---

Parameter	Description
-----------	-------------

---

<i>schedule</i>	Specifies the schedule name.
-----------------	------------------------------

---

### Output

---

Field	Description
Schedule Name	Schedule name
Schedule Specification	Parameters of the schedule
Schedule Status	Ready or Active
Next Time	The next time the task will run
Task to Run	The name of the task to run
Error Message	Any error message associated with this schedule
Task Details	Details of the task, as shown by <code>show task-details</code>

---

## Example

Show details for task schedule Sched1 which should run task T1. The task will run at 12:59. When the task was scheduled to run the previous time, an error occurred.

```
# show schedule-details Sched1
Schedule Details
-----
Schedule Name: Sched1
Schedule Specification: Start 2/19/2007 23:47:00, Every 3 Minutes
Schedule Status: Ready
Next Time: 2/23/2007 12:59:00
Task To Run: T1
Error Message: Schedule unable to execute Task, - Task is not Ready
to run

Task Details
-----
Task Name: T1
Task Type: TakeSnapshot
Task Status: Ready
Task State: Init
Master Volume Name: VD1_V1
Master Volume Serial: 00c0ffd2710700481a8fcf4501000000
Snapshot Prefix: T1
Retention Count: 1
Last Snapshot Created: T1_S1530
Error Message: none

Snapshot Name          Snapshot Serial
-----
T1_S1530               00c0ffd2710700482ce3de4501000000
```

## Related Commands

- “create schedule” on page 56
- “create task” on page 60
- “show schedules” on page 212

## show schedules

### Description

Shows configured task schedules.

### Input

```
show schedules
```

### Output

Field	Description
Schedule Name	Schedule name
Task To Run	Task name
Next Time	The next time the task will run; or none if the task will not run again

### Example

Show configured task schedules for a system.

```
# show schedules
Schedule Name      Task To Run      Next Time
-----
S1                  T1                2/23/2007 12:59:00
-----
```

### Related Commands

- “create schedule” on page 56
- “create task” on page 60
- “show schedule-details” on page 210

# show sensor-status

## Description

Shows the status and current values reported by environmental sensors in each controller module and power module.

## Input

```
show sensor-status
```

## Output

---

Field	Description
Sensor Name	Where the sensor is located
Value	The value of the sensor
Status	<ul style="list-style-type: none"><li>• <b>Absent:</b> Component is not present</li><li>• <b>Fault:</b> One or more subcomponents has a fault</li><li>• <b>OK:</b> All subcomponents are operating normally. Temperature status OK indicates that the sensor is working properly, not that the temperature is within an acceptable range.</li><li>• <b>N/A:</b> Status is not available</li></ul>

---

## Example

Show the status and value of the sensors.

```
# show sensor-status
```

Sensor Name	Value	Status
CPU Temperature-Ctrlr A	87	OK
CPU Temperature-Ctrlr B	87	OK
FPGA Temperature-Ctrlr A	60	OK
FPGA Temperature-Ctrlr B	55	OK
Onboard Temperature 1-Ctrlr A	39	OK
Onboard Temperature 1-Ctrlr B	31	OK
Onboard Temperature 2-Ctrlr A	51	OK
Onboard Temperature 2-Ctrlr B	47	OK
Capacitor Temperature-Ctrlr A	36	OK
Capacitor Temperature-Ctrlr B	34	OK
CM Temperature, Upper-Ctrlr A	44	OK
CM Temperature, Lower-Ctrlr B	38	OK
Power Supply 1 Temperature	37	OK
Power Supply 2 Temperature	37	OK
Capacitor Pack Voltage-Ctrlr A	8.21	OK
Capacitor Pack Voltage-Ctrlr B	8.28	OK
Capacitor Cell 1 Voltage-Ctrlr A	2.05	OK
Capacitor Cell 1 Voltage-Ctrlr B	2.06	OK
Capacitor Cell 2 Voltage-Ctrlr A	2.08	OK
Capacitor Cell 2 Voltage-Ctrlr B	2.06	OK
Capacitor Cell 3 Voltage-Ctrlr A	2.04	OK
Capacitor Cell 3 Voltage-Ctrlr B	2.05	OK
Capacitor Cell 4 Voltage-Ctrlr A	2.05	OK
Capacitor Cell 4 Voltage-Ctrlr B	2.12	OK
Capacitor Charge-Ctrlr A	100%	OK
Capacitor Charge-Ctrlr B	100%	OK
Power Supply 1 Voltage, 12V	12.54	OK
Power Supply 1 Voltage, 5V	5.53	OK
Power Supply 1 Voltage, 3.3V	3.54	OK
Power Supply 2 Voltage, 12V	12.45	OK
Power Supply 2 Voltage, 5V	5.57	OK
Power Supply 2 Voltage, 3.3V	3.36	OK
Overall Unit Status	OK	OK

## Related Commands

- “show enclosure-status” on page 178
- “show expander-status” on page 184

# show shutdown-status

## Description

Shows whether the RAID (storage) controllers are shut down.

## Input

```
show shutdown-status
```

## Output

Message stating whether each controller is up (operating) or down (shut down).

## Example

Show the shutdown status for each controller.

```
# show shutdown-status  
storage controller A is up  
storage controller B is up
```

## Related Commands

- “restart” on page 101
- “shutdown” on page 240

## show snap-pools

### Description

Shows information about snap pools owned by a specified controller or both controllers.

### Input

```
show snap-pools [controller a|b|both]
```

Parameter	Description
controller a b both	Optional. Shows snap pools owned by controller A only, by controller B only, or by either controller (both). If this parameter is omitted, all snap pools are shown.

### Output

Field	Description
Vdisk	Virtual disk name
Serial#	Snap pool serial number
Name	Snap pool name
Size	Total size of the snap pool volume
Free	Amount of free space available in this snap pool
MasterVols	Number of master volumes associated with this snap pool
Snapshots	Number of snapshots using this snap pool
Threshold	Snap pool threshold level (Warning, Error, and Critical)
%Usage	Threshold value (percent of snap pool space used) that triggers the threshold's policy
Policy	Recovery policy invoked when threshold value is reached
SizeToExpand	Increment size by which the snap pool is automatically expanded each time the threshold level is reached. This parameter applies when the Auto Expand policy is active; otherwise its value is N/A.

## Example

Show information for snap pools owned by either controller.

```
# show snap-pools
Vdisk          Serial#          Name
Size          Free          MasterVols  Snapshots
-----
R5              00c0ff6270190000938c1d4701000000  SP1
3001.0MB  2990.5MB  1          0
Threshold  %Usage    Policy          SizeToExpand
-----
Warning    75%       Notify Only     N/A
Error      90%       Auto Expand     1000.3MB
Critical   99%       Delete Snapshots N/A
-----
```

## Related Commands

- “create snap-pool” on page 58
- “delete snap-pool” on page 78
- “expand snap-pool” on page 88
- “set snap-pool-policy” on page 145
- “set snap-pool-threshold” on page 147

## show snapshots

### Description

Shows information about snapshots for a specified controller, master volume, or snap pool. If no parameters are specified, information about all snapshots is shown.

### Input

```
show snapshots [controller a|b|both] | [master-volume volume] |  
[snap-pool volume]
```

Parameter	Description
controller a b both	Optional. Only includes snapshots owned by controller A only, controller B only, or by either controller (both).
master-volume volume	Optional. Only includes snapshots associated with the specified master volume name or serial number. For the syntax to use, see “Volume Syntax” on page 26.
snap-pool volume	Optional. Only includes snapshots associated with the specified snap pool name or serial number. For the syntax to use, see “Volume Syntax” on page 26.

### Output

Field	Description
Vdisk	Virtual disk name
Serial#	Snapshot serial number
Name	Snapshot name
Creation Date/Time	Date and time the snapshot was prepared or committed
Status	Indicates whether the snapshot is Available or Unavailable

Field	Description
Status-Reason	Shows “---” for Available status, or a reason for Unavailable status: <ul style="list-style-type: none"> <li>• MV Not Accessible (master volume is not accessible)</li> <li>• MV Not Found (master volume is not found)</li> <li>• SP Not Accessible (snap pool is not accessible)</li> <li>• SP Not Found (snap pool is not found)</li> <li>• SS Pending (snapshot is pending)</li> <li>• VC-MD In Progress (volume-copy with modified data is in progress)</li> <li>• RB-MD In Progress (rollback with modified data is in progress)</li> <li>• Unknown</li> </ul>
Master Volume Name	Name of associated master volume
Snap-pool Name	Name of associated snap pool
Snap Data	Total amount of preserved and write data associated with the snapshot
UniqueData	Amount of preserved and write data that is unique to the snapshot
SharedData	Amount of preserved and write data that is shared between this snapshot and other snapshots

### Example

Show information about snapshots associated with snap pool SP2.

```
# show snapshots snap-pool SP2
Vdisk Serial#                               Name Creation Date/Time  Status
  Status-Reason Master Volume Name  Snap-pool Name  Snap Data  UniqueData
  SharedData
-----
VD1      00c0ff0a43180048ddc3134501000000  SS1    2008-03-19 13:32:11  Available
  ---                V2                SP2                0B                0B
  0B
-----
```

### Related Commands

- “show master-volumes” on page 200
- “show snap-pools” on page 216

# show snmp-parameters

## Description

Shows current settings for SNMP notification.

## Input

```
show snmp-parameters
```

## Output

Field	Description
SNMP	<ul style="list-style-type: none"><li>• enabled: SNMP notification is enabled</li><li>• disabled: SNMP notification is disabled</li></ul>
SNMP Filter	<ul style="list-style-type: none"><li>• Critical: Only critical events are sent as traps</li><li>• Warning: All critical events and warnings are sent as traps</li><li>• Informational: All events are sent as traps</li><li>• None: No events are sent as traps and traps are disabled</li></ul>
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: enabled
SNMP Filter: Critical, Warning
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
```

## Related Commands

- “set snmp-parameters” on page 149

# show system

## Description

Shows information about the system.

## Input

```
show system
```

## Output

- System Name
- System Contact
- System Location
- System Info
- Vendor Name
- Product ID
- Product Brand
- SCSI Vendor ID
- Enclosure Count

## Related Commands

- “set system” on page 150

# show task-details

## Description

Shows details of a configured task.

## Input

```
show task-details task
```

## Output (TakeSnapshot)

Field	Description
Task Name	Task name
Task Type	TakeSnapshot
Task Status	The status of the task: Ready, Active
Task State	The current state of the task: Init, Vol Verified, License Checked, Name Created, Snap Created, Snap Verified
Master Volume Name	Master volume name
Master Volume Serial	Volume serial number
Snapshot Prefix	Label identifying the snapshot. Snapshot names have the format <i>prefix_S#</i> , where # increments from 0001.
Retention Count	Number of snapshots with this prefix that are retained. When a new snapshot exceeds this limit, the oldest snapshot with the same prefix is deleted.
Last Snapshot Created	The name of the last snapshot taken
Error Message	Any error message associated with this task

## Output (ResetSnapshot)

Field	Description
Task Name	Task name
Task Type	ResetSnapshot
Task Status	The status of the task: Ready, Active
Task State	The current state of the task: Init, Snap Verified
Snapshot Name	Name of the snapshot to be reset
Snapshot Serial	Serial number of the snapshot to be reset
Error Message	Any error message associated with this task

## Output (VolumeCopy)

Field	Description
Task Name	Task name
Task Type	VolumeCopy
Task Status	The status of the task: Ready, Active
Task State	The current state of the task: Init, Vol Verified, Name Created, Vol Created
Source Volume Name	Name of the volume to be copied
Source Volume Serial	Serial number of the volume to be copied
Destination Vdisk Name	Name of the destination virtual disk
Destination Vdisk Serial	Serial number of the destination virtual disk
Destination Volume Prefix	Label that identifies copies created by this task. Volume names have the format <i>prefix_V#</i> , where # increments from 0001.
Include Modified Data	True or False
Last Copy Created	Name of the last copy created
Error Message	Any error message associated with this task

## Example

Show the details of the volume copy task C1.

```
# show task-details C1
Task Details
-----
Task Name: C1
Task Type: VolumeCopy
Task Status: Ready
Task State: Init
Source Volume Name: VD1_V1
Source Volume Serial: 00c0ffd2710700481a8fcf4501000000
Destination Vdisk Name: VD2
Destination Vdisk Serial: 00c0ffd270280048b68ecf4500000000
Destination Volume Prefix: Copy
Include Modified Data: false
Last Copy Created: none
Error Message: none
```

Show the details of the take snapshot task T1.

```
# show task-details T1
Task Details
-----
Task Name: T1
Task Type: TakeSnapshot
Task Status: Active
Task State: Snap Created
Master Volume Name: VD1_V1
Master Volume Serial: 00c0ffd2710700481a8fcf4501000000
Snapshot Prefix: T1
Retention Count: 1
Last Snapshot Created: T1_S0963
Error Message: none

Snapshot Name          Snapshot Serial
-----
T1_S0963                00c0ffd271070048ab53dd4501000000
```

## **Related Commands**

- “create schedule” on page 56
- “create task” on page 60
- “delete task” on page 81
- “show schedule-details” on page 210
- “show tasks” on page 227

# show tasks

## Description

Shows configured tasks.

## Input

```
show tasks
```

## Output

Field	Description
Task Name	Task name
Task Type	Task type: TakeSnapshot, ResetSnapshot, VolumeCopy
Task Status	Task status: Ready, Active

## Example

Show configured tasks for the system.

```
# show tasks
Task Name                Task Type                Task Status
-----
Task1                    TakeSnapshot             Ready
copyVol                  VolumeCopy                Active
Reset1                   ResetSnapshot            Ready
-----
```

## Related Commands

- “create task” on page 60
- “create schedule” on page 56
- “delete task” on page 81
- “show schedule-details” on page 210
- “show task-details” on page 223

# show users

## Description

Shows configured user profiles.

## Input

```
show users
```

## Output

Field	Description
Username	User name
Access Level	<ul style="list-style-type: none"><li>• Monitor: View-only access to selected user interfaces</li><li>• Manage: Modify access to selected user interfaces</li></ul>
User Type	Applies to the WBI only. <ul style="list-style-type: none"><li>• Standard: Has access to standard administrative functions</li><li>• Advanced: Has access to standard and advanced functions</li><li>• Diagnostic: Has access to standard, advanced, and troubleshooting functions</li></ul>
WBI	Web-browser interface
CLI	Command-line interface
FTP	File transfer protocol interface

## Example

Show configured users for a system.

```
# show users
Username      Access Level  User Type    WBI   CLI   FTP
-----
monitor       Monitor       Standard     x     x
manage        Manage        Diagnostic    x     x     x
ftp           Manage        Standard     x
jsmith        Manage        Advanced     x     x
```

## **Related Commands**

- “create user” on page 63
- “delete user” on page 82
- “set user” on page 151
- “show users” on page 228

## show vdisks

### Description

Shows information for all or specific virtual disks.

### Input

```
show vdisks [vdisks]
```

---

Parameter	Description
-----------	-------------

---

<i>vdisks</i>	Optional. Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26. If this parameter is omitted, information is shown for all virtual disks.
---------------	--

---

### Output

---

Field	Description
Name	Virtual disk name
Size	Virtual disk size
Free	Virtual disk free space
Pref Owner	Controller that is the preferred owner of the virtual disk
Curr Owner	Controller that has current, temporary ownership of the virtual disk when its preferred owner is offline
RAID	Virtual disk RAID level
Dsk	Number of disk drives in the virtual disk
Spr	Number of vdisk spares assigned to the virtual disk
Chk	Virtual disk chunk size

---

Field	Description
Stat	<ul style="list-style-type: none"> <li>• CRIT: The vdisk is online, however some drives are down and the vdisk is not fault tolerant</li> <li>• FTDN: The vdisk is online and fault tolerant, however some of the drives are down</li> <li>• FTOL: The vdisk is online and fault tolerant</li> <li>• OFFL: The vdisk is offline either because of initialization or because drives are down and data may be lost</li> <li>• QRCR: The vdisk is in a critical state and has been quarantined because some drives are missing</li> <li>• QROF: The vdisk is offline and has been quarantined because some drives are missing</li> <li>• UP: The vdisk is online and does not have fault tolerant attributes</li> </ul>
Jobs	<ul style="list-style-type: none"> <li>• DRSC: Disks within the vdisk are being scrubbed</li> <li>• EXPD: The vdisk is being expanded</li> <li>• INIT: The vdisk is initializing</li> <li>• LOWF: A low-level format is in progress</li> <li>• RCON: The vdisk is being reconstructed</li> <li>• VRFY: The vdisk is being verified</li> <li>• VRSC: The vdisk is being scrubbed</li> </ul>
Serial#	Virtual disk serial number

## Example

Show information about virtual disk VD1 only.

```
# show vdisks VD1
Name      Size   Free   Pref Owner  Curr Owner  RAID   Dsk Spr Chk Stat
  Jobs      Serial#
-----
VD1       1.0TB 999.2GB A         A           RAID0   2   0   64  UP
  VSRC 65% 00c0ff0a431800489f7c054500000000
-----
```

## Related Commands

- “abort create” on page 38
- “create vdisk” on page 65
- “delete vdisk” on page 83
- “expand vdisk” on page 90
- “set vdisk” on page 153

## show versions

Alias for `versions`. See “versions” on page 247.

# show volumecopy-status

## Description

Shows information about in-progress volume copy operations. While a volume copy is in progress, the destination volume cannot be accessed.

## Input

```
show volumecopy-status [controller a|b]
```

Parameter	Description
controller a b	Optional. Shows volume copy operations for volumes owned by controller A or controller B only. If this parameter is omitted, all volume copy operations are shown.

## Output

Field	Description
VC Volume Name	Destination volume name
Serial#	Destination volume serial number
Vdisk	Destination virtual disk name
Source Volume	Source volume name
Progress	Percent complete of the volume copy
Status	Indicates whether the destination volume is Unavailable or Suspended
Status-Reason	The status is Unavailable while the volume-copy is in progress. The status is Suspended if the source volume goes offline while the copy is in progress. When the source volume comes back online, the copy process resumes from the point where it stopped.

## Example

Show information about volume copies in progress for controller A.

```
# show volumecopy-status controller a
VC Volume Name  Serial#                               Vdisk
  Source Volume  Progress  Status      Status-Reason
-----
MV1-copy        00c0ff6270050000509b0f4702000000  VD1
  VD1_V1        7%           Unavailable  VC In Progress
-----
```

## Related Commands

- “abort volumecopy” on page 41
- “volumecopy” on page 248

# show volume-maps

## Description

Shows mapping information for a specified volume or for all volumes.

## Input

```
show volume-maps [volume]
```

Parameter	Description
-----------	-------------

<i>volume</i>	Optional. Specifies the volume by its name or serial number. For the syntax to use, see “Volume Syntax” on page 26. If this parameter is omitted, information for all volumes is shown.
---------------	---

## Output

Field	Description
SN	Volume serial number.
Name	Volume name.
CH	Host ports that the volume is mapped on.
ID	FC and iSCSI only. An index into a table of port IDs (not the actual port ID). This is always 0.
LUN	Logical unit number.
Access	Access mode: read-write (rw) or read-only (ro).
Host-Port-Identifier	<ul style="list-style-type: none"><li>• FC or SAS: The host’s world wide port name (WWPN)</li><li>• iSCSI: The iSCSI host initiator’s node name (typically the IQN)</li><li>• all other hosts for the volume’s default mapping</li></ul>
Nickname	Host nickname, or blank if not set or for all other hosts.

## Example

On a SAS system, show the mappings for volume V1.

```
# show volume-maps V1
Volume [SN 00c0ff0a43180048517e054501000000, Name (V1)] mapping view:
CH          LUN Access Host-Port-Identifier      Nickname
-----
A1,B1       5 rw      0123456789AAABBB      Host1
A0,B0       6 ro      0123456789AAACCC      Host2

Success: Command completed successfully
```

On an FC system, show the mappings for volume V1.

```
# show volume-maps V1
Volume [SN 00c0ff0a43180048517e054501000000, Name (V1)] mapping view:
CH          ID LUN Access Host-Port-Identifier      Nickname
-----
0,1         0 5 rw      0123456789FFFFFF      Host1
0,1         0 6 ro      0123456789AAAAAA      Host2

Success: Command completed successfully
```

On an iSCSI system, show the mappings for volume V1.

```
# show volume-maps
Volume [SN 00c0ff0a427d00484f28f54501000000, Name (V1)] mapping view:
CH          ID LUN Access Host-Port-Identifier      Nickname
-----
0,1         0 25 rw     iqn.1991-05.com.microsoft:host1.domain  Host1
0,1         0 26 rw     iqn.1991-05.com.microsoft:host2.domain  Host2

Success: Command completed successfully
```

## Related Commands

- “show host-maps” on page 188
- “show host-wwn-names” on page 194
- “show iscsi-hosts” on page 195
- “show volumes” on page 237

# show volumes

## Description

Shows volume information for all or specified virtual disks.

## Input

```
show volumes [vdisk vdisks] [class standard|ptsnap]
[type snap-pool|mastervolume|snapshot|standard]
```

Parameter	Description
<i>vdisk</i> <i>vdisks</i>	Optional. Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
class standard ptsnap	Optional. Specifies the class of volumes to show.
type snap-pool  mastervolume  snapshot standard	Optional. Specifies the type of volumes to show.

## Output

Field	Description
Vdisk	Name of the virtual disk
Volume Name	Name of the volume
Size	Volume size
WR Policy	Write-back cache mode (write-back or write-through)
Class	Standard, PTSNAP (snapshot-related), or unknown
Volume Serial Number	Volume serial number
Cache Opt	Read-ahead cache mode (standard or super-sequential)

Field	Description
Type	<ul style="list-style-type: none"> <li>• standard: Standard volume</li> <li>• standard*: Destination of an in-progress volume copy and cannot be mounted until the copy is complete</li> <li>• snap-pool: Snap-pool volume</li> <li>• mastervol: Master volume</li> <li>• snapshot: Snapshot volume</li> <li>• unknown: Unknown</li> </ul>

## Example

Show volume information for standard volumes only.

```
# show volumes type standard
Vdisk      Volume Name      Size      WR Policy      Class
  Volume Serial Number      Cache Opt      Type
-----
VD1         V1                 10.0GB    writeback      standard
00c0ff0a43180048aff0074501000000      standard      standard
-----
```

Show volume information for virtual disk VD1 only.

```
# show volumes vdisk VD1
Vdisk      Volume Name      Size      WR Policy      Class
  Volume Serial Number      Cache Opt      Type
-----
VD1         V1                 10.0GB    writeback      standard
00c0ff0a43180048aff0074501000000      standard      standard
VD1         SP1                10.0GB    writeback      PTSNAP
00c0ff0a43180048d9f0074501000000      standard      snap-pool
VD1         V2                 10.0GB    writeback      PTSNAP
00c0ff0a43180048f3f0074501000000      standard      mastervol
VD1         SS1                10.0GB    writeback      PTSNAP
00c0ff0a4318004821f1074501000000      standard      snapshot
-----
```

## **Related Commands**

- “create volume” on page 68
- “delete volume” on page 86
- “expand volume” on page 92
- “set volume” on page 155
- “show vdisks” on page 230
- “show volume-maps” on page 235

# shutdown

## Description

Cleanly shuts down the RAID controller in either or both controller modules. This ensures that any data in the controller's write-back cache is written to disk. When both RAID controllers are 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 RAID controllers are shut down, but information shown might be invalid.

---

## Input

```
shutdown a|b|both
```

---

Parameter	Description
-----------	-------------

---

a b both	Specifies whether to shut down the RAID controller in controller module A, B, or both.
----------	--

---

## Output

Messages are displayed when the RAID controllers are shut down.

## Example

Shut down RAID controller A while logged into A.

```
# shutdown a
Info: Shutting down SC a...

Success: Command completed successfully
```

## Related Commands

- “restart” on page 101

# stty

## Description

Sets and shows terminal information.

## Input

```
stty info | hardwrap | rows # | columns #
```

Parameter	Description
info	Shows current information about the terminal
hardwrap	Toggles the hard wrapping of output. Terminals usually wrap at the screen width without truncating output, but turning on hard wrapping ensures this.
rows #	Specifies the number of rows that a terminal can display. The terminal usually sets this value; this is an override. The <code>info</code> parameter shows this as screen height.
columns #	Specifies the number of columns that a terminal can display. The terminal usually sets this value; this is an override. The <code>info</code> parameter shows this as screen width.

## Example

Show information about the terminal.

```
# stty info
Terminal Type: ANSI
Screen width : 140
Screen height: 60
Hard wrap    : Off
Success: Command completed successfully
```

# trust

## Description

Enables an offline virtual disk to be brought online for emergency data collection only. It must be enabled before each use.



---

**Caution** – This command can cause unstable operation and data loss if used improperly. It is intended for disaster recovery only.

---

The `trust` command re-synchronizes the time and date stamp and any other metadata on a bad disk drive. This makes the disk drive an active member of the virtual disk again. You might need to do this when:

- One or more disks of a virtual disk start up more slowly or were powered on after the rest of the disks in the virtual disk. This causes the date and time stamps to differ, which the system interprets as a problem with the “late” disks. In this case, the virtual disk functions normally after being trusted.
- A virtual disk is offline because a drive is failing, you have no data backup, and you want to try to recover the data from the virtual disk. In this case, `trust` may work, but only as long as the failing drive continues to operate.

When the “trusted” virtual disk is back online, back up its data and audit the data to make sure that it is intact. Then delete that virtual disk, create a new virtual disk, and restore data from the backup to the new virtual disk. Using a trusted virtual disk is only a disaster-recovery measure; the virtual disk has no tolerance for any additional failures.

## Input

To enable the trust command:

```
trust enable
```

To trust a virtual disk:

```
trust vdisk vdisk
```

Parameter	Description
<code>enable</code>	Enables the trust command before use
<code>vdisk <i>vdisk</i></code>	Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Enable the trust command and then trust virtual disk VD1.

```
# trust enable  
Trust Virtual-disk Enabled.  
  
# trust vdisk VD1  
Are you sure? yes  
Virtual-disk VD1 has been trusted.
```

# unmap volume

## Description

Removes an explicit mapping whose settings override a volume's default mapping. When the explicit mapping is removed, host access to the volume is controlled by the volume's default mapping (described in "map volume" on page 94).

## Input

```
unmap volume volume [host host]
```

Parameter	Description
<i>volume</i>	Specifies the volume by its name or serial number. For the syntax to use, see "Volume Syntax" on page 26.
<i>host host</i>	Optional. For FC and SAS, this specifies the host's nickname or 16-hex-digit WWPN. For iSCSI this specifies the iSCSI host initiator's node name (typically the IQN) or nickname. For the nickname syntax to use, see "Host Nickname Syntax" on page 27. If this parameter is omitted, mapping changes apply to all hosts not explicitly mapped.

## Example

Unmap volume V1 from host Host1.

```
# unmap volume V1 host Host1
Success: volume unmapped successfully
```

Unmap volume V2's default mapping (leaving explicit mappings unchanged).

```
# unmap volume V2
Success: volume unmapped successfully
```

## **Related Commands**

- “map volume” on page 94
- “show host-maps” on page 188
- “show host-wwn-names” on page 194
- “show volumes” on page 237
- “show volume-maps” on page 235

# verify vdisk

## Description

For specified RAID 3, 5, 6, and 50 virtual disks, this command verifies all parity blocks. For specified RAID 1 and 10 virtual disks, this command compares the primary and secondary drives.

The verification process ensures that the redundancy data in the virtual disk is consistent with the user data in the virtual disk. The number of inconsistencies found is noted in the “Vdisk verification complete” event (event code 21) in the event log.

## Input

```
verify vdisk vdisks
```

Parameter	Description
<i>vdisks</i>	Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.

## Example

Verify a virtual disk.

```
# verify vdisk VD1
Info: Verify started on vdisk VD1

Success: Command completed successfully
```

## Related Commands

- “abort verify” on page 40
- “show vdisks” on page 230

# versions

## Description

Shows the hardware and software versions for each controller module.

Alias: show versions

## Input

```
versions
```

## Output

- Storage Controller CPU Type
- Storage Controller Firmware
- Storage Controller Memory
- Storage Controller Loader
- Management Controller Firmware
- Management Controller Loader
- Expander Controller Firmware
- CPLD Revision
- Hardware Revision
- Host Interface Module
- Host Interface Module Model

# volumecopy

## Description

Copies a snapshot or a master volume to a new standard volume. The command creates the destination volume you specify, which must be in a virtual disk owned by the same controller as the source volume. While the copy operation is in progress, the destination volume's type is shown as `standard*`; when complete, it changes to `standard`.

Before copying a master volume, verify that the snap-pool has space for the temporary snapshot, which is used to track changes to the master volume while the copy is in progress; for information about estimating snap-pool size, see help for the WBI's Create Snap-Pool page. Also, you must unmount it from hosts. After the volume copy has started, you can remount the master volume.

Before copying a snapshot volume with its modified data, you must unmount it from hosts. When the volume copy starts, the snapshot and the destination volume will be offline (unavailable to hosts) until the operation is complete.



---

**Caution** – Copying a mounted master volume or a mounted snapshot volume (when modified data is included) will result in data corruption.

---

## Input

```
volumecopy source-volume volume1 dest-vdisk vdisk [modified-  
snapshot yes|no] volume2
```

---

Parameter	Description
<code>source-volume</code> <i>volume1</i>	Specifies the virtual disks by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.
<code>dest-vdisk</code> <i>vdisk</i>	Specifies the destination virtual disk by name or serial number. For the syntax to use, see “Virtual Disk Syntax” on page 26.

---

Parameter	Description
modified-snapshot yes no	Optional. Specifies whether to include or exclude modified write data from the snapshot in the copy. This parameter applies only when the source volume is a snapshot; it is ignored if the source volume is a master volume. <ul style="list-style-type: none"> <li>• yes: Include modified snapshot data.</li> <li>• no: Exclude modified snapshot data.</li> </ul> If this parameter is omitted for a snapshot, modified snapshot data is excluded.
volume2	Specifies a name for the volume to create on the destination vdisk. For the syntax to use, see “Virtual Disk Syntax” on page 26.

### Example

Copy master volume MV1 to new volume MV1copy on virtual disk VD2.

```
# volumecopy source-volume MV1 dest-vdisk VD2 MV1copy
Leaving the source volume mounted when starting a volume copy
operation will result in data corruption. The source volume must
be unmounted prior to beginning the volume copy operation. The
source volume can be remounted once the volume copy has started.
In addition, once volume copy starts, the destination volume will
be created, and will be offline until the volume copy operation is
complete. Is the source volume unmounted from all Operating
Systems? yes
Success: Volume Copy Started.

# show volumes
Vdisk Volume Name Size WR Policy Class
Volume Serial Number Cache Opt Type
-----
VD2 MV1copy 200.0GB writeback PTSNAP
00c0ff6270190000e9080e4702000000 standard standard*
-----
```

### Related Commands

- “abort volumecopy” on page 41
- “create task” on page 60
- “show vdisks” on page 230
- “show volumecopy-status” on page 233
- “show volumes” on page 237



# Troubleshooting Using the CLI

---

This appendix briefly describes CLI commands that are useful for troubleshooting storage system problems, and it includes other troubleshooting topics.

Topics covered in this appendix include:

- “Viewing Command Help” on page 252
- “clear cache” on page 252
- “clear expander-status” on page 252
- “ping” on page 253
- “rescan” on page 253
- “reset host-channel-link” on page 253
- “restart” on page 253
- “restore defaults” on page 254
- “set debug-log-parameters” on page 254
- “set expander-fault-isolation” on page 255
- “set expander-phy” on page 255
- “set led” on page 255
- “set protocols” on page 256
- “show debug-log” on page 256
- “show debug-log-parameters” on page 256
- “show enclosure-status” on page 257
- “show events” on page 257
- “show expander-status” on page 257
- “show frus” on page 257
- “show protocols” on page 258
- “show redundancy-mode” on page 258
- “trust” on page 258
- “Problems Scheduling Tasks” on page 259
- “Missing Parameter Data Error” on page 260

# Viewing Command Help

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

```
# help
```

To view help for a specific command, type either:

```
# help command  
# command ?
```

To view information about the syntax to use for specifying disk drives, virtual disks, volumes, and volume mapping, type:

```
# help syntax
```

## clear cache

Clears any unwritable cache in both RAID controllers for a specified volume, or any orphaned data for volumes that no longer exist. This command can be used with a dual-controller configuration only.

For details see “clear cache” on page 44.

## clear expander-status

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Clears the counters and status for SAS Expander Controller 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.

For details see “clear expander-status” on page 47.

## ping

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

For details see “ping” on page 97.

## rescan

When installing a system with drive enclosures attached, the enclosure IDs might not agree with the physical cabling order. This is because the controller might have been previously attached to some of the same enclosures and it attempts to preserve the previous enclosure IDs if possible. To correct this condition, make sure that both controllers are up and perform a rescan using the CLI.

For details see “rescan” on page 98.

## reset host-channel-link

Issues a loop initialization primitive (LIP) from specified controllers on specified channels. This command is for use with an FC system using FC-AL (loop) topology.

For details see “reset host-channel-link” on page 99.

## restart

Restarts the RAID controller or the Management Controller in either or both controller modules.

If you restart a RAID controller, it attempts to shut down with a proper failover sequence, which includes stopping all I/O operations and flushing the write cache to disk, and then the controller restarts. The Management Controllers are not restarted so they can provide status information to external interfaces.

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



---

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

---

---

**Note** – If an iSCSI storage system is connected to a Microsoft Windows host, the following event is recorded in the Windows event log: Initiator failed to connect to the target.

---

For details see “restart” on page 101.

## restore defaults

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Restores the manufacturer's default configuration to the controllers. When the command informs you that the configuration has been restored, you must restart the RAID controllers and Management Controllers for the changes to take effect. After restarting the controllers, hosts might not be able to access volumes until you re-map them.



---

**Caution** – This command changes how the system operates and might require some reconfiguration to restore host access to volumes.

---

For details see “restore defaults” on page 103.

## set debug-log-parameters

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Sets the types of debug messages to include in the Storage Controller debug log. If multiple types are specified, use spaces to separate them and enclose the list in quotation marks (").

For details see “set debug-log-parameters” on page 122.

## set expander-fault-isolation

When fault isolation is enabled, the Expander Controller will isolate PHYs that fail to meet certain criteria. When fault isolation is disabled, the errors are noted in the logs but the PHYs are not isolated.

---

**Note** – This command should be used only by service technicians, or with the advice of a service technician.

---

For details see “set expander-fault-isolation” on page 125.

## set expander-phy

The Expander Controller will enable or disable (isolate) the a specific PHY.

---

**Note** – This command should be used only by service technicians, or with the advice of a service technician.

---

For details see “set expander-phy” on page 127.

## set led

Changes the state of drive module or enclosure LEDs to help you locate devices. For a drive module, the top LED will illuminate solid blue. For an enclosure, the top LED on the chassis ear will illuminate solid blue .

For details see “set led” on page 138.

## set protocols

Enables or disables one or more of the following management services and protocols.

- http, for standard access to SMU
- https, for secure access to SMU
- telnet, for standard access to the CLI
- ssh, for secure access to the CLI
- ftp, an alternate interface for firmware upgrade
- Storage Management Initiative Specification (SMI-S)
- Simple Network Management Protocol (SNMP)
- Telnet service port 1023
- Telnet debug port 4048
- In-band CAPI management interface
- In-band SES management interface

For details see “set protocols” on page 143.

## show debug-log

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Shows the debug logs for the Storage Controller (SC), the Management Controller (MC), the semaphore trace, task logs, or all of them. If no logs are specified, all logs are shown.

For details see “show debug-log” on page 169.

## show debug-log-parameters

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Shows which debug message types are enabled (on) or disabled (off) for inclusion in the Storage Controller debug log.

For details see “show debug-log-parameters” on page 172.

## show enclosure-status

Shows the status of system enclosures and their components. For each attached enclosure, the command shows general SCSI Enclosure Services (SES) information followed by component-specific information.

For details see “show enclosure-status” on page 178.

## show events

Shows events for an enclosure, including events from each Management Controller and each Storage Controller. A separate set of event numbers is maintained for each controller module. Each event number is prefixed with a letter identifying the controller module that logged the event.

If SNMP is configured, events can be sent to SNMP traps.

For details see “show events” on page 181.

## show expander-status

---

**Note** – This command should only be used by service technicians, or with the advice of a service technician.

---

Shows diagnostic information relating to SAS Expander Controller physical channels, known as PHY lanes. For each enclosure, this command shows status information for PHYs in I/O module A and then I/O module B.

For details see “show expander-status” on page 184.

## show frus

Shows information for all field-replaceable units (FRUs) in the controller enclosure and in any attached drive enclosures. Some information reported is for use by service technicians.

For details “show frus” on page 186.

## show protocols

Shows which management services and protocols are enabled or disabled.

For details see “show protocols” on page 207.

## show redundancy-mode

Shows the redundancy status of the system.

For details see “show redundancy-mode” on page 208.

## trust

Enables an offline virtual disk to be brought online for emergency data collection only. It must be enabled before each use.



---

**Caution** – This command can cause unstable operation and data loss if used improperly. It is intended for disaster recovery only.

---

The `trust` command re-synchronizes the time and date stamp and any other metadata on a bad disk drive. This makes the disk drive an active member of the virtual disk again. You might need to do this when:

- One or more disks of a virtual disk start up more slowly or were powered on after the rest of the disks in the virtual disk. This causes the date and time stamps to differ, which the system interprets as a problem with the “late” disks. In this case, the virtual disk functions normally after being trusted.
- A virtual disk is offline because a drive is failing, you have no data backup, and you want to try to recover the data from the virtual disk. In this case, `trust` may work, but only as long as the failing drive continues to operate.

When the “trusted” virtual disk is back online, back up its data and audit the data to make sure that it is intact. Then delete that virtual disk, create a new virtual disk, and restore data from the backup to the new virtual disk. Using a trusted virtual disk is only a disaster-recovery measure; the virtual disk has no tolerance for any additional failures.

For details see “trust” on page 242.

# Problems Scheduling Tasks

There are two parts to scheduling tasks: you must create the task and then create the schedule to run the task.

## Create the Task

There are three tasks you can create: `TakeSnapshot`, `ResetSnapshot`, and `VolumeCopy`.

Perform the operation directly to ensure the command syntax is correct. For example, if you want to schedule taking a snapshot, first issue a command to take the snapshot and verify that it runs. Then create a task that will take the snapshot when scheduled.

## Reset Snapshot

Before resetting a snapshot, you must unmount the snapshot if it is connected to a host system, or you could lose data. There is no unmount command in the CLI. The host system must perform this task.

## Schedule the Task

If your task does not run at the times you specified, check the schedule specifications. It is possible to create conflicting specifications.

- Start time is the first time the task will run.
- If you use the `Between` option, the starting date/time must be in the `Between` range.
- The year must be four digits, between 2006 and 2999.
- Either the `Repeat` option or the `Expires On` option will end a schedule.
- Using the `Every` option with a time value specifies that the task will recur at a specified time.
- Using the `Every` option with a date value specifies that the task will recur on the specified days at either the start time or another specified time.
- The `Only On` option constrains the period of recurrence.
- `Nth`, must match the number. 1st, 2nd, 3rd, 4th, ..., 21st, 22nd, etc.

# Errors Associated with Scheduling Tasks

The following table describes error messages associated with scheduling tasks.

**Table 4-1** Errors Associated with Scheduling Tasks

Error Message	Solution
Task Already Exists	Select a different name for the task.
Unknown Task Type	The task type is misspelled. Valid task types are: TakeSnapshot, ResetSnapshot and VolumeCopy.
Schedule Already Exists	Select a different name for the schedule.
Expected one of START, EVERY, BETWEEN, ONLY, COUNT, EXPIRES	There might be a comma at the end of the expression.
Invalid syntax for Nth suffix	The suffix must match the number. 1st, 2nd, 3rd, etc.

## Missing Parameter Data Error

If you try to use a command that has a name parameter and the CLI displays “Error: The command is missing parameter data” then the name value you specified might have been interpreted as the keyword of an optional parameter.

For example, this problem would occur if you tried to create a virtual disk named A or a without specifying the `assigned-to` parameter.

To use a name that the CLI could interpret as an optional parameter, you must specify that parameter before the name parameter.

# Glossary

---

The glossary defines terms and acronyms used in MSA2000 Family storage system documentation. Definitions obtained from the Storage Networking Industry Association (SNIA) Dictionary are indicated with “(SNIA)” at the end. For the complete SNIA Dictionary, go to [www.snia.org/education/dictionary](http://www.snia.org/education/dictionary).

<b>active-active</b>	Synonym for <i>dual active</i> components or controllers. A pair of components, such as the controllers in a failure tolerant storage subsystem that share a task or class of tasks when both are functioning normally. When one of the components fails, the other takes on the entire task. Dual active controllers are connected to the same set of storage devices, improving both I/O performance and failure tolerance compared to a single controller. (SNIA)
<b>address</b>	A data structure or logical convention used to identify a unique entity, such as a particular process or network device.
<b>ANSI</b>	American National Standards Institute.
<b>API</b>	Application programming interface.
<b>array</b>	See <i>storage system</i> .
<b>block</b>	The unit in which data is stored to or retrieved from a disk. For MSA2000 Family storage systems a block is 512 bytes, equivalent to the size of a disk sector.
<b>broadcast write</b>	Technology that provides simultaneous caching of write data to both RAID controllers' cache memory with positive direct memory access acknowledgement (certified direct memory access).

- cache** The location in which data is stored temporarily. There are a variety of cache types. Read cache holds data in anticipation that it will be requested. Write cache holds data written by a client until it can be stored on other (typically slower) storage media such as disk or tape. (SNIA)
- See also *write-back cache*, *write-through cache*.
- capacitor pack** The controller module component that provides backup power to transfer unwritten data from cache to Compact Flash memory in the event of a power failure. Storing the data in Compact Flash provides unlimited backup time. The unwritten data can be committed to the disk drives when power is restored.
- CAPI** Configuration application programming interface. The proprietary protocol used for communication between the Management Controller and the Storage Controller in a controller module.
- channel** A physical path used for the transfer of data and control information between storage devices and a RAID controller or a host; or, a SCSI bus in a controller module.
- CHAP** Challenge-Handshake Authentication Protocol.
- chassis** An enclosure's metal housing.
- chunk size** The amount of contiguous data that is written to a virtual disk member before moving to the next member of the virtual disk. The default chunk size is 64 Kbyte. The number can be adjusted to improve performance. Generally, larger chunks are more effective for sequential reads.
- CLI** The command-line interface that system administrators can use to configure, monitor, and manage MSA2000 Family storage systems. The CLI is accessible from any management host that can access a controller module through an out-of-band Ethernet or RS-232 connection.
- clone** A copy of either a master volume or a snapshot.
- controller** The control logic in a storage subsystem that performs command transformation and routing, aggregation (RAID, mirroring, striping, or other), high-level error recovery, and performance optimization for multiple storage devices. (SNIA)
- A controller is also referred to as a RAID controller.

<b>controller enclosure</b>	An enclosure that contains disk drives and one or two controller modules. See <i>controller module</i> .
<b>controller module</b>	A FRU that contains: a Storage Controller processor; a Management Controller processor; a SAS expander and Expander Controller processor; management interfaces; a LAN subsystem; cache protected by a capacitor pack and Compact Flash memory; host, expansion, management, and service ports; and midplane connectivity. In a controller enclosure, the upper controller module is designated <i>A</i> and the lower one is designated <i>B</i> .
<b>copy-on-write (COW)</b>	<p>A technique for maintaining a point in time copy of a collection of data by copying only data that is modified after the instant of replicate initiation. The original source data is used to satisfy read requests for both the source data itself and for the unmodified portion of the point in time copy. (SNIA)</p> <p>See also <i>snap pool</i>.</p>
<b>CPLD</b>	Complex programmable logic device. A generic term for an integrated circuit that can be programmed in a laboratory to perform complex functions.
<b>CPU</b>	Central processing unit. The CPU is where most calculations take place, and the type of CPU in a controller module affects its performance capability. In MSA2000 Family storage systems, CPU is also referred to as the Storage Controller processor or the RAID controller processor.
<b>DAS</b>	See <i>direct attach storage (DAS)</i> .
<b>data host</b>	A host that reads/writes data to the storage system. The MSA2012fc or MSA2012sa can be directly connected to multiple data hosts for direct attach storage (DAS). The MSA2012fc or MSA2012i can be connected to multiple data hosts through switches for a storage area network (SAN).

<b>data mirroring</b>	Data written to one disk drive is simultaneously written to another disk drive. If one disk fails, the other disk can be used to run the virtual disk and reconstruct the failed disk. The primary advantage of disk mirroring is 100 percent data redundancy: since the disk is mirrored, it does not matter if one of the disks fails; both disks contain the same data at all times and either can act as the operational disk. The disadvantage of disk mirroring is that it is expensive because each disk in the virtual disk is duplicated. RAID 1 and 10 use mirroring.
<b>data striping</b>	The storing of sequential blocks of incoming data on all the different disk drives in a virtual disk. This method of writing data increases virtual disk throughput because multiple disks are working simultaneously, retrieving and storing. RAID 0, 3, 5, 6, 10, and 50 use striping.
<b>DHCP</b>	Dynamic Host Configuration Protocol.
<b>direct attach storage (DAS)</b>	A dedicated storage device that connects directly to one or more servers. (SNIA)  Supported for the MSA2012fc.
<b>disk mirroring</b>	See <i>data mirroring</i> .
<b>drive enclosure</b>	An enclosure that contains disk drives and one or two expansion modules. Drive enclosures can be attached to a controller enclosure to provide additional storage capacity. See <i>expansion module</i> .
<b>drive module</b>	A FRU consisting of a disk drive and drive sled.
<b>dynamic spare</b>	An available disk drive that is used to replace a failed drive in a virtual disk, if the Dynamic Spares feature is enabled and no vdisk spares or global spares are designated.
<b>EC</b>	See <i>Expander Controller (EC)</i> .
<b>EMP</b>	See <i>enclosure management processor (EMP)</i> .
<b>enclosure</b>	A physical storage device that contains disk drives. If the enclosure contains integrated RAID controllers it is known as a controller enclosure; otherwise it is a drive enclosure.

<b>enclosure management processor (EMP)</b>	An Expander Controller subsystem that provides data about an enclosure's environmental conditions such as temperature, power supply and fan status, and the presence or absence of disk drives.
<b>Ethernet adapter</b>	An adapter that connects an intelligent device to an Ethernet network. Usually called an Ethernet network interface card, or Ethernet NIC. (SNIA)
<b>Expander Controller (EC)</b>	The processor (located in the SAS expander in each controller module and expansion module) that is primarily responsible for enclosure management and SES.
<b>expansion module</b>	A FRU that contains: a SAS expander and Expander Controller processor; host, expansion, and service ports; and midplane connectivity. In a drive enclosure, the upper expansion module is designated <i>A</i> and the lower one is designated <i>B</i> .
<b>fabric</b>	A Fibre Channel switch or two or more Fibre Channel switches interconnected in such a way that data can be physically transmitted between any two N_Ports on any of the switches. (SNIA)
<b>fabric switch</b>	A fabric switch functions as a routing engine that actively directs data transfer from source to destination and arbitrates every connection. Bandwidth per node via a fabric switch remains constant when more nodes are added.
<b>failback</b>	See <i>recovery</i> .
<b>failover</b>	In an active-active configuration, failover is the act of temporarily transferring ownership of controller resources from a failed controller to a surviving controller. The resources include virtual disks, cache data, host ID information, and LUNs and WWNs. See also <i>recovery</i> .
<b>fault tolerance</b>	The capacity to cope with internal hardware problems without interrupting the system's data availability, often by using backup systems brought online when a failure is detected. Many systems provide fault tolerance by using RAID architecture to give protection against loss of data when a single disk drive fails. Using RAID 1, 3, 5, 6, 10, or 50 techniques, the RAID controller can reconstruct data from a failed disk drive and write it to a spare or replacement disk drive.

<b>fault-tolerant virtual disk</b>	A virtual disk that provides protection of data in the event of a single disk drive failure by employing RAID 1, 3, 5, 6, 10, or 50. RAID 6 also provides protection against the failure of two drives.
<b>FC</b>	See <i>Fibre Channel (FC)</i> .
<b>FC-AL</b>	See <i>Fibre Channel-Arbitrated Loop (FC-AL)</i> .
<b>Fibre Channel (FC)</b>	A serial I/O bus capable of supporting multiple protocols, including access to open system storage (FCP protocol), access to mainframe storage (FICON protocol), and IP. Fibre Channel supports point to point, arbitrated loop, and switched topologies. (SNIA)
<b>Fibre Channel-Arbitrated Loop (FC-AL)</b>	A form of Fibre Channel network in which up to 126 nodes are connected in a loop topology, with each node's L_Port transmitter connecting to the L_Port receiver of the node to its logical right. Nodes connected to a Fibre Channel Arbitrated Loop arbitrate for the single transmission that can occur on the loop at any instant using a Fibre Channel Arbitrated Loop protocol that is different from Fibre Channel switched and point-to-point protocols. An arbitrated loop may be private (no fabric connection) or public (attached to a fabric by an FL_Port). (SNIA)
<b>field-replaceable unit (FRU)</b>	An assembly component that is designed to be replaced on site, without the system having to be returned to the manufacturer for repair.
<b>FRU</b>	See <i>field-replaceable unit (FRU)</i> .
<b>Gbyte (GB)</b>	Gigabyte. Equivalent to 1000 Kbyte for data storage and statistics, or 1024 Mbyte for memory.
<b>global spare</b>	A spare disk drive that is available to all virtual disks in a system.
<b>HBA</b>	See <i>host bus adapter (HBA)</i> .
<b>HIM</b>	Host interface module.

<b>host bus adapter (HBA)</b>	An adapter that connects a host I/O bus to a computer's memory system. Host bus adapter is the preferred term in SCSI contexts. Adapter and NIC are the preferred terms in Fibre Channel contexts. The term NIC is used in networking contexts such as Ethernet and token ring. (SNIA)
<b>host port</b>	A host-interface port on a controller module or an expansion module.
<b>host port interconnect</b>	A dual-controller Fibre Channel enclosure includes host port interconnect circuitry which can be used to connect the host ports on the upper controller module to those on the lower controller module. When enabled, the port interconnect gives each host access to all the volumes assigned to both controllers and makes it possible to create a redundant configuration without using an external FC switch. The port interconnect should only be enabled when the system is used in direct attach configurations. When using a switch attached configuration, the port interconnect must be disabled.
<b>hot swap</b>	The ability to remove and replace a FRU while the system is powered on and operational.
<b>in-band management</b>	Transmission of a protocol other than the primary data protocol over the same medium as the primary data protocol. Management protocols are a common example of in-band transmission. (SNIA)  This type of access is available through use of the Configuration API (CAPI) to develop a programmed interface.
<b>independent cache performance mode (ICPM)</b>	An operating mode in which a pair of controllers can process host I/Os and share disk channels but cannot fail over and assume responsibilities of a failed controller, because no mirroring of write-back cache occurs.
<b>initialization</b>	The process of writing a specific pattern to all data blocks on all disk drives in a virtual disk. This process overwrites and destroys existing data on the disk drives and the virtual disk. Initialization is required to make the entire virtual disk consistent at the onset. Initialization ensures that virtual-disk verifications performed in the future are executed correctly.
<b>I/O</b>	Input/output.

<b>I/O module (IOM)</b>	See <i>controller module</i> and <i>expansion module</i> .
<b>IP</b>	Internet Protocol.
<b>IQN</b>	ISCSI Qualified Name.
<b>iSCSI</b>	Internet Small Computer System Interface.
<b>iSNS</b>	Internet Storage Name Service.
<b>JBOD</b>	Just a Bunch of Disks. A drive enclosure that is directly attached to a host.
<b>jumbo frame</b>	In an iSCSI network, a frame that can contain 9000 bytes for large data transfers. A normal frame can contain 1500 bytes.
<b>Kbyte (KB)</b>	Kilobyte. Equivalent to 1000 bytes for data storage and statistics, or 1024 bytes for memory.
<b>LAN</b>	See <i>local area network (LAN)</i> .
<b>leftover drive</b>	A disk drive that contains metadata but is no longer part of a virtual disk.
<b>local area network (LAN)</b>	A communications infrastructure designed to use dedicated wiring over a limited distance (typically a diameter of less than five kilometers) to connect to a large number of intercommunicating nodes. Ethernet and token ring are the two most popular LAN technologies. (SNIA)
<b>logical unit number (LUN)</b>	The SCSI identifier of a logical unit within a target. (SNIA)  For example, a LUN identifies the mapping between a storage system volume and a port on a switch or HBA/NIC.
<b>loop address</b>	Indicates the unique ID of a node in FC loop topology. A loop address is sometimes referred to as a Loop ID.
<b>loop topology</b>	See <i>Fibre Channel-Arbitrated Loop (FC-AL)</i> .
<b>LUN</b>	See <i>logical unit number (LUN)</i> .
<b>Management Controller (MC)</b>	The processor (located in a controller module) that is primarily responsible for human-computer interface and computer-computer interface functions, and interacts with the Storage Controller.

<b>management host</b>	A workstation with direct or network connections to a storage system's management ports and that is used to manage the system.
<b>management information base (MIB)</b>	A database of managed objects accessed by network management protocols. An SNMP MIB is a set of parameters that an SNMP management station can query or set in the SNMP agent of a network device (for example, a router).
<b>master volume</b>	A volume that is enabled for snapshots. A master volume must be owned by the same controller as the associated snap pool.
<b>Mbyte</b>	Megabyte (MB).
<b>MC</b>	See <i>Management Controller (MC)</i> .
<b>metadata</b>	Data in the first sectors of a disk drive that the system uses to identify virtual disk members.
<b>MIB</b>	See <i>management information base (MIB)</i> .
<b>network interface card (NIC)</b>	See <i>Ethernet adapter</i> .
<b>Network Time Protocol (NTP)</b>	A protocol that enables the storage system's time and date to be obtained from a network-attached server, keeping multiple hosts and storage devices synchronized.
<b>NIC</b>	See <i>network interface card (NIC)</i> .
<b>node WWN</b>	See <i>world wide node name (WWNN)</i> .
<b>Non-RAID</b>	The RAID level option that can be used for a virtual disk having a single disk drive and that does not need the data redundancy or performance benefits of RAID. The capacity of a non-RAID virtual disk equals the capacity of its disk drive. For fault tolerance, use RAID 1 or above.
<b>NTP</b>	See <i>Network Time Protocol (NTP)</i> .
<b>originator</b>	The network device that originates an iSCSI login request to another device (the recipient). For a login request from an iSCSI host initiator to a storage system, the host is the originator and the storage system is the recipient.

<b>out-of-band management</b>	Method of accessing and managing a system using the RS-232 or Ethernet connection.
<b>ownership</b>	In an active-active configuration, one controller has ownership of the following resources: virtual disks and vdisk spares. When a controller fails, the other controller assumes temporary ownership of its resources.
<b>PHY</b>	Hardware component that converts between digital and analog in the signal path between the Storage Controller, Expander Controller, disk drives, and SAS ports.
<b>PID</b>	Primary controller identifier number.
<b>point-to-point</b>	Point-to-point is an alternative to FC-AL topology and is required in some fabric switch configurations. The controller enclosure supports point-to-point connections only to fabric ports (F_Ports). Loop topology is appropriate for most fabric switches, as it provides more flexibility when considering fault-tolerant designs.
<b>port bypass circuit (PBC)</b>	See <i>host port interconnect</i> .
<b>port WWN</b>	See <i>world wide port name (WWPN)</i> .
<b>power-and-cooling module</b>	A FRU that includes an AC power supply and two cooling fans. An enclosure has two power-and-cooling modules for failure tolerance and can operate with only one module.
<b>priority</b>	Priority enables controllers to serve other I/O requests while running jobs (utilities) such as rebuilding virtual disks. Priority ranges from low, which uses the controller's minimum resources, to high, which uses the controller's maximum resources.
<b>RAID</b>	Redundant Array of Independent Disks, a family of techniques for managing multiple disks to deliver desirable cost, data availability, and performance characteristics to host environments. (SNIA)
<b>RAID controller</b>	See <i>controller</i> .
<b>RAIDIO</b>	RAID input/output; a nickname for the controller board.

<b>RAS</b>	Reliability, availability, and serviceability. These headings refer to a variety of features and initiatives all designed to maximize equipment uptime and mean time between failures, minimize downtime and the length of time necessary to repair failures, and eliminate or decrease single points of failure in favor of redundancy.
<b>rebuild</b>	The regeneration and writing onto one or more replacement disks of all of the user data and check data from a failed disk in a virtual disk with RAID level 1, 10, 3, 5, 6, and 50. A rebuild can occur while applications are accessing data on the system's virtual disks.
<b>recipient</b>	The network device that receives an iSCSI login request from another device (the originator). For a login request from an iSCSI host initiator to a storage system, the host is the originator and the storage system is the recipient.
<b>recovery</b>	In an active-active configuration, recovery (also known as failback) is the act of returning ownership of controller resources from a surviving controller to a previously failed (but now active) controller. The resources include virtual disks, cache data, host ID information, and LUNs and WWNs.
<b>remote scripting CLI client</b>	A command-line interface (CLI) that enables you to manage the system from a remote management host. The client communicates with the management software through a secure out-of-band interface, HTTPS, and provides the same control and monitoring capability as the browser interface. The client must be installed on a host that has network access to the system.
<b>rollback</b>	The process of resetting a volume's data to become identical to a snapshot taken of that volume.
<b>SAN</b>	See <i>Storage Area Network (SAN)</i> .
<b>SAS</b>	Serial Attached SCSI.
<b>SATA</b>	Serial Advanced Technology Attachment.
<b>SC</b>	See <i>Storage Controller (SC)</i> .
<b>SCSI</b>	Small Computer System Interface. A collection of ANSI standards and proposed standards which define I/O buses primarily intended for connecting storage subsystems or devices to hosts through host bus adapters. (SNIA)

## **SCSI Enclosure Services (SES)**

An ANSI X3T10 standard for management of environmental factors such as temperature, power, voltage, etc. (SNIA)

In MSA2000 Family storage systems, SES data is managed by the Expander Controller and EMP.

- secret** For use with CHAP, a password that is shared between an initiator and a target to enable authentication.
- SFP** Small form-factor pluggable connector, used in FC controller module host ports. An SFP is a FRU.
- SID** Secondary controller identifier number.
- SMART** Self-Monitoring Analysis and Reporting Technology. The industry-standard reliability prediction indicator for both the IDE/ATA and SCSI hard disk drives. Hard disk drives with SMART offer early warning of some hard disk failures so critical data can be protected.
- SMI-S** Storage Management Interface Specification.
- SMTP** Simple Mail Transfer Protocol. A protocol for sending email messages between servers and from mail clients to mail servers. The messages can then be retrieved with an email client using either POP or IMAP.
- SMU** Storage Management Utility. The web browser interface that system administrators can use to configure, monitor, and manage MSA2000 Family storage systems. SMU is accessible from any management host that can access a system through an out-of-band Ethernet connection.
- snap pool** A volume that is configured to store snapshot data.
- snapshot** A fully usable copy of a defined collection of data that contains an image of the data as it appeared at the point in time at which the copy was initiated. (SNIA)
- SNIA** Storage Networking Industry Association.
- SNMP** Simple Network Management Protocol. An IETF protocol for monitoring and managing systems and devices in a network. The data being monitored and managed is defined by a MIB. The functions supported by the protocol are the request and retrieval of data, the setting or writing of data, and traps that signal the occurrence of events. (SNIA)
- spare** See *dynamic spare*, *global spare*, *vdisk spare*.

<b>standard volume</b>	A volume that is not enabled for snapshots.
<b>standby</b>	See <i>spare</i> .
<b>state</b>	The current operational status of a disk drive, a virtual disk, or controller. A controller module stores the states of drives, virtual disks, and the controller in its nonvolatile memory. This information is retained across power interruptions.
<b>Storage Area Network (SAN)</b>	A storage system consisting of storage elements, storage devices, computer systems, and/or appliances, plus all control software, communicating over a network. (SNIA)
<b>Storage Controller (SC)</b>	The processor (located in a controller module) that is primarily responsible for RAID controller functions. The Storage Controller is also referred to as the RAID controller.
<b>storage system</b>	One or more enclosures, referred to in a logical (as opposed to physical) sense.
<b>stripe size</b>	The number of data disks in a virtual disk multiplied by the chunk size.
<b>sub-vdisk</b>	One of multiple RAID 1 virtual disks across which data is striped to form a RAID 10 virtual disk; or one of multiple RAID 5 virtual disks across which data is striped to form a RAID 50 virtual disk.
<b>system</b>	See <i>storage system</i> .
<b>Tbyte (TB)</b>	Terabyte. Equivalent to 1000 Gbyte for data storage and statistics, or 1024 Gbyte for memory.
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol.
<b>topology</b>	The logical layout of the components of a computer system or network and their interconnections. Topology deals with questions of what components are directly connected to other components from the standpoint of being able to communicate. It does not deal with questions of physical location of components or interconnecting cables. (SNIA)
<b>trap</b>	A type of SNMP message used to signal that an event has occurred. (SNIA)

<b>ULP</b>	Unified LUN Provisioning. A MSA2012sa storage system feature that makes all volumes in the system accessible to hosts through all host ports on both controllers. ULP incorporates Asymmetric Logical Unit Access (ALUA) extensions.
<b>UT</b>	Universal Time. A modern time system related to the conventional Greenwich Mean Time (GMT) used for time zones.
<b>UPS</b>	Uninterruptible Power Supply.
<b>vdisk</b>	Abbreviation for virtual disk.
<b>vdisk spare</b>	A disk drive that is marked as a spare to support automatic data rebuilding after a disk drive associated with a virtual disk fails. For a vdisk spare to take the place of another disk drive, it must be at least equal in size to the failed disk drive and all of the virtual disks dependent on the failed disk drive must be redundant—RAID 1, 10, 3, 5, 6, or 50.
<b>verify</b>	A process that checks the integrity of the redundant data on fault-tolerant virtual disks. For RAID 3, 5, 6, and 50, the verify process recalculates the parity of data stripes in each of the virtual disk's RAID stripe sets and compares it with the stored parity. For RAID 1 and 10, the verify process checks for mirror mismatches. The number of inconsistencies found, which can indicate a failing drive, is reported in the event log.
<b>virtual disk</b>	For MSA2000 Family storage systems, a set of disk drives that share a RAID level and drive type, and across which host data is spread for redundancy or performance.
<b>volume</b>	A logical subdivision of a virtual disk. Multiple LUNs can be assigned to the same volume, one for each host port given access to the volume. See also <i>standard volume</i> .
<b>volume mapping</b>	The process by which volume permissions (read only, read/write, or none) and LUNs are assigned to a host port.
<b>WBI</b>	See <i>SMU</i> .
<b>web-browser interface (WBI)</b>	See <i>SMU</i> .

<b>world wide name (WWN)</b>	<p>A unique 64-bit number assigned by a recognized naming authority (often via block assignment to a manufacturer) that identifies a node process or node port. (SNIA)</p> <p>MSA2000 Family storage systems derive WWNs from the serial numbers of controller modules and expansion modules.</p>
<b>world wide node name (WWNN)</b>	<p>A globally unique 64-bit identifier assigned to each Fibre Channel node process. (SNIA)</p>
<b>world wide port name (WWPN)</b>	<p>A globally unique 64-bit identifier assigned to each Fibre Channel port. (SNIA)</p>
<b>write policy</b>	<p>A cache-writing strategy used to control write operations. The write policy options are CIFS write-back and write-through cache.</p>
<b>write-back cache</b>	<p>A caching technique in which the completion of a write request is signaled as soon as the data is in cache, and actual writing to non-volatile media occurs at a later time. Write-back cache includes an inherent risk that an application will take some action predicated on the write completion signal, and a system failure before the data is written to non-volatile media will cause media contents to be inconsistent with that subsequent action. For this reason, good write-back cache implementations include mechanisms to preserve cache contents across system failures (including power failures) and to flush the cache at system restart time. (SNIA)</p> <p>This is how MSA2000 Family storage systems operate. See also <i>write-through cache</i>.</p>
<b>write-through cache</b>	<p>A caching technique in which the completion of a write request is not signaled until data is safely stored on non-volatile media. Write performance with a write-through cache is approximately that of a non-cached system, but if the data written is also held in cache, subsequent read performance may be dramatically improved. (SNIA)</p> <p>MSA2000 Family storage systems use write-through cache when write-back cache is disabled or when cache backup power is not working. See also <i>write-back cache</i>.</p>



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