IBM Spectrum Accelerate
Version 11.5.4

Command-Line Interface (CLI) Reference Guide

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Note
Before using this document and the product it supports, read the information in "Notices" on page 717.

Edition notice

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Contents

About this guide

This guide describes the command-line interface (CLI) commands for IBM Spectrum Accelerate™.

Intended audience

This document serves as a reference for system administrators and all IT staff who manage the IBM Spectrum Accelerate system from the CLI. This document is also a reference for programmers who want to automate storage system commands.

Conventions used in this guide

Command examples and output examples are documented in monospaced font, with a frame around it.

For example:

- **Command:**

```
vol_rename vol=DBVolume new_name=DBVolume1
```

- **Output:**

```
Command completed successfully.
```

Access control refers to the types of user accounts that are allowed to use a specific command.

Return codes are the possible codes that the system can return after a specific command is issued and completed either successfully or with an error.

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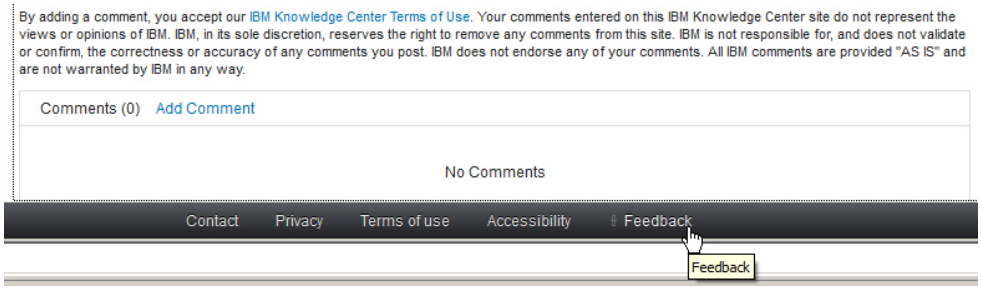

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Chapter 1. Overview of the command-line interface (CLI)

The command-line interface (CLI) provides a mechanism for issuing commands to manage and maintain the storage system. CLI commands are entered on the IBM XCLI utility.

This section explains how to install and start the XCLI utility. It also provides information about interactive and basic modes for running commands in the utility and an overview of the CLI command structure and parameters.

The following topics are covered:

Overview of the XCLI utility

This section describes how to download, install, and start the IBM XCLI utility. It also explains how to log off the XCLI.

The following topics are covered:

Installing and starting the XCLI

This information describes how to download and install the IBM XCLI utility. The XCLI is available on Microsoft Windows, Linux and other operating systems.

About this task

Note: For the installation requirements and a list of available packages, see the *IBM Hyper-Scale Manager Release Notes* on the IBM Knowledge Center website.

Procedure

Perform these steps to download and install the XCLI:

1. Download the IBM Hyper-Scale Manager installation package from the IBM Fix Central website.
2. Perform one of the following procedures for your operating system.
   - **Windows:** Double-click the installation file, and follow the instructions on the screen.
   - **Linux:** Extract the installation file to a designated folder on your system, using the following command:

     `tar -xzf file_name.tar`
   - **AIX®, HP-UX, Solaris:** Extract the installation file using the following command:

     `gunzip file_name.tar.gz`

     Then extract the file to a designated folder on your system, using the following command:

     `tar -xvf file_name.tar`

3. Start the XCLI depending on the hosting operating system and operational mode.

Starting the XCLI on a Windows system

You can start the XCLI on a Windows system in either interactive or basic mode.

Interactive mode:
About this task

To run commands in interactive mode, perform the following steps:

Procedure

1. Click **Start** > **Programs** > **IBM XIV** > **XCLI** to open an XCLI session window.
2. Follow the instructions on the screen and type the following information:
   a. Storage system IP address or DNS
   b. User name
   c. Password

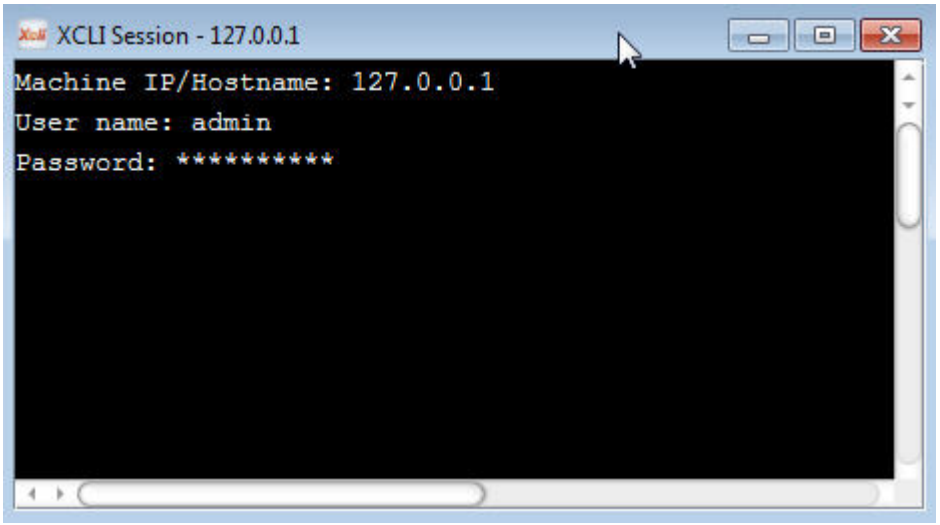

Figure 1. XCLI terminal

3. You are now connected to the specified storage system. The XCLI prompt appears in the session window. The window title includes the name of the storage system to which the XCLI is connected.
4. Run any CLI command from this prompt.

Basic mode:
About this task

To run commands in basic mode, perform the following steps:

Procedure

1. Open a Windows command session.
2. Type `cd c:\program files\IBM\Storage\XIV`.
3. Run any CLI command, including the XCLI identification parameters, for example:

```
xcli -u user -p ******** -m 127.0.0.1 vol_list
```

Starting the XCLI on a Linux system

You can start the XCLI on a Linux system in either interactive or basic mode.

Interactive mode:
About this task

To run commands in interactive mode, perform the following steps:

Procedure

1. Type `xcli -w` to open a new session.
2. Follow the instructions on the screen and type the following information:
   a. User name
   b. Password
   c. Storage system IP address or DNS
3. You are now connected to the specified storage system. The XCLI prompt appears in the session window. You can run any CLI command from this prompt.

Basic mode:
About this task

To run commands in basic mode, enter the command including the XCLI identification parameters, for example:

```
xcli -u user -p ******** -m 127.0.0.1 vol_list
```

Exiting an interactive XCLI session

When running XCLI in interactive mode, you can exit the interactive session by either closing the session window or running the **exit** command.

To terminate an interactive XCLI session automatically after the predefined period, set the **session_timeout** property in the `xiv-general.properties` file, that is stored in the `properties` directory. The value of **session_timeout** is defined in minutes.

The location of the `properties` directory varies among operating systems as follows:

Windows

```
%APPDATA%\XIV\GUI12\properties
```

Non Windows

```
$USERDIR/.xiv/GUI12/properties
```

Using the CLI

This section provides information about interactive and basic modes for running CLI commands and an overview of the CLI command structure and parameters.

The following topics are covered:

Interactive and basic modes

You can use the CLI in two modes: interactive and basic.

The differences between these two modes are as follows:

- Basic mode requires you to log in to the storage system each time you issue a command, but the interactive mode requires you to log in only once.
- In basic mode, you must enter the entire command syntax. In interactive mode, you can enter a shorter syntax.
- Interactive mode offers several command and argument completion features.

The following example shows the command syntax for each of these modes:

Basic

```
xcli -u user -p password -m 127.0.0.1 vol_list
```

Interactive

```
vol_list
```

Note: Each of the batch-mode parameters in these examples is explained later in this chapter.

Interactive mode features

Running CLI commands in interactive mode provides command and argument completion, along with possible values to these arguments.

About this task

The CLI offers several ways to interactively complete command names.

Procedure

1. To complete the name of a command, type one or more characters and press Tab. In the following example, the CLI adds a character to the name of a command that starts with **vol**. The first click on Tab adds a character.

```
>>vol
>>vol_
```

2. Next, to list commands, type one or more characters and press Tab twice (Tab-Tab).

```
>>vol_
vol_by_id         vol_copy          vol_create        vol_delete
vol_format        vol_list          vol_lock          vol_mapping_list
vol_move          vol_rename        vol_resize        vol_unlock
```

Example

- This example lists all commands that start with the letter **v**:

```
>> v
version_get        vol_by_id          vol_copy           vol_create
vol_delete         vol_format         vol_list           vol_lock
vol_mapping_list   vol_move           vol_rename         vol_resize
vol_unlock         vpd_config_get     vpd_config_set
```

- This example lists all commands that start with the letters **cg_**:

```
>> cg_
cg_add_vol         cg_create          cg_delete        cg_list
cg_move            cg_remove_vol      cg_rename        cg_snapshots_create
```

Command Argument Completion:

The CLI can provide list arguments and argument values to help you complete a command.

About this task

To list arguments for a specific command, type the command name and press Tab. To list values for a specific argument, type the command name and argument, optionally specify one or more characters for the value, and then press Tab.

Procedure

1. Listing arguments for a command. This example lists arguments for the **vol_create** command:

```
>> vol_create
vol=   size=   size_block=   pool=
```

2. Listing values for a specific argument. This example lists valid values for the **pool** argument that is required for the **pool_create** command:

```
>> pool_create pool=
8058  2nd Pool  8059  pool1
```

3. Listing a subset of values for a specific argument. This example lists valid values that start with v for the **vol** argument that is required for the **vol_list** command:

```
>> vol_list vol=v
vol1  vol2
```

Understanding the command syntax

This information describes the general syntax for a CLI command in basic mode.

When in basic mode, the CLI uses the following general syntax:

```
xcli < <[ --file=FILE ] -c CONFIG|-m IP1 [-m IP2 [-m IP3]] >
-L|-a <config> -m IP1 [-m IP2 [ -m IP3]]|-d IP1 [-m IP2 [ -m IP3]] >|
[ -r ]
[ <-l | --list> | <-s | --csv> | <-x | --xml> ]
[ <-u | --user> user ]
[ <-p | --password> password ]
[-t [--fields=field1,field2,...]]
[command]
```

Command syntax quick reference

This information describes the command parameters and options that are available in the CLI basic mode.

Use the following table as a quick reference to the various parameters and options.

Options	Values
-f	Specifies the name of a configuration file that lists the storage system
-c	Specifies the storage system on which the command is to be run
-m	Specifies the IP address of the storage system on which the command runs
-L	Lists the storage systems, as read from the configuration file
-a	Specifies the name of the storage system
-d	Removes a storage system from the configuration file
-r	Specifies the name of a batch file that runs CLI commands
-l	Displays the command output in user-readable format
-s	Displays the command output in CSV format
-x	Displays the command output in XML format
-u	Specifies the user
-p	Specifies the password
-t	Manages the fields of the command output
-h	Displays command help
-y	Suppresses the `Are you sure?` prompt
-v	Displays the version of the XCLI on the screen
command	Runs the specified command

Syntax example

The CLI command syntax specifies the command to be run, along with its applicable parameters and their values.

In the following example, the parameters to the left of the **vol_list** command specify the storage system to which the command is being directed, and also specify the required user and password for this storage system:

```
xcli -u admin -p ********** -m 127.0.0.1 vol_list
```

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

Storage system

The storage system is specified by either its IP address or name of the storage system as listed in the configuration file. See "Configuration parameters" on page 8 for more information.

-m Specifies the IP address of the storage system to which this command is directed.

-c Specifies the name of the storage system to which this command is directed, as it is defined in the configuration file (for example, `my_system`).

Command

vol_list
Specifies the command to be run. For more information about running commands, see "Interactive mode features" on page 4.

Using identification parameters

This information describes the parameters used to set the user, password, and storage system.

The following topics are covered:

- "Setting user and password parameters"
- "Identifying and configuring a storage system" on page 8

Setting user and password parameters

The CLI and the storage system provide a password-controlled user ID as a security mechanism for controlling CLI operations.

When running in basic mode, specify the user name and password as follows:

```
xcli -u admin -p ********** -c my_system vol_list
```

In this command:

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

my_system

-c Specifies the name of the storage system to which this command is directed, as it is defined in the configuration file (for example, `my_system`).

Command

vol_list
Specifies the command to be run.

The password handling mechanism performs as follows:

1. Checking the user:
   - The **-u** or **--user** parameter on the command line is checked first and its value is used as the user name.
   - If the **-u** or **--user** parameter is not specified, the `XIV_XCLIUSER` environment variable is used as a user name.

2. Checking the password:
   - The **-p** or **--password** parameter on the command line is checked first and its value is used as the password.
   - If the **-p** or **--password** parameter is not specified, the `XIV_XCLIPASSWORD` environment variable is used as the password.

Note: If you do not specify both the user ID and the password, the command fails.

Identifying and configuring a storage system

This information describes the parameters used to identify the storage system on which a command is to run, and how to create a configuration file to manage the storage systems that you can use.

Configuration parameters:

Most CLI commands are directed to a specific storage system using the IP address. You must provide at least one address and up to three addresses per storage system.

To provide the storage system IP address, log in to an interactive session or specify the configuration file that stores the storage system IP address or addresses.

Specifying a storage system using its IP address

In the following example, the command is directed to a storage system with an IP address of `127.0.0.1`:

```
xcli -u admin -p ********** -m 127.0.0.1 vol_list
```

In this command:

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

Storage system

The storage system is specified by its IP address.

-m Specifies the IP address of the storage system to which this command is directed.

Command

vol_list
Specifies the command to be run.

Specifying a storage system by using a configuration file

In the following example, the command is directed to a storage system that is listed on the `my_system` configuration file:

```
xcli -u admin -p ********** -c my_system vol_list
```

In this command:

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

Storage system
The storage system is specified by its name on the configuration file.

-c Specifies the name of the storage system to which this command is directed, as it is defined in the configuration file (for example, `my_system`).

Command

vol_list
Specifies the command to be run.

Creating a configuration file:

You can use the configuration file to manage a list of the storage systems that you are working with.

Use the following options to add and subtract storage systems from this file and to list them.

Listing the available storage systems
In the following example, the configuration information is read from a default file location or from the file that is specified with [-f *file*].

```
xcli [-f file] -L
```

Adding a new storage system to the configuration file
In the following example, IP1...IP3 are added to the configuration file at the default file location. If applicable, the addresses are added to the file that is specified in [-f *file*]. The <*config*> variable represents the configuration name of the storage system that you are adding to the list.

```
xcli [-f file] -a <config> -m IP1 [-m IP2 [ -m IP3]]
```

Removing a storage system from the configuration file
In the following example, IP1...IP3 are removed from the configuration file. If applicable, the addresses are removed from the file that is specified with [-f *file*].

```
xcli [-f file] -d IP1 [-m IP2 [ -m IP3]]
```

Location of the configuration file

The configuration file is located in the following directory, depending on the operating system. You do not specify the location of the configuration file when you add or remove storage systems from the configuration.

Windows
`\Application Data\XIV\GUI12\properties`

UNIX In the home folder under `.xiv`

Certificate management

This section describes the way certificates are managed via the XCLI utility.

The general format of the certificate commands is:

```
xcli -C <command> [ <p1>=<v1> [<p2>=<v2>]...]
```

The available commands are: list, show, import and remove.

List [type=<type>]

This command lists the trusted certificates (global and private). This command accepts the type of list as a parameter.

Type = all (default)
Lists all trusted certificates.

For example:

```
xcli -C list
```

Private
Lists all private trusted certificates.

For example:

```
xcli -C list type=private
```

Global
Lists all global trusted certificates.

Show alias=<alias>

This command displays the certificate details. This command accepts the name of the specific certificate as a parameter. For example:

```
xcli -C show alias=abcd
```

Import pem=<pem_file_path> [alias=<alias>]

This command imports a certificate (in PEM format) into the list of trusted certificates. This command accepts the location of the certificate as a mandatory parameter and the name into which the certificate will be renamed. For example:

```
xcli -C import pem=C:\abc\def\cert.pem
xcli -C import alias=abcd pem=C:\abc\def\cert.pem
```

Remove alias=<alias>

This command removes a certificate from the list. For example:

```
xcli -C remove alias=abcd
```

Display options

This information describes the formats that you can choose to display the command output.

The following topics are covered:

- "Using display options"
- "Table display options"

Using display options

Output from an CLI command can be displayed in a list, comma-separated value (CSV) and XML formats. You can specify only one format. If you do not specify the format, the output defaults to a list.

The display options are:

-l Displays command output in a list (also known as user-readable format).

-s Displays command output in CSV format.

-x Displays command output in XML format.

Use the display options as follows:

Interactive mode

```
vol_list -s
```

Basic mode

```
xcli -u user -p ********** -m 127.0.0.1 -s vol_list
```

In this command:

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

Storage system

The storage system is specified by either its IP address or name of the storage system as listed in the configuration file. See "Configuration parameters" on page 8 for more information.

-m Specifies the IP address of the storage system to which this command is directed.

-c Specifies the name of the storage system to which this command is directed, as it is defined in the configuration file (for example, `my_system`).

Display option

-s Displays command output in CSV format.

Command

`vol_list`
Specifies the command to be run. For more information about running commands, see "Interactive mode features" on page 4.

Table display options

The list option displays the command output in a user-readable format. When running a command with a list option, you can specify which table columns are displayed on the screen.

Determine the way that the table is displayed as follows:

Interactive mode

```
vol_list -t "size"
```

Single-command mode

```
xcli -u admin -p ********** -m 127.0.0.1 vol_list -t "size"
```

In this command:

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

Storage system

The storage system is specified by either its IP address or name of the storage system as listed in the configuration file. See "Configuration parameters" on page 8 for more information.

-m Specifies the IP address of the storage system to which this command is directed.

-c Specifies the name of the storage system to which this command is directed, as it is defined in the configuration file (for example, `my_system`).

Table display option

-t "size"

Specifies the one or more columns that are to be displayed. In this example, only the Size column is displayed. You can list any combination of the table columns.

Command

vol_list

Specifies the command to be run. For more information about running commands, see "Interactive mode features" on page 4.

Viewing the available columns

You can view all of the available table's columns by running: `help command=<command_name> format=full`.

The result provides information about the command, including a list of all of its fields. For example, the available fields for the **vol_list** command are:

- **name**
- **size**
- **master_name**
- **cg_name**
- **pool_name**
- **creator**
- **used_capacity**
- **used_capacity_MiB**
- **snapshot_time_on_master**
- **serial**

- **wwn**
- **capacity**
- **mirrored**
- **sg_name**
- **snapshot_time**
- **sg_snapshot_of**
- **locked_by_pool**
- **size_MiB**
- **locked**
- **snapshot_of**
- **modified**
- **delete_priority**

Running commands in batch mode

CLI commands can be grouped together and run in a batch. For example, you can use batch mode to run an identical set of commands on multiple storage systems.

Creating a batch file for the commands

Create a text file and write the commands without the **xcli** prefix or CLI parameters. For example:

```
pool_create pool=pool_00001 hard_size=171 soft_size=171 snapshot_size=65
vol_create vol=vol_00010 size=17 pool=pool_00001
vol_list vol=vol_00010
```

This example contains the following commands:

- The **pool_create** command, along with its arguments. This command creates a storage pool, which is a prerequisite for creating a volume.
- The **vol_create** command, along with its arguments. This command creates a volume in the pool that has just been created.
- The **vol_list** command displays the details of the newly created volume.

Name the script file and save it.

Running a batch file

To run the batch file, you must specify the CLI parameters:

```
xcli -u admin -p ********** -m 127.0.0.1 -r
"C:\Documents and Settings\avia\xcli\xcli_script.txt"
```

In this command:

Identification parameters

-u Specifies the user ID.

-p Specifies the password.

Storage system

The storage system is specified by either its IP address or name of the storage system as listed in the configuration file. See "Configuration parameters" on page 8 for more information.

-m Specifies the IP address of the storage system to which this command is directed.

-c Specifies the name of the storage system to which this command is directed, as it is defined in the configuration file (for example, `my_system`).

The batch parameter

-r Specifies the name of the batch file to run on the storage system.

Viewing the output

The three commands in the previous example create a pool, then create a volume, then display the volume details. The following output is returned from running these three commands in batch mode:

- Confirmation that a pool was created
- Confirmation that a volume was created
- Table with the details of the newly created volume

Failure of batch mode

When one of the commands that run in batch mode fails, the following actions occur:

1. The script exits immediately.
2. No commands after the failing command are run.
3. An error message is displayed identifying the CLI command that failed.

Displaying CLI help and the XCLI utility version

This information describes how to display help for the CLI command and the version of the XCLI utility.

About this task

The following command displays the help text for the CLI in batch mode:

```
xcli <-h | --help>
```

For details about the **help** command, see "Displaying help" on page 156.

The following command displays the XCLI utility version:

```
xcli <-v | --version>
```

Chapter 2. Host and cluster management commands

This section describes the command-line interface (CLI) for host and cluster management.

Adding a host to a cluster

Use the **cluster_add_host** command to add a host to a cluster.

```
cluster_add_host cluster=ClusterName host=HostName map=MapName
```

Parameters

Name	Type	Description	Mandatory
cluster	Object name	Name of the cluster to contain the host.	Y
host	Object name	Host to be added to the cluster.	Y
map	Enumeration	Defines whether to override the cluster mapping with the host mapping or vice versa, or append the cluster mapping on top of the host mapping.	Y

If the host already belongs to another cluster, the command fails. If the host already belongs to the specified cluster, the operation completes successfully, but has no effect.

Using the **map** parameter:

- If **map=cluster**, the mapping of the host and host type are overridden with the cluster's mapping and type.
- If **map=host**, the mapping of the cluster and its host type are overridden with the host's mapping and type. Use this value to add a host to an empty cluster, so that the cluster will obtain the host's mapping.
- If **map=clusterWithHostExceptions**, the host keeps its mapping and the cluster mapping is appended on top of it.

The host or cluster receives a single SCSI unit attention message, even if the change affects multiple volumes.

Example:

```
cluster_add_host cluster=Cluster1 host=Host1 map=cluster
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **HOST_BELONGS_TO_ANOTHER_CLUSTER**
  Host already belongs to another cluster
- **HOST_AND_CLUSTER_HAVE_CONFLICTING_MAPPINGS**
  Host mapping conflicts with cluster mapping
- **HOST_AND_CLUSTER_HAVE_DIFFERENT_MAPPING_TYPE**
  Host mapping type is not the same as the cluster mapping type
- **HOST_NOT_IN_CLUSTERS_DOMAINS**
  The host is not part of all of the domains the cluster is attached to.

Creating a cluster

Use the **cluster_create** command to create a new cluster.

```
cluster_create cluster=ClusterName [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
cluster	Object name	Name of the cluster to be created.	Y	N/A
domain	N/A	The cluster will be attached to the specified domains. To define more than one domain, separate them with a comma. To attach the cluster to all existing domains, use "*".	N	none

The newly created cluster does not contain hosts, and has the default type, but no mapping.

Example:

```
cluster_create cluster=Cluster1
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CLUSTER_NAME_EXISTS**
  Cluster name already exists
- **MAX_CLUSTERS_REACHED**
  Maximum number of clusters already defined
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Deleting clusters

Use the **cluster_delete** command to delete a cluster.

```
cluster_delete cluster=ClusterName
```

Parameters

Name	Type	Description	Mandatory
cluster	Object name	Cluster to be deleted.	Y

This command deletes a cluster. All hosts contained in the cluster remain active and are not deleted. The special type of each host is set to the cluster's special type. The mapping of each host is set to the cluster's mapping. No I/O interruption is caused by this command.

Example:

```
cluster_delete cluster=Cluster1
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_ASSIGNED_CLUSTER**

  Cluster *Cluster*' has hosts in it. Are you sure you want to delete it?

Return codes

- **CLUSTER_BAD_NAME**

  Cluster name does not exist

Listing clusters

Use the **cluster_list** command to retrieve information about a specific cluster, or about all of them.

```
cluster_list [ cluster=ClusterName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
cluster	Object name	Name of cluster to be listed.	N	All clusters.
domain	Object name	The domain name.	N	All Domains

The output provides each cluster's special type, and comma-separated lists of hosts, users, and user groups.

Example:

```
cluster_list
```

Output:

```
Name       Hosts   Type      Creator           User Group
---------- ------- --------- ----------------- ------------
Cluster1           default   xiv_maintenance
```

Field ID	Field output	Default position
name	Name	1
hosts	Hosts	2
type	Type	3
creator	Creator	4

Field ID	Field output	Default position
user_group	User Group	5

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Removing a host from a cluster

Use the **cluster_remove_host** command to remove a host from a cluster.

```
cluster_remove_host cluster=ClusterName host=HostName
```

Parameters

Name	Type	Description	Mandatory
cluster	Object name	Cluster name.	Y
host	Object name	Host to be removed from cluster.	Y

This command removes the specified host from a cluster. The host then no longer belongs to any cluster. The host's special type and mapping remain identical to the cluster's special type and mapping, and therefore, I/O is not interrupted. The association of the host with user or user groups remains the same as the cluster's association.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**

  Host name does not exist
- **CLUSTER_BAD_NAME**

  Cluster name does not exist
- **HOST_NOT_IN_CLUSTER**

  Host is not part of specified cluster

Renaming clusters

Use the **cluster_rename** command to rename a cluster.

```
cluster_rename cluster=ClusterName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
cluster	Object name	Cluster to be renamed.	Y
new_name	Object name	New name of cluster.	Y

This command renames the specified cluster.

Example:

```
cluster_rename cluster=Cluster1 new_name=Cluster2
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **CLUSTER_NAME_EXISTS**
  Cluster name already exists

Adding a port to a host

Use the **host_add_port** command to add a port address to a host.

```
host_add_port host=HostName < fcaddress=wwpn | iscsi_name=iSCSIName >
```

Parameters

Name	Type	Description	Mandatory
host	Object name	The host name.	Y
fcaddress	N/A	FC address of the added port.	N

Name	Type	Description	Mandatory
iscsi_name	iSCSI initiator name	iSCSI initiator name of the newly added port.	N

The FC port address or iSCSI initiator (port) name assigned to the host must be unique per storage system. The FC port name must be exactly 16 characters long, in hexadecimal format.

Only the following alphanumeric characters are valid: 0-9, A-F, a-f. In addition to the 16 characters, colons (:) may be used as separators in the 16 character port name. The iSCSI initiator name may not exceed 253 characters and may not contain any blank spaces.

Example:

```
host_add_port host=Host1 fcaddress=5001738035C601C0
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**

  Host name does not exist
- **HOST_PORT_EXISTS**

  Host with this port ID already defined
- **ISCSI_HOST_ILLEGAL_PORT_NAME**

  Port name for iSCSI Host is illegal

  Troubleshooting: Port names for iSCSI Hosts must contain only printable characters.
- **MAX_PORTS_REACHED**

  Maximum number of ports already defined in the system
- **TARGET_PORT_BAD_ADDRESS**

  Remote port address is illegal or does not belong to the remote target
- **PORT_EXISTS**

  Port is already defined
- **REMOTE_MAX_VIRTUAL_HOSTS_REACHED**

  Maximum number of remote virtual hosts already defined

Defining a new host

Use the **host_define** command to define a new host to connect to the storage system.

```
host_define host=HostName [ cluster=ClusterName ]
[ iscsi_chap_name=iscsiChapName iscsi_chap_secret=iscsiPass ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	The name of the host to be created.	Y	N/A
cluster	Object name	The name of the cluster to contain the newly created host.	N	No cluster.
iscsi_chap_name	String	The host's CHAP name identifier.	N	none
iscsi_chap_secret	String	The password of the initiator used to authenticate to the system when CHAP is enabled.	N	none
domain	N/A	The domains the cluster will be attached to. To include more than one domain, separate them with a comma. To include all existing domains, use an asterisk ("*").	N	none

The name of the host must be unique in the system.

Use the **host_add_port** command to add port addresses to this host (see Adding a port to a host for details). Specifying the cluster is optional.

The parameters **iscsi_chap_name** and **iscsi_chap_secret** must be either both specified or both unspecified.

If **iscsi_chap_secret** does not conform to the required secret length (96-128 bits), the command will fail.

The command checks whether the **iscsi_chap_name** and **iscsi_chap secret** are unique. In case they are not, an error message is displayed, but the command completes.

The secret has to be between 96 bits and 128 bits. There are 3 ways to enter the secret:

- *Base64*: Requires to prefix the entry with 0b. Each subsequent character entered is treated as a 6-bit equivalent length
- *Hex*: Requires to prefix the entry with 0x. Each subsequent character entered is treated as a 4-bit equivalent length

- *String*: Requires no prefix (cannot be prefixed with 0b or 0x). Each character entered is treated as a 8 bit equivalent length

Example:

```
host_define host=server1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ISCSI_CHAP_NAME_AND_SECRET_NOT_UNIQUE**

  Both iSCSI CHAP name and secret are already used by another host. Are you sure you want to reuse those values?

Return codes

- **HOST_NAME_EXISTS**

  Host name already exists
- **MAX_HOSTS_REACHED**

  Maximum number of hosts already defined
- **CLUSTER_BAD_NAME**

  Cluster name does not exist
- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.
- **HOST_NOT_IN_CLUSTERS_DOMAINS**

  The host is not part of all of the domains the cluster is attached to.

Deleting a host

Use the **host_delete** command to delete a host.

```
host_delete host=HostName
```

Parameters

Name	Type	Description	Mandatory
host	Object name	The host name.	Y

After this command is executed, the deleted host can no longer connect to the system, and I/O requests from this host are not handled.

Example:

```
host_delete host=mailserver
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_HOST**
  Are you sure you want to delete host *Host*?

Return codes

- **HOST_BAD_NAME**
  Host name does not exist

Listing hosts

Use the **host_list** command to list a specific host or all hosts.

```
host_list [ host=HostName ] [ perf_class=perfClassName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	The host name.	N	All hosts.
perf_class	Object name	The name of a performance class.	N	no filter.
domain	Object name	The domain name.	N	All Domains

This command lists all the hosts in the system.

A host name can be specified to list only a specific host or all the hosts.

The list contains the following comma separated information:

- Port addresses
- Containing cluster, if one exists

- Associated users and user groups

Example:

```
host_list host=mailserver
```

Output:

```
Name     Type      FC Ports   iSCSI Ports   User Group   Cluster
-------- --------- ---------- ------------- ------------ ---------
host_4   default              iscsi_4
host_5   default              iscsi_5
host_6   default              iscsi_6
host_7   default              iscsi_7
host_8   default              iscsi_8
host_9   default              iscsi_9
```

Field ID	Field output	Default position
name	Name	1
type	Type	2
fc_ports	FC Ports	3
iscsi_ports	iSCSI Ports	4
creator	Creator	N/A
user_group	User Group	5
cluster	Cluster	6
perf_class	Performance Class	7
iscsi_chap_name	iSCSI CHAP Name	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Listing ports

Use the **host_list_ports** command to list all the ports of a host.

```
host_list_ports host=HostName [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	The host name.	Y	N/A
domain	Object name	The domain name.	N	All Domains

Example:

```
host_list_ports host=tlib_host_pro125_fc0
```

Output:

```
Host                 Type       Port name
--------             ---------  ---------
tlib_host_pro125_fc0 FC         100000062B125CD0
```

Field ID	Field output	Default position
host	Host	1
type	Type	2
port_name	Port Name	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Removing a port from a host

Use the **host_remove_port** command to remove a port from a host.

```
host_remove_port host=HostName < fcaddress=wwpn | iscsi_name=iSCSIName >
```

Parameters

Name	Type	Description	Mandatory
host	Object name	The host name.	Y
fcaddress	N/A	FC address of the port to be removed.	N
iscsi_name	iSCSI initiator name	iSCSI initiator name of the port to be removed.	N

Example:

```
xcli.py host_remove_port host=host1 iscsi_name=iscsi1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **PORT_DOES_NOT_BELONG_TO_HOST**
  Port ID belongs to another host
- **HOST_PORT_DOES_NOT_EXIST**
  Port ID is not defined
- **ISCSI_HOST_ILLEGAL_PORT_NAME**
  Port name for iSCSI Host is illegal
  Troubleshooting: Port names for iSCSI Hosts must contain only printable characters.
- **OLVM_LINK_IS_NOT_UP**
  IBM Hyper-Scale Mobility link is not up. The mapping list cannot be updated.
- **TARGET_PORT_BAD_ADDRESS**
  Remote port address is illegal or does not belong to the remote target
- **HOST_PORT_EXISTS**
  Host with this port ID already defined
- **MAX_PORTS_REACHED**
  Maximum number of ports already defined in the system
- **PORT_EXISTS**
  Port is already defined
- **REMOTE_MAX_VIRTUAL_HOSTS_REACHED**
  Maximum number of remote virtual hosts already defined

Renaming a host

Use the **host_rename** command to rename a host.

```
host_rename host=HostName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
host	Object name	The original host name.	Y
new_name	Object name	The new host name. Must be unique in the system.	Y

The new host name must be unique in the system.

The command still succeeds even if the new name is identical to the current name.

Example:

```
host_rename host=server2 new_name=mailserver
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Storage integration administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Technicians	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_NAME_EXISTS**
  Host name already exists

Updating a host definition

Use the **host_update** command to update a host definition.

```
host_update host=HostName [ iscsi_chap_name=iscsiChapName ] [ iscsi_chap_secret=iscsiPass ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	Name that represents the host to the storage system.	Y	N/A
iscsi_chap_name	String	The host's CHAP name identifier	N	[unchanged]
iscsi_chap_secret	String	The password of the initiator used to authenticate to the storage system when CHAP is enabled	N	[unchanged]

The command carries out the following CHAP-related checks:

- The parameters **iscsi_chap_name** and **iscsi_chap_secret** must be either both specified or both unspecified.

  These parameters have to be unique. In case they are not, an error message is displayed, but the command completes.
- The secret needs to be between 96 bits and 128 bits. There are 3 ways to enter the secret:
  - *Base64*: Requires to prefix the entry with 0b. Each subsequent character entered is treated as a 6-bit equivalent length
  - *Hex*: Requires to prefix the entry with 0x. Each subsequent character entered is treated as a 4-bit equivalent length
  - *String*: Requires no prefix (cannot be prefixed with 0b or 0x). Each character entered is treated as an 8-bit equivalent length
- If **iscsi_chap_secret** does not conform with the required secret length (96-128 bits), the command fails.

Changing the **iscsi_chap_name** and/or **iscsi_chap_secret**:

- A warning message will be displayed stating that the changes will apply only next time the host is connected.

Example:

```
host_update host iscsi_chap_name iscsi_chap_secret
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ISCSI_CHAP_NAME_AND_SECRET_NOT_UNIQUE**

  Both iSCSI CHAP name and secret are already used by another host. Are you sure you want to reuse those values?
- **ISCSI_CHAP_SECRET_NOT_UNIQUE**

  iSCSI CHAP secret is already used by another host. Are you sure you want to reuse this value?
- **ISCSI_CHAP_NAME_NOT_UNIQUE**

  iSCSI CHAP name is already used by another host. Are you sure you want to reuse this value?

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **ISCSI_CHAP_NAME_EMPTY**
  CHAP name should be a non-empty string
- **ISCSI_CHAP_NAME_TOO_LONG**
  CHAP name is too long
- **ISCSI_CHAP_SECRET_EMPTY**
  CHAP secret should be a non-empty string
- **ISCSI_CHAP_SECRET_BAD_SIZE**
  CHAP secret should be 12 to 16 bytes long
- **ISCSI_CHAP_SECRET_BAD_HEX_FORMAT**
  CHAP secret is an illegal hexadecimal number or wrong size - should be 24 to 32 hexadecimal digits

Mapping a volume to a host or cluster

Use the **map_vol** command to map a volume to a host or a cluster.

```
map_vol <host=HostName | cluster=ClusterName> vol=VolName lun=LUN [ override=<no|yes> ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	Host name.	N	N/A
cluster	Object name	Cluster name.	N	N/A
vol	Object name	Volume name.	Y	N/A
lun	Integer	LUN identifier.	Y	N/A
override	Boolean	Override the existing mapping.	N	no

This command maps a volume to a host or to a cluster. It maps the volume to all the hosts that are contained in the cluster.

The command fails if:

- The specified host is contained in a cluster, because in this case the mapping must be done through the cluster.
- Another volume is mapped to the same LUN for this cluster/host, and the **override** parameter is not specified.
  - If the **override** parameter is specified, the mapping is replaced. The host (or all hosts in the cluster) will see continuous mapping of volume to this LUN with a different content, and probably size.
- Mapping to a cluster, if the LUN was defined as an exception.
  - Whenever the LUN is defined as an exception, map it directly to the host.

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	This volume is a snapshot. The master volume of this snapshot is mapped to a host or cluster that is associated with the user executing this command. This snapshot was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_PERFORM_HOST_SPECIFIC_MAPPING**

  '*Host*' is part of a cluster. Are you sure you want to map this volume only for that specific host?
- **ARE_YOU_SURE_YOU_WANT_TO_MAP_VOLUME**

  Are you sure you want to map volume *Volume*, which is already mapped to another host/cluster?

Return codes

- **HOST_BAD_NAME**

  Host name does not exist
- **HOST_BELONGS_TO_CLUSTER**

  Host is part of a cluster
- **CLUSTER_BAD_NAME**

  Cluster name does not exist
- **VOLUME_BAD_NAME**

  Volume name does not exist
- **SNAPSHOT_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified or deleted.
- **VOLUME_ALREADY_ASSIGNED**

  Mapping conflict: volume is already assigned
- **LUN_ALREADY_IN_USE**

  Mapping conflict: LUN is already in use
- **EXT_LUN_ILLEGAL**

  LUN is out of range or does not exist
- **VOLUME_HAS_HOST_SPECIFIC_MAPPING**

  Specified Volume is currently mapped to another LUN in a host-specific mapping
- **LUN_HAS_HOST_SPECIFIC_MAPPING**

  Specified LUN currently has another volume mapped in a host-specific mapping
- **VOLUME_IS_NON_PROXY_OLVM_DESTINATION**

  The volume is in an IBM Hyper-Scale Mobility migration state.
- **ISCSI_HOST_ILLEGAL_PORT_NAME**

  Port name for iSCSI Host is illegal

Troubleshooting: Port names for iSCSI Hosts must contain only printable characters.

- **MAX_PORTS_REACHED**

  Maximum number of ports already defined in the system
- **OLVM_LINK_IS_NOT_UP**

  IBM Hyper-Scale Mobility link is not up. The mapping list cannot be updated.
- **HOST_PORT_EXISTS**

  Host with this port ID already defined
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **REMOTE_MAX_VIRTUAL_HOSTS_REACHED**

  Maximum number of remote virtual hosts already defined

Listing the mapping of volumes to hosts or clusters

Use the **mapping_list** command to list the mapping of volumes to a specified host or cluster.

```
mapping_list [ host=HostName | cluster=ClusterName ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	Host name.	N	N/A
cluster	Object name	Cluster name.	N	N/A
domain	N/A	List of hosts, clusters or domains to show mapping from. To define more than one host, cluster or domain, separate them with a comma. To specify all existing domains, use "*".	N	All user domains.

Field ID	Field output	Default position
lun	LUN	1
volume	Volume	2
proxy	Proxy	3
size	Size	4
master	Master	5
serial	Serial Number	6
locked	Locked	7
host	Host	8

Example:

```
mapping_list host=demo__host_1,demo_host_fc10000006072d0190
```

Output:

```
LUN  Volume           Size   Master  Serial Number   Locked   Host
---- ---------------- ------ ------- --------------- -------- ----------------------------
0    vol-870834-0003  137            3               no       demo_host_fc10000006072d0190
1    vol-870834-0004  137            4               no       demo_host_fc10000006072d0190
2    vol-870834-0005  137            5               no       demo_host_fc10000006072d0190
3    vol-870834-0006  137            6               no       demo_host_fc10000006072d0190
4    vol-870834-0007  34             7               yes      demo_host_fc10000006072d0190
5    vol-870834-0008  34             8               no       demo_host_fc10000006072d0190
6    vol-870834-0010  34             10              no       demo_host_fc10000006072d0190
7    vol-870834-0009  34             9               no       demo_host_fc10000006072d0190
8    vol-870834-0011  34             11              no       demo_host_fc10000006072d0190
9    vol-870837-0004  17             12              no       demo_host_fc10000006072d0190
10   vol-870837-0006  17             13              no       demo_host_fc10000006072d0190
11   vol-870837-0022  17             27              no       demo_host_fc10000006072d0190
12   vol-870837-0024  17             28              no       demo_host_fc10000006072d0190
13   vol-870837-0027  68             31              no       demo_host_fc10000006072d0190
14   vol-870837-0028  86             32              no       demo_host_fc10000006072d0190
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **TOO_MANY_MAPPINGS**
  There are too many mappings to display
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Setting the special type of hosts or clusters

Use the **special_type_set** command to set the special type of a host or a cluster.

```
special_type_set <host=HostName | cluster=ClusterName>  type=<default|hpux|zvm>
```

Parameters

Name	Type	Description	Mandatory
host	Object name	Host name.	N
cluster	Object name	Cluster name.	N
type	Enumeration	Special map type.	Y

The supported special types are `hpux` and `zvm`. The type must be specified for hosts or clusters that run on the HP-UX operating system. All other operating systems do not require a special type.

Note: If you need to modify the **type** parameter, make sure to do it when creating a new host definition. Changing the type when volumes are already attached to the host, will cause loss of access to the host.

Example:

```
special_type_set host=tlib_host_pro26_fc0 type=zvm
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_BELONGS_TO_CLUSTER**
  Host is part of a cluster
- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Listing hosts/clusters to which a volume is mapped

Use the **vol_mapping_list** command to list all hosts and clusters to which a volume is mapped.

```
vol_mapping_list vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Volume name.	Y

This command lists all the hosts and clusters to which a volume is mapped, as well as hosts that are part of a cluster and have host-specific mapping to the volume. The output list contains two columns: name of host/cluster and type (host or cluster).

Field ID	Field output	Default position
host	Host/Cluster	1
type	Type	2
lun	LUN	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist

Unmapping a volume from a host or cluster

Use the **unmap_vol** command to unmap a volume from a host or a cluster.

```
unmap_vol <host=HostName | cluster=ClusterName> vol=VolName [ idle_seconds=IdleSeconds ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	Host name.	N	N/A
cluster	Object name	Cluster name.	N	N/A
vol	Object name	Volume name.	Y	N/A
idle_seconds	Integer	How many seconds the volume needs to be idle before unmapping	N	-1

The command to unmap from a cluster will unmap the volume from all the hosts that are contained in that cluster.

The command fails if the specified host is contained in a cluster. In this case, the unmapping of the host must be performed through the cluster.

The command does not fail when the volume is not mapped to the host/cluster.

Using this command with **unmap_vol_set_default_idle_time**: The default value of the **idle_seconds** parameter can be set before running the **unmap_volume** command.

The command takes some time to process: If the command fails with **VOLUME_NOT_IDLE** (see the return codes below), wait one minute to allow the host to complete background writes, and try again the command.

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The volume is a snapshot, where its master volume is mapped to a host or cluster associated with the user and the snapshot was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **HOST_BAD_NAME**

  Host name does not exist
- **HOST_BELONGS_TO_CLUSTER**

  Host is part of a cluster
- **CLUSTER_BAD_NAME**

  Cluster name does not exist
- **VOLUME_BAD_NAME**

  Volume name does not exist
- **SNAPSHOT_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified or deleted.
- **VOLUME_IS_NON_PROXY_OLVM_DESTINATION**

  The volume is in an IBM Hyper-Scale Mobility migration state.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **OLVM_LINK_IS_NOT_UP**

  IBM Hyper-Scale Mobility link is not up. The mapping list cannot be updated.
- **ISCSI_HOST_ILLEGAL_PORT_NAME**

  Port name for iSCSI Host is illegal

  Troubleshooting: Port names for iSCSI Hosts must contain only printable characters.
- **MAX_PORTS_REACHED**

  Maximum number of ports already defined in the system
- **HOST_PORT_EXISTS**

  Host with this port ID already defined
- **VOLUME_NOT_IDLE**

  Volume was not idle before unmapping. Check connected hosts and idle timeout
- **MAPPING_IS_NOT_DEFINED**

The requested mapping is not defined

- **REMOTE_MAX_VIRTUAL_HOSTS_REACHED**
  Maximum number of remote virtual hosts already defined

Setting the default idle time before unmapping a volume

Use the **unmap_vol_set_default_idle_time** command to set the default idle time required for a volume before unmapping it.

```
unmap_vol_set_default_idle_time idle_time_seconds=IdleSeconds
```

Parameters

Name	Type	Description	Mandatory
idle_time_seconds	Integer	Defines how many seconds the volume needs to be idle before unmapping.	Y

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Creating a performance class

Use the **perf_class_create** command to create a performance class.

```
perf_class_create perf_class=perfClassName [ type=<shared|independent> ]
```

Parameters

Name	Type	Description	Mandatory	Default
perf_class	String	The name of a performance class.	Y	N/A
type	Enumeration	Determines if associated objects will be limited independently or share the same limit.	N	shared

The performance class name must be unique. Up to 1000 classes can be created.

Example:

```
perf_class_create perf_class=p1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **PERF_CLASS_EXISTS**
  Performance Class already exists.
- **MAX_PERF_CLASSES_REACHED**
  Maximum number of Performance Class is already defined.

Deleting a performance class

Use the **perf_class_delete** command to delete a performance class.

```
perf_class_delete perf_class=perfClassName
```

Parameters

Name	Type	Description	Mandatory
perf_class	Object name	Name of a performance class.	Y

Example:

```
perf_class_delete perf_class=p1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_A_PERF_CLASS**

  Are you sure you want to delete Performance Class *Performance Class*?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_A_PERF_CLASS_ASSOCIATED_WITH_HOSTS**

  Deleting Performance Class *Performance Class* will remove the performance limits set for hosts associated with the Performance Class. Are you sure you want to delete Performance Class *Performance Class*?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_A_PERF_CLASS_ASSOCIATED_WITH_POOLS**

  Deleting Performance Class *Performance Class* will remove the performance limits set for pools associated with the Performance Class. Are you sure you want to delete Performance Class *Performance Class*?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_A_PERF_CLASS_ASSOCIATED_WITH_VOLUMES**

  Deleting Performance Class *Performance Class* will remove the performance limits set for volumes associated with the Performance Class. Are you sure you want to delete Performance Class *Performance Class*?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_A_PERF_CLASS_ASSOCIATED_WITH_DOMAINS**

  Deleting Performance Class *Performance Class* will remove the performance limits set for domains associated with the Performance Class. Are you sure you want to delete Performance Class *Performance Class*?

Return codes

- **PERF_CLASS_BAD_NAME**

  Performance Class does not exist

Renaming a performance class

Use the **perf_class_rename** command to rename a performance class.

```
perf_class_rename perf_class=perfClassName
new_name=Name
```

Parameters

Name	Type	Description	Mandatory
perf_class	Object name	The name of an existing performance class.	Y
new_name	String	The new name for the performance class. The class new name must be unique.	Y

Example:

```
perf_class_rename perf_class=p1 new_name=perf1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **PERF_CLASS_EXISTS**
  Performance Class already exists.
- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist

Listing details of performance classes

Use the **perf_class_list** command to list performance classes.

```
perf_class_list [ perf_class=perfClassName ]
```

Parameters

Name	Type	Description	Mandatory	Default
perf_class	String	Name of a performance class. If left unspecified, all performance classes will be listed.	N	All performance classes.

ID	Name	Default Position
name	Performance class	1
max_iops	Max IOPS rate (IOPS)	3
max_bw	Max bandwidth rate (MB/s)	4

Example:

```
perf_class_list
```

Output:

```
Performance class   Max IO rate(IOPOS)   Max BW rate(MB/s)
perf1               0                   0
```

Access control

User Category	Permission
Storage administrator	Allowed

User Category	Permission
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Adding a host to a performance class

Use the **perf_class_add_host** command to add a host to a performance class.

```
perf_class_add_host perf_class=perfClassName host=HostName
```

Parameters

Name	Type	Description	Mandatory
perf_class	Object name	The name of a performance class.	Y
host	Object name	The name of the host to be added to the performance class.	Y

If the host is already associated with another performance class, it will be removed from that performance class.

Example:

```
perf_class_add_host perf_class=p1 host=h1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist
- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_ALREADY_IN_PERF_CLASS**

Host *host* already in Performance Class *Performance Class*.

- **PERF_CLASS_ASSOCIATED_WITH_POOLS_OR_DOMAINS**
  Performance Class *Performance Class* is already in use by pool or domain.

Removing a host from its performance class

Use the **perf_class_remove_host** command to remove a host from its performance class.

```
perf_class_remove_host host=HostName
```

Parameters

Name	Type	Description	Mandatory
host	Object name	The name of the host to be removed from its performance class.	Y

Example:

```
perf_class_remove_host host=h1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **PERF_CLASS_DOES_NOT_CONTAIN_ANY_HOSTS**
  Performance Class is already empty

Adding a pool to a performance class

Use the **perf_class_add_pool** command to add a pool to a performance class.

```
perf_class_add_pool perf_class=perfClassName pool=PoolName
```

Parameters

Name	Type	Description	Mandatory
perf_class	Object name	Name of a performance class	Y
pool	Object name	Name of a pool that will be added to the performance class	Y

If the pool is already associated with another performance class, it will be removed from it.

Example:

```
perf_class_add_pool perf_class=p1 pool=h1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **POOL_ALREADY_IN_PERF_CLASS**
  Pool *pool name* already in Performance Class *Performance Class*.
- **PERF_CLASS_ASSOCIATED_WITH_HOSTS**
  Performance Class *Performance Class* is already in use by host.

Removing a pool from its performance class

Use the **perf_class_remove_pool** command to remove a pool from its performance class.

```
perf_class_remove_pool pool=PoolName
```

Parameters

Name	Type	Description	Mandatory
pool	Object name	The name of the pool to be removed from its performance class.	Y

Example:

```
perf_class_remove_pool pool=h1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **POOL_NOT_CONNECTED_TO_ANY_PERF_CLASS**
  Pool Not connected to any performance class

Adding a domain to a performance class

Use the **perf_class_add_domain** command to add a domain to a performance class.

```
perf_class_add_domain perf_class=perfClassName domain=DomainName
```

Parameters

Name	Type	Description	Mandatory
domain	Object name	The name of the domain to be added to the performance class.	Y
perf_class	Object name	The name of a performance class.	Y

Example:

```
perf_class_add_domain perf_class=perf1 domain=d1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist
- **DOMAIN_ALREADY_IN_PERF_CLASS**
  Domain *domain name* already in Performance Class *Performance Class*.
- **PERF_CLASS_ASSOCIATED_WITH_HOSTS**
  Performance Class *Performance Class* is already in use by host.

Removing a domain from its performance class

Use the **perf_class_remove_domain** command to remove a domain from its performance class.

```
perf_class_remove_domain domain=DomainName
```

Parameters

Name	Type	Description	Mandatory
domain	Object name	The name of the domain to be removed from its performance class.	Y

Example:

```
perf_class_remove_domain domain=d1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **PERF_CLASS_NOT_ASSOC_WITH_DOMAIN**
  The domain is not in any performance class.

Setting the rate for a performance class

Use the **perf_class_set_rate** command to set the rate for a performance class.

```
perf_class_set_rate perf_class=perfClassName [ max_io_rate=iops ] [ max_bw_rate=bw ]
```

Parameters

Name	Type	Description	Mandatory	Default
perf_class	Object name	Name of a performance class.	Y	N/A
max_io_rate	Positive integer	Specifies the performance class maximum rate in IOPS per interface (IOPS). The max setting allowed is 100,000. If zero is specified, the IOPS rate will not be limited.	N	Keep unchanged.
max_bw_rate	Positive integer	Specifies the performance class maximum rate in bandwidth per interface (Mbps). The max setting allowed is 10,000. If zero is specified, the bandwidth rate will not be limited.	N	Keep unchanged.

This command sets the rate for a performance class. The specified rate is applied for each interface module. Either **max_io_rate**, **max_bw_rate** or both must be set.

Example:

```
perf_class_set_rate perf_class=p1 max_io_rate=1000
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist
- **PERF_CLASS_INVALID_RATE**
  The rate set for the Performance Class is invalid

Listing host profiles

Use the **host_profile_list** command to list all host profiles.

```
host_profile_list [ host=HostName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	The name of the specific host whose profiles should be listed	N	>All Host Profiles.
domain	Object name	The domain name.	N	All Domains

The command lists all host profiles or a specific one.

Field ID	Field output	Default position
host_name	Host Name	1
update_time	Update Time	2
profile	Profile	3

Example:

```
host_profile_list host
```

Output:

```
Host Name                  Update Time          Profile
-------------------------- -------------------- ----------------------
host1                      2012-05-09 22:54:36  Windows 7
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Removing the profile of the specified host

Use the **host_profile_clear** command to remove the profile of the specified host.

```
host_profile_clear  host=HostName
```

Parameters

Name	Type	Description	Mandatory
host	Object name	The host name.	Y

Example:

```
host_profile_clear host
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_PROFILE_DOES_NOT_EXIST**
  No profile defined for the requested host

Enabling the host profiler

Use the **host_profiler_enable** command to enable the host profiler functionality.

```
host_profiler_enable
```

Example:

```
host_profiler_enable
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Disabling the host profiler

Use the **host_profiler_disable** command to disable the host profiler functionality.

```
host_profiler_disable
```

Example:

```
host_profiler_disable
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Listing ALUs

Use the **alu_list** command to list all ALU LUNs in the storage system.

```
alu_list [ host=HostName ]  [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	The host name.	N	All hosts.
domain	Object name	The domain name.	N	All Domains

This command returns a list of triplets of **host**, **ALU**, and **lun_id**, optionally filtered by host.

A host name can be specified to list either the specific ALU LUNs exposed by this host, or all ALU LUNs.

The list contains the following comma-separated information:

- ALU name
- Host name
- LUN number

Example:

```
alu_list host
```

Output:

```
Name   Host Name   Lun
------ ----------- -----
alu1    host1       754
```

Field ID	Field output	Default position
name	Name	1
host	Host Name	2
lun	Lun	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing all volumes bound to an ALU

Use the **alu_bind_list** command to list all volumes bound to an ALU.

```
alu_bind_list alu=ALUName
```

Parameters

Name	Type	Description	Mandatory
alu	Object name	The name of the ALU to retrieve information about.	Y

This command returns a list of couples of (**slu_name, slu_lun**), where ALU and SLU are bound. The format of the **slu_lun** is D2YYYYYY0000 (hexadecimal), where YYYYYY is the 24 bits that uniquely identify a bound volume.

Example:

```
alu_bind_list alu
```

Output:

```
SLU Name   SLU LUN
---------- ------------------
v1         0000D20000030000
```

Field ID	Field output	Default position
slu_name	SLU Name	1
slu_lun	SLU LUN	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **ALU_BAD_NAME**

  ALU name does not exist

Listing all ALUs and hosts to which the volume is bound

Use the **vol_bind_list** command to list all ALUs and hosts to which the volume is bound.

```
vol_bind_list vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Volume name.	Y

The list contains **slu_lun**, **alu name**, **alu_lun**, and **host**. The format of the **slu_lun** is D2YYYYYY0000 (hexadecimal), where YYYYYY is the 24 bits, that uniquely identify a bound volume.

Example:

```
vol_bind_list vol=alu_vol
```

Output:

```
SLU Name   SLU LUN
---------- ------------------
v1         0000D20000030000
```

Field ID	Field output	Default position
slu_lun	SLU LUN	1
alu	ALU	2
host	HOST	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist

Chapter 3. Volume management commands

This section describes the command-line interface (CLI) for volume management.

See also:

- Volume snapshot management commands
- Consistency group management commands
- Storage pool management commands

Clearing reservations of a volume

Use the **reservation_clear** command to clear reservations of a volume.

```
reservation_clear  vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The name of the volume to clear reservations of.	Y

Example:

```
reservation_clear vol=Vol1
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist

Listing reservation keys

Use the **reservation_key_list** command to list reservation keys.

```
reservation_key_list [ vol=VolName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The name of the volume whose reservation keys are to be listed.	N	All volumes.

Example:

```
reservation_key_list vol=Vol2
```

Output:

```
Initiator Port     Volume Name        Reservation Key
------------------ ------------------ -----------------
100000062B151C3C   vol-dmathies-0a7   2
100000062B151C3C   vol-dobratz-23a    3
```

Field ID	Field output	Default position
initiator_port	Initiator Port	1
initiator_port_isid	Initiator ISID	2
vol_name	Volume Name	3
reg_key	Reservation Key	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist

Listing volume reservations

Use the **reservation_list** command to list volume reservations.

```
reservation_list  [ vol=VolName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The name of the volume whose reservations are to be listed.	N	All volumes.

Example:

```
reservation_list vol=Vol1
```

Output:

```
Volume Name   Reserving Port   Reservation Type   Persistent
vol1                           none               none

Cont.:

Reservation Type   Persistent Access Type   Initiator UID   PR Generation
                   none                     -1              0
```

Field ID	Field output	Description	Default position
name	Volume Name	N/A	1
reserved_by_port	Reserving Port	N/A	2
reserved_by_port_isid	Reserving ISID	N/A	3
reservation_type	Reservation Type	N/A	4
persistent_reservation_type	Persistent Reservation Type	N/A	5
access_type	Persistent Access Type	N/A	6
reserving_initiator_uid	Initiator UID	uid of reserving host	7
pr_generation	PR Generation	N/A	8
reservation_age	Reservation Age	N/A	9

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist

Finding a volume by its internal index

Use the **vol_by_id** command to print the volume name according to its internal volume index.

```
vol_by_id id=n
```

Parameters

Name	Type	Description	Mandatory
id	Positive integer	SCSI volume ID.	Y

Example:

```
vol_by_id id=59
```

Output:

```
Name     Size (GB) Master Name Consistency Group Pool Creator Used Capacity(GB)
volume_1 51                                                    0
```

Field ID	Field output	Default position
name	Name	1
size	Size (GB)	2
size_MiB	Size (MiB)	N/A
master_name	Master Name	3
cg_name	Consistency Group	4
pool_name	Pool	5
creator	Creator	6
proxy	Proxy	N/A
capacity	Capacity (blocks)	N/A
modified	Modified	N/A
sg_name	Snapshot Group Name	N/A
delete_priority	Deletion Priority	N/A
locked	Locked	N/A
serial	Serial Number	N/A
snapshot_time	Snapshot Creation Time	N/A
snapshot_time_on_master	Master Copy Creation Time	N/A
snapshot_internal_role	Snapshot Internal Role	N/A
snapshot_of	Snapshot of	N/A
sg_snapshot_of	Snapshot of Snap Group	N/A
wwn	WWN	N/A
mirrored	Mirrored	N/A
locked_by_pool	Locked by Pool	N/A
used_capacity	Used Capacity (GB)	7
used_capacity_MiB	Used Capacity (MiB)	N/A
capacity_used_by_ snapshots_MiB	Capacity Used by Snapshots (MiB)	N/A
short_lived_io	Short Live IO	N/A
enable_VAAI	VAAI enabled	N/A
user_disabled_VAAI	VAAI disabled by user	N/A
snapshot_format	Snapshot Format	N/A
ssd_caching	SSD Caching State	N/A
use_ssd_caching_default	Use SSD Caching Default State	N/A
unmap_support	Unmap Support	N/A

Field ID	Field output	Default position
managed	Managed	N/A
enable_unmap	unmap enabled	N/A
user_disabled_ unmap	unmap disabled by user	N/A
marked	Marked	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_SERIAL**

  Volume with requested SCSI serial number does not exist

Copying volumes

Use the **vol_copy** command to copy a source volume onto a target volume.

```
vol_copy vol_src=VolName vol_trg=VolName
```

Parameters

Name	Type	Description	Mandatory
vol_src	Object name	Name of the source volume from which the data is to be taken.	Y
vol_trg	Object name	Name of the target volume to which the data is to be copied.	Y

This command copies a source volume onto a target volume.

All data stored on the target volume is lost and cannot be restored.

This command performs the following as a single atomic action:

- Deletes the target volume.
- Creates a new volume with the same name as the target volume and the same size as the source volume.
- Instantly copies the source volume data onto the target volume.

All volume-to-host mappings of the target volume remain intact during this process. Except for its size, the target volume retains all of its properties, including its name, ID, lock state, creation time and all other attributes.

Immediately after the completion of the command, the volumes are independent of each other and are valid for any further operations (including deletion).

If the target volume is larger then the source volume, excess storage space is freed and returned to the target volume's storage pool. If the target volume is smaller than the source volume, all storage space that is needed to support the additional volume's capacity is reserved from the storage pool.

The command fails in the following cases:

- The target is not formatted.
- The source volume is larger than the target volume, and there is not enough free space in the storage pool that contains the target for target volume resizing.
- The target volume has a snapshot associated with it or if the target volume is a snapshot.
- The target volume is locked.
- The target volume is part of any mirroring definitions (either master or slave).
- The source volume is a slave of a synchronous mirroring, and it is currently inconsistent due to either a re-synchronization or an initialization process.
- There is not enough free space in the storage pool that contains the target.

In the following example, the -y option suppresses the **ARE_YOU_SURE_YOU_WANT_TO_COPY_VOLUME Y/N** prompt.

Example:

```
vol_copy vol_src=DBVolume vol_trg=DBVolumeCopy
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_COPY_VOLUME**

  Are you sure you want to copy the contents of volume *source Volume* to volume *target Volume*?

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_COPY_VOLUME**

  Are you sure you want to copy the contents of volume *source Volume* to volume *target Volume*?

Return codes

- **NOT_ENOUGH_HARD_SPACE**
  No space to allocate for volume's current usage
- **NOT_ENOUGH_SPACE**
  No space to allocate for volume's current usage
- **SOURCE_VOLUME_BAD_NAME**
  Source volume name does not exist
- **SOURCE_VOLUME_DATA_MIGRATION_UNSYNCHRONIZED**
  Data Migration has not completed to source volume
- **TARGET_VOLUME_BAD_NAME**
  Target volume name does not exist
- **TARGET_VOLUME_LOCKED**
  Target volume is locked
- **TARGET_VOLUME_HAS_MIRROR**
  Mirror is defined for target volume
- **TARGET_VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for target volume
- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots
- **VOLUME_IDENTICAL**
  Source and target are the same volume
- **VOLUME_HAS_SNAPSHOTS**
  Volume has snapshots
- **VOLUME_IS_NOT_CONSISTENT_SLAVE**
  Operation not allowed on slave volume that is not consistent.
- **TARGET_VOLUME_NOT_FORMATTED**
  Target volume is not formatted
- **SNAPSHOT_IS_FORMATTED**
  Snapshot is formatted
- **VOLUME_TOO_BIG_TO_COPY**
  Volume is too large to be copied
- **TARGET_VOLUME_HAS_OLVM**
  This target volume is part of an IBM Hyper-Scale Mobility relation.
- **VOLUME_IS_OLVM_PROXY**
  The volume is in an IBM Hyper-Scale Mobility Proxy phase.
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Creating a volume

Use the **vol_create** command to create a new volume.

```
vol_create vol=VolName < size=GB | size_blocks=BLOCKS > pool=PoolName  [ ext_id=Identifier ]
 [ perf_class=perfClassName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Volume name.	Y	N/A
size	Positive integer	Volume size in GB.	N	N/A
size_blocks	Positive integer	Size in number of blocks.	N	N/A
pool	Object name	The name of the storage pool to which the volume belongs.	Y	N/A
ext_id	String	External identifier of the volume.	N	N/A

This command is used to create a new volume. The name of the volume must be unique in the system.

The space for the volume is allocated from the specified storage pool and the volume belongs to that storage pool. Specifying the storage pool is mandatory.

When creating a volume, the storage space that is needed to support the volume's capacity is reserved from the capacity of the storage pool for the volume. The command fails if the reservation cannot be committed.

Volumes are created in increments of approximately 1 GB. In some cases, rounding of up to 5% of the size can take place. The size is the actual "net" storage space, as seen by the user's applications, not including any mirroring or other data protection overhead.

The volume is logically formatted at the creation time, which means that any read operation results in returning all zeros as a response.

Upon successful completion of the command, its lock state is *unlocked*, meaning that write, format and resize operations are allowed.

The creation time of the volume is set to the current time and is never changed.

Example:

```
vol_create vol=DBVolume size=2000 pool=DBPool
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed

User Category	Permission
Host side accelerator client	Disallowed

Return codes

- **VOLUME_CANNOT_HAVE_ZERO_SIZE**
  Volume size cannot be zero
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **VOLUME_EXISTS**
  Volume name already exists
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **NOT_ENOUGH_SPACE**
  No space to allocate volume
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **ELECTRONIC_LICENSE_NOT_APPROVED**
  Operation blocked until Electronic license approval
  Troubleshooting: Please retrieve Electronic license version and accept it
- **VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit
- **INVALID_SLICE_OFFSET**
  Slice offset is illegal
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **ENCRYPTION_IN_PROGRESS**
  System is in the process of changing encryption activation state
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.

Deleting a volume

Use the **vol_delete** command to delete a volume.

```
vol_delete vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Name of the volume to delete.	Y

After deletion, all data stored on the volume is lost and cannot be restored.

This command cannot be applied to a snapshot. To delete a snapshot, use Deleting a snapshot.

The volume is removed from all LUN maps that contain its mapping

This command deletes all snapshots associated with this volume. Even snapshots that are part of a snapshot group (this can happen when the volume was in a consistency group and was removed from it prior to the deletion).

This command cannot be applied to a volume that is part of a consistency group or to a volume that is mapped to a host or cluster.

The command succeeds regardless of the volume's lock state.

Example:

```
vol_delete vol=DBVolumeCopy
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_VOLUME**
  Are you sure you want to delete volume *Volume*?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_VOLUME_WITH_SNAPSHOTS**
  Volume *Volume* has snapshots! Are you sure you want to delete this volume AND all its snapshots?

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_HAS_MIRROR**
  Mirror is defined for this volume
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **SNAPSHOT_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified or deleted.
- **VOLUME_BELONGS_TO_CG**
  Volume belongs to a Consistency Group
- **VOLUME_IS_MAPPED**
  Volume that is mapped to a host cannot be deleted

- **VOLUME_IS_BOUND**

  Volume is bound to a ALU

  Troubleshooting: Unbound the volume from the ALU
- **VOLUME_HAS_MAPPED_SNAPSHOT**

  Volume which has a snapshot that is mapped to a host cannot be deleted
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**

  Snapshot is currently a target of an active sync job

  Troubleshooting: Please wait for sync job to complete
- **SNAPSHOT_IS_CONSISTENT_ELCS**

  If a mirrored volume is not consistent then its ELCS is protected and cannot be deleted.
- **VOLUME_HAS_OLVM**

  IBM Hyper-Scale Mobility relation is defined for this volume
- **VOLUME_IS_OLVM_PROXY**

  The volume is in an IBM Hyper-Scale Mobility Proxy phase.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **VOLUME_HAS_DATA_MIGRATION**

  Data Migration is defined for this volume

Formatting a volume

Use the **vol_format** command to formats a volume.

```
vol_format vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Name of the volume to be formatted.	Y

A formatted volume returns zeros as a response to any read command.

All data stored on the volume is lost and cannot be restored.

The formatting of the volume is done logically and no data is actually written to the physical storage space allocated for the volume. This allows the command to complete instantly.

The volume's lock state must be unlocked when the command is issued.

This command fails if the volume has snapshots associated with it, or if the volume is a snapshot, or if the volume is part of any mirroring or data migration definition.

Example:

```
vol_format vol=DBVolume
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_FORMAT_VOLUME**

  Volume *Volume* may contain data. Formatting will cause data loss. Are you sure you want to format volume *Volume*?

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_HAS_SNAPSHOTS**

  Volume has snapshots
- **VOLUME_IS_SNAPSHOT**

  Operation is not permitted on snapshots
- **VOLUME_LOCKED**

  Volume is locked
- **VOLUME_HAS_MIRROR**

  Mirror is defined for this volume
- **VOLUME_HAS_DATA_MIGRATION**

  Data Migration is defined for this volume
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Listing volumes

Use the **vol_list** command to list all volumes or a specific one.

```
vol_list [ vol=VolName | pool=PoolName | cg=cgName ] [ show_proxy=<yes|no> ]
[ managed=<yes|no|all> ] [ domain=DomainName ] [ wwn=WWNString ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Name of a specific volume to be listed.	N	All volumes.

Name	Type	Description	Mandatory	Default
pool	Object name	Name of a specific pool whose volumes are to be listed.	N	Volumes in all Pools.
cg	Object name	List all the volumes in this consistency group.	N	All Consistency Groups.
show_proxy	Boolean	Returns data on proxy volumes (volumes in Proxy state) as well.	N	No
managed	Boolean	Filter only volumes that are or are not managed.	N	no.
domain	Object name	The domain name.	N	All Domains
wwn	String	The WWN as a hexadecimal string	N	""

This command lists volumes according to:

- Volume name
- Pool
- Consistency Group
- WWN

If no parameter is indicated, the command lists all the available volumes. In addition, the command indicates whether the volume is mirrored.

This command displays the following VAAI fields (available in the XML output format):

- **enable_VAAI**
- **user_disabled_VAAI**

This command displays the following snapshot format field (available in the XML output format):

- **snapshot_format**

Example:

```
vol_list
```

Output:

```
Name               Size (GB) Master Name Pool      Creator  Used Capacity (GB)
DBLog              3006                  MainPool  admin    0
Dev                2010                  MainPool  admin    0
Marketing          1013                  MainPool  admin    0
Dev.snapshot_00001 2010      Dev         MainPool  admin
Dev.snapshot_00002 2010      Dev         MainPool  admin
Dev.snapshot_00003 2010      Dev         MainPool  admin
```

Field ID	Field output	Default position
name	Name	1
size	Size (GB)	2

Field ID	Field output	Default position
size_MiB	Size (MiB)	N/A
master_name	Master Name	3
cg_name	Consistency Group	4
pool_name	Pool	5
creator	Creator	6
proxy	Proxy	N/A
capacity	Capacity (blocks)	N/A
modified	Modified	N/A
sg_name	Snapshot Group Name	N/A
delete_priority	Deletion Priority	N/A
locked	Locked	N/A
serial	Serial Number	N/A
snapshot_time	Snapshot Creation Time	N/A
snapshot_time_on_master	Master Copy Creation Time	N/A
snapshot_internal_role	Snapshot Internal Role	N/A
snapshot_of	Snapshot of	N/A
sg_snapshot_of	Snapshot of Snap Group	N/A
wwn	WWN	N/A
mirrored	Mirrored	N/A
locked_by_pool	Locked by Pool	N/A
used_capacity	Used Capacity (GB)	7
capacity_used_by_ snapshots_MiB	Capacity Used by Snapshots (MiB)	N/A
short_lived_io	Short Live IO	N/A
enable_VAAI	VAAI enabled	N/A
user_disabled_VAAI	VAAI disabled by user	N/A
snapshot_format	Snapshot Format	N/A
ssd_caching	SSD Caching State	N/A
use_ssd_caching_default	Use SSD Caching Default State	N/A
unmap_support	Unmap Support	N/A
managed	Managed	N/A
enable_unmap	unmap enabled	N/A
user_disabled_unmap	unmap disabled by user	N/A
marked	Marked	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Locking a volume

Use the **vol_lock** command to lock a volume so that it is read-only.

```
vol_lock vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Name of the volume to lock.	Y

This command locks a volume so that hosts cannot write to it.

A volume that is locked is write-protected, so that hosts can read the data stored on it, but cannot change it. In addition, a locked volume cannot be formatted or resized. In general, locking a volume prevents any operation (other than deletion) that changes the volume's image.

This command succeeds when the volume's lock state is already set to the one the user is trying to apply. In this case, the lock state remains unchanged.

The lock state of a master volume is set to *unlocked* when a master volume is created.

The lock state of a snapshot is set to *locked* when a snapshot is created.

In addition to the lock state, snapshots also have a modification state. The modification state is a read-only state (which cannot be changed by the user explicitly) and it is initially set to *unmodified* when the snapshot is created. The first time a snapshot lock state is set to *unlocked*, the modification state of the snapshot is changed to *modified*, and it is never changed thereafter.

Example:

```
vol_lock vol=DBVolume
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The volume is a snapshot, where its master volume is mapped to a host or cluster associated with the user and the snapshot was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A

User Category	Permission	Condition
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified or deleted.
- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_IS_SLAVE**
  Volume is defined as a slave volume
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Renaming a volume

Use the **vol_rename** command to rename a volume.

```
vol_rename vol=VolName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Name of the volume to be renamed.	Y
new_name	Object name	New volume name.	Y

The new name of the volume must be unique in the system.

This command succeeds even if the new name is identical to the current name. It also succeeds regardless of the volume's lock state.

Renaming a snapshot does not change the name of its master volume. Renaming a master volume does not change the names of its associated snapshots.

Example:

```
vol_rename vol=DBVolume new_name=DBVolume1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The volume is a snapshot, where its master volume is mapped to a host or cluster associated with the user and the snapshot was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_EXISTS**

  Volume name already exists
- **SNAPSHOT_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified or deleted.
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**

  Snapshot is part of a Snapshot Group
- **VOLUME_BAD_PREFIX**

  Volume name has a reserved prefix
- **SNAPSHOT_IS_CONSISTENT_ELCS**

  If a mirrored volume is not consistent then its ELCS is protected and cannot be deleted.
- **OLVM_ERROR**

  IBM Hyper-Scale Mobility error.
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_VOLUMES**

  This command is not supported for IBM Hyper-Scale Mobility volumes.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Resizing a volume

Use the **vol_resize** command to resize a volume.

```
vol_resize vol=VolName  < size=GB | size_blocks=BLOCKS >
[ shrink_volume=<yes|no> ] [ force_on_inactive_mirror=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The name of the volume to be resized.	Y	N/A

Name	Type	Description	Mandatory	Default
size	N/A	The new volume size.	N	N/A
size_blocks	N/A	New size of volumes in number of blocks.	N	N/A
shrink_volume	Boolean	Must be specified as yes if the new size is smaller than the current size.	N	No
force_on_ inactive_mirror	Boolean	The parameter is required for a successful resize of a volume if (1) the volume is mirrored, (2) the volume is a master, and (3) the mirror has been deactivated by the system following a previously issued resize command that failed to successfully complete due to a communication error.	N	No

The volume can be resized in either direction. However, whenever the volume is downsized, you have to specify this with **shrink_volume=yes**.

The new size of the volume is rounded up in increments of approximately 1 GB. In some cases, rounding of up to 5% of the size can take place.

If the new size equals the current size, the command succeeds without changes to the volume.

The volume's address space is extended at its end to reflect the increased size, and the additional capacity is logically formatted (that is, zeros are returned for all read commands).

When resizing a regular volume (not a writable snapshot), all storage space that is needed to support the additional volume's capacity is reserved (static allocation). This guarantees the functionality and integrity of the volume, regardless of the resource levels of the volume's storage pool. The command fails if this reservation cannot be committed.

The volume's lock state must be unlocked when the command is issued, or otherwise the command fails.

- Resizing a master volume does not change the size of its associated snapshots.
- These snapshots can still be used to restore their individual master volumes.
- A snapshot is resized in a similar way: the resize does not change the size of its master volume.

In the following example, the *-y* option suppresses the **ARE_YOU_SURE_YOU_WANT_TO_ENLARGE_VOLUME Y/N** prompt.

Example:

```
vol_resize -y vol=DBVolume size=2500
```

Using the **force_on_inactive_mirror** parameter:

- This parameter forces the resizing of a mirror peer even if mirroring is inactive (this may happen when the mirroring cannot be activated due to size mismatch).

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_ENLARGE_VOLUME**

  Are you sure you want to increase volume size?
- **ARE_YOU_SURE_YOU_WANT_TO_REDUCE_VOLUME**

  Decreasing volume size may cause data loss. Are you sure you want to proceed?
- **VOLUME_WILL_CROSS_1TB_SIZE**

  Many operating systems do not support a resize operation across the 1TB boundary, are you sure?

  Troubleshooting: Snapshot backup before resize is advised

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **ILLEGAL_VOLUME_SIZE**

  Illegal volume size
- **NOT_ENOUGH_SPACE**

  No space to allocate volume
- **REMOTE_VOLUME_SIZE_ABOVE_LIMIT**

  Volume size specified is above limit of remote machine
- **VOLUME_LOCKED**

  Volume is locked
- **VOLUME_HAS_DATA_MIGRATION**

  Data Migration is defined for this volume
- **CAN_NOT_SHRINK_MAPPED_VOLUME**

  Mapped volume's size cannot be decreased

- **CAN_NOT_SHRINK_VOLUME_WITH_SNAPSHOTS**
  Size of volume with snapshots cannot be decreased
- **CAN_NOT_SHRINK_REMOTE_VOLUME_WITH_SNAPSHOTS**
  Remote volume has snapshots
- **CAN_NOT_SHRINK_MAPPED_REMOTE_VOLUME**
  Remote volume is mapped
- **VOLUME_IS_BOUND**
  Volume is bound to a ALU
  Troubleshooting: Unbound the volume from the ALU
- **REMOTE_VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for slave volume
- **VOLUME_CANNOT_HAVE_ZERO_SIZE**
  Volume size cannot be zero
- **CAN_NOT_SHRINK_SNAPSHOTS**
  Size of snapshots cannot be decreased
- **CAN_NOT_RESIZE_ASYNC_INTERVAL_VOLUMES**
  Size of volumes with asynchronous mirroring cannot be changed
- **CAN_NOT_SHRINK_VOLUME**
  Size of volumes cannot be decreased without explicit request
- **MIRROR_SIZE_MISMATCH**
  Slave volume and Master Volume sizes are different
- **MIRROR_POSSIBLE_SIZE_MISMATCH**
  Slave volume and Master Volume sizes may be different. This problem occurs whenever the Master does not receive an acknowledgment from the Slave until the command timed out, or any other unexpected failure.
- **VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_VOLUMES**
  This command is not supported for IBM Hyper-Scale Mobility volumes.
- **MIRROR_IS_NON_OPERATIONAL**
  Mirror is non-operational
- **VOLUME_IS_SLAVE**
  Volume is defined as a slave volume
- **MIRROR_RETRY_OPERATION**
  There is an operation in progress on this mirror , please try again your request in a few seconds
  Troubleshooting: Please try again the command in a few seconds
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  Volume has multiple mirrors, operation not allowed or target must be specified
- **REMOTE_MIRROR_IS_STANDBY**
  Remote mirror is marked as standby

Unlocking a volume

Use the **vol_unlock** command to unlock a volume, so that it is no longer read-only and can be written to.

```
vol_unlock vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The name of the volume to unlock.	Y

An unlocked volume is no longer write-protected.

The lock state of regular volumes is set to *unlocked* when they are created. The lock state of snapshots is set to *locked* when they are created.

In addition to the lock state, snapshots also have a modification state. The modification state is a read-only state (which cannot be changed by the user explicitly) and it is initially set to *unmodified* when the snapshot is created. The first time a snapshot lock state is set to *unlocked*, the modification state of the snapshot is changed to *modified*, and it is never changed thereafter.

The modification time is the time when the unlock command was executed, regardless of the actual changes performed on the volume via write commands.

If applied on a volume that is part of an IBM Hyper-Scale Mobility relation, the command has to be acknowledged by both source and destination volumes. Otherwise, a completion code is returned (see below).

Example:

```
vol_unlock vol=DBVolume
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The volume is a snapshot, where its master volume is mapped to a host or cluster associated with the user and the snapshot was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_UNLOCK_SNAPSHOT**

  Are you sure you want to unlock snapshot *Snapshot*?

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_IS_SLAVE**

  Volume is defined as a slave volume
- **SNAPSHOT_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified or deleted.
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**

  Snapshot is part of a Snapshot Group
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Displaying the difference of allocated partitions between two volumes

Use the **vol_diff** command to display the allocated partitions' difference between two volumes.

```
vol_diff  vol_src=VolName vol_trg=VolName offset=Offset count=N
```

Parameters

Name	Type	Description	Mandatory
vol_src	Object name	Name of the first volume.	Y
vol_trg	Object name	Name of the second volume.	Y
count	Integer	Number of partitions to check.	Y
offset	Integer	First partition to check.	Y

The result shows the different count partitions from the starting partition as an array of integers, each integer representing a bitmap of 8 partitions.

Example:

```
vol_diff  vol_src=v1 vol_trg=v2 offset=10 count=120
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed

User Category	Permission
Host side accelerator client	Disallowed

Return codes

- **SOURCE_VOLUME_BAD_NAME**

  Source volume name does not exist
- **TARGET_VOLUME_BAD_NAME**

  Target volume name does not exist
- **VOLUMES_TO_COMPARE_ARE_NOT_RELATED**

  The source volume and target volume are not of the same dynasty and therefore XIV cannot compute the difference between them.
- **INVALID_COUNT**

  The offset plus count is beyond the volume address space
- **INVALID_OFFSET**

  Specified partition offset is beyond the volume address space.
- **VOLUME_IDENTICAL**

  Source and target are the same volume

Chapter 4. Volume snapshot management commands

This section describes the command-line interface (CLI) for snapshot management.

See also:

- Volume management commands
- Consistency group management commands
- Storage pool management commands

Changing a snapshot deletion priority

Use the **snapshot_change_priority** command to change a snapshot's deletion priority.

```
snapshot_change_priority snapshot=SnapshotName  delete_priority=del_value
```

Parameters

Name	Type	Description	Mandatory
snapshot	Object name	Name of the snapshot whose delete_priority is to be changed.	Y
delete_priority	Integer	The priority for deleting the volume's snapshot.	Y

This command changes the priority of the deletion of an existing snapshot. The deletion priority determines which snapshots are deleted first when the system runs out of snapshot storage.

The Auto Delete Priority can have a value between 1 and 4, as follows:

- 1 = Is the last to be deleted automatically ("1" is the default set by the system)
- ...
- 4 = Is the first to be deleted automatically

Example:

```
snapshot_change_priority snapshot=DBVolume.snapshot1 delete_priority=4
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	The master volume of the snapshot is mapped to a host or cluster associated with the user and the snapshot was created by the application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **VOLUME_IS_NOT_A_SNAPSHOT**

  Operation is permitted only on snapshots
- **SNAPSHOT_ILLEGAL_PRIORITY**

  Illegal snapshot priority; must be an integer between 1 and 4.
- **SNAPSHOT_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified or deleted.
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**

  Snapshot is part of a Snapshot Group
- **VOLUME_BAD_NAME**

  Volume name does not exist
- **SNAPSHOT_IS_CONSISTENT_ELCS**

  If a mirrored volume is not consistent then its ELCS is protected and cannot be deleted.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Creating a snapshot

Use the **snapshot_create** command to create a snapshot of an existing volume.

```
snapshot_create vol=VolName < [ name=Name ]
[ delete_priority=del_value ] > | < overwrite=Name > [ ext_id=Identifier ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Name of the volumes to snapshot.	Y	N/A
name	Object name	Names of the new snapshots.	N	Auto-generated names.
delete_priority	Integer	The deletion priority of the volume's snapshot.	N	1
overwrite	Object name	Name of an existing snapshots to be overwritten with the current volumes content.	N	N/A

Name	Type	Description	Mandatory	Default
ext_id	String	External identifier of the volume.	N	N/A

This command creates a new snapshot for an existing volume, which is referred to as the snapshot's master volume. The snapshot's content is the same as the master volume at the exact point in time when the snapshot was created. The snapshot remains unchanged, although the master volume keeps changing after the snapshot is created. Upon a successful completion of this command, the snapshot is created and assigned a name that can later be used by other commands. The name does not have to be new. It can be the name of an already existing snapshot (in such a case, the already existing snapshot is overridden).

A write operation can be processed at the exact time of the snapshot creation, meaning that the write operation request was sent to the system before the command was executed, while the write was acknowledged after the command was executed. In this case, the content of the snapshot is not deterministic and may either contain the original value before the write operation, or the new value after the write operation. In fact, the snapshot's data may even contain a mixture of the two, where some blocks are equal to the volume before the write operation and other blocks are equal to the value after the write operation.

The new snapshot is initially locked for changes.

The created snapshot acts like a regular volume, except for the differences described below:

- The snapshot's name is either automatically generated from its master volume's name or given as a parameter to the command. It can later be changed without altering the snapshot's modification state.
- Upon successful completion of the command, the system assigns a unique SCSI ID to the snapshot. The creation time of the snapshot is set to the current time and is never changed until the snapshot is deleted.
- The size of the snapshot is the same as its master volume's size, but no storage space is reserved for the snapshot. This means that the functionality of the snapshot is not guaranteed. When the snapshot's storage pool is exhausted, the snapshot may be deleted.
- The snapshot's lock state is initially set to "locked", and as long as it is not "unlocked", the snapshot remains an exact image of the master volume at creation time and can be the source for a restore operation. The modification state of the snapshot is initially set to "unmodified".

During creation, the snapshot's deletion priority can be set explicitly, or it is automatically set to the default value. The deletion priority determines which snapshots will be deleted first when the storage pool runs out of snapshot storage. This may happen due to the redirect-on-write mechanisms which share unchanged data between volumes and their snapshots, as well as between snapshots of the same volume.

The Auto Delete Priority can have a value between 1 and 4, as follows:

- 1 = Is last to be deleted automatically ("1" is the default set by the system)
- ...
- 4 = Is first to be deleted automatically

The snapshot is associated with its master volume and this association cannot be broken or changed as long as the snapshot exists.

The `overwrite` option copies the current content of the volume into one of its existing snapshots (set as an input argument). The overwritten snapshot keeps the same SCSI device WWN and same mapping, so hosts maintain a continuous mapping to the snapshot, without any need for a rescan or similar operation. The overwritten snapshot must be an existing snapshot of the given volume. The overwritten snapshot cannot be part of a snapshot group.

This command fails when no snapshot space is defined in the storage pool the master volume belongs to.

Mirroring limitations:

- This command fails if the volume is a slave of an asynchronous mirroring coupling.
- This command fails if the volume is a slave of an inconsistent synchronous coupling.

Example:

```
snapshot_create vol=DBVolume name=DBVolume.snapshot1 delete_priority=2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The volume is mapped to a host or a cluster associated with the user. If a snapshot overwrite is used, the target snapshot must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined
- **DOMAIN_MAX_VOLUMES_REACHED**

  The domain exceeds the maximum allowed number of volumes.
- **SNAPSHOT_ILLEGAL_PRIORITY**

  Illegal snapshot priority; must be an integer between 1 and 4.

- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots
- **VOLUME_EXISTS**
  Volume name already exists
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **VOLUME_DATA_MIGRATION_UNSYNCHRONIZED**
  Data Migration has not completed to this volume
- **OVERWRITE_SNAPSHOT_BAD_NAME**
  Snapshot name does not exist
- **OVERWRITE_SNAPSHOT_IS_MASTER_VOL**
  This snapshot cannot be overwritten as it is a master volume.
- **SNAPSHOT_OVERWRITE_MISMATCH**
  Specified snapshot is not a snapshot of the specified volume
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **SNAPSHOT_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified or deleted.
- **POOL_SNAPSHOT_LIMIT_REACHED**
  There is not enough space to create a snapshot.
- **VOLUME_IS_NOT_CONSISTENT_SLAVE**
  Operation not allowed on slave volume that is not consistent.
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**
  Snapshot is currently a target of an active sync job
  Troubleshooting: Please wait for sync job to complete
- **TOO_MANY_FAST_SNAPSHOTS_IN_VOLUME**
  Max number of fast snapshots for this volume already exist
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **NUM_VOLUMES_WILL_EXCEED_MAXIMUM**
  Can not create all the volumes, as the num of volumes will exceed its maximum value.
- **DOMAIN_WILL_EXCEED_MAXIMUM_VOLUMES_ALLOWED**
  Can not create all of the volumes, as the domain will exceed the maximum allowed number of volumes.

Deleting a snapshot

Use the **snapshot_delete** command to delete a snapshot.

```
snapshot_delete snapshot=SnapshotName
```

Parameters

Name	Type	Description	Mandatory
snapshot	Object name	Snapshot to be deleted.	Y

This command cannot be used to delete a master volume, or a snapshot which is mapped to a host or cluster, or an internal snapshot of a mirroring.

Example:

```
snapshot_delete snapshot=DBVolume.snapshot1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The master volume of the snapshot is mapped to a host or cluster associated with the user and the snapshot was created by the application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_IS_NOT_A_SNAPSHOT**

  Operation is permitted only on snapshots
- **SNAPSHOT_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified or deleted.
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**

  Snapshot is part of a Snapshot Group
- **SNAPSHOT_IS_MAPPED**

  Snapshot that is mapped to a host cannot be deleted
- **VOLUME_IS_BOUND**

  Volume is bound to a ALU

  Troubleshooting: Unbound the volume from the ALU
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**

  Snapshot is currently a target of an active sync job

  Troubleshooting: Please wait for sync job to complete
- **SNAPSHOT_IS_CONSISTENT_ELCS**

  If a mirrored volume is not consistent then its ELCS is protected and cannot be deleted.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Duplicating a snapshot

Use the **snapshot_duplicate** command to duplicate an existing snapshot.

```
snapshot_duplicate snapshot=SnapshotName [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
snapshot	Object name	The name of the snapshot to duplicate.	Y	N/A
name	Object name	Name of the new snapshot to be generated.	N	Automatically generated name.

The newly created snapshot is initially locked for changes and is associated with the master volume of the existing snapshot. The content of the newly created snapshot is identical with the content of the source snapshot.

It is useful to duplicate a snapshot before unlocking it for write operations. The duplicate snapshot can be used as a logical backup of the data in case the write operation caused logical data corruption.

Upon successful completion of the command, a new duplicate snapshot is created.

The duplicated snapshot is identical with the source snapshot. It has the same creation time and behaves as if it was created at the exact same moment and from the same master volume.

The duplicate snapshot's name is either automatically generated from its master volume's name or provided as a parameter. It can later be changed without altering its modification state.

A snapshot can be duplicated multiple times. A duplicated snapshot can be the source for further duplications.

Example:

```
snapshot_duplicate snapshot=DBVolume.snapshot1 name=DBVolume.snapshot1.copy
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The master volume of the snapshot is mapped to a host or cluster associated with the user and the snapshot was created by the application administrator.

User Category	Permission	Condition
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.
- **VOLUME_IS_NOT_A_SNAPSHOT**
  Operation is permitted only on snapshots
- **VOLUME_EXISTS**
  Volume name already exists
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Formatting a snapshot

Use the **snapshot_format** command to format a snapshot.

```
snapshot_format snapshot=SnapshotName
```

Parameters

Name	Type	Description	Mandatory
snapshot	Object name	The snapshot to be formatted.	Y

This command deletes the content of a snapshot while maintaining its mapping to the host. The format operation results with:

- The formatted snapshot is read-only
- The format operation has no impact on performance
- The formatted snapshot does not consume space
- Reading from the formatted snapshot always returns zeroes
- The formatted snapshot can be overridden
- The formatted snapshot can be deleted
- The formatted snapshot deletion priority can be changed

Example:

```
snapshot_format snapshot
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**
  Snapshot is currently a target of an active sync job
  Troubleshooting: Please wait for sync job to complete
- **VOLUME_BAD_NAME**
  Volume name does not exist
- **SNAPSHOT_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified or deleted.
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **SNAPSHOT_IS_FORMATTED**
  Snapshot is formatted
- **ELCS_CANNOT_BE_FORMATTED**
  The snapshot is an ELCS and cannot be formatted.
- **VOLUME_IS_NOT_A_SNAPSHOT**
  Operation is permitted only on snapshots
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Listing snapshot information

Use the **snapshot_list** command to list snapshot information.

```
snapshot_list vol=VolName [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	List of all the snapshots of this volume.	Y	N/A
domain	Object name	The domain name.	N	All Domains

This command lists snapshot information for all the snapshots of a specified volume.

It displays the following VAAI fields (available in XML output format):

- **enable_VAAI**
- **user_disabled_VAAI**

The command displays the following snapshot format field (available in XML output format):

- **snapshot_format**

Field ID	Field output	Default position
name	Name	1
size	Size (GB)	2
size_MiB	Size (MiB)	N/A
master_name	Master Name	3
cg_name	Consistency Group	4
pool_name	Pool	5
creator	Creator	6
proxy	Proxy	N/A
capacity	Capacity (blocks)	N/A
modified	Modified	N/A
sg_name	Snapshot Group Name	N/A
delete_priority	Deletion Priority	N/A
locked	Locked	N/A
serial	Serial Number	N/A
snapshot_time	Snapshot Creation Time	N/A
snapshot_time_on_master	Master Copy Creation Time	N/A
snapshot_internal_role	Snapshot Internal Role	N/A
snapshot_of	Snapshot of	N/A
sg_snapshot_of	Snapshot of Snap Group	N/A
wwn	WWN	N/A
mirrored	Mirrored	N/A
locked_by_pool	Locked by Pool	N/A
used_capacity_MiB	Used Capacity (MiB)	N/A
capacity_used_by_ snapshots_MiB	Capacity Used by Snapshots (MiB)	N/A
short_lived_io	Short Live IO	N/A
enable_VAAI	VAAI enabled	N/A
user_disabled_VAAI	VAAI disabled by user	N/A
snapshot_format	Snapshot Format	N/A

Field ID	Field output	Default position
ssd_caching	SSD Caching State	N/A
use_ssd_caching_default	Use SSD Caching Default State	N/A
unmap_support	Unmap Support	N/A
managed	Managed	N/A
enable_unmap	unmap enabled	N/A
user_disabled_unmap	unmap disabled by user	N/A
marked	Marked	N/A

Example:

```
snapshot_list vol=DBVolume
```

Output:

```
Name               Size (GB)  Master Name  Consistency Group  Pool
DBVolume.sp1       2508       DBVolume                        default
DBVolume.sp1.copy  2508       DBVolume                        default
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Restoring a volume from a snapshot

Use the **snapshot_restore** command to restore a master volume or a snapshot from one of its associated snapshots.

```
snapshot_restore snapshot=SnapshotName [ target_snapshot=SnapshotName ]
```

Parameters

Name	Type	Description	Mandatory	Default
snapshot	Object name	Name of the snapshot with which to restore its master volume, or snapshot.	Y	N/A
target_snapshot	Object name	Snapshot to be restored.	N	Restore the master volume.

This command restores the data of a master volume from one of its associated snapshots.

Issuing a restore command, logically copies the data of the source snapshot onto its volume. The volume's data is therefore restored to the state of the snapshot creation. If the volume was resized after the snapshot was created, the restore operation resizes the volume back to its original size.

All the snapshots associated with the volume are left unchanged during a restore operation.

It is possible to snapshot the volume before restoring it, so that the generated snapshot can be used and the data is not lost.

It is possible to restore another snapshot (the target snapshot) from the source snapshot. The target snapshot must be a snapshot of the same volume as the source snapshot. The target snapshot's content and size will be identical to the source snapshot's content and size. The target snapshot's lock/unlock status will remain as it was.

Restoring a mirrored volume:

- Delete the mirror
- Restore the volume
- Re-establish the mirror

It is impossible to restore a volume while it is mirrored.

Example:

```
snapshot_restore snapshot=DBVolume.snapshot1
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	Both target and source are snapshots of the same master volume. This master volume is mapped to a host or cluster associated with the user, and the target snapshot was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_RESTORE_SNAPSHOT**

  Are you sure you want to restore the volume from snapshot *Snapshot*?

Return codes

- **VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for this volume
- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_IS_NOT_A_SNAPSHOT**
  Operation is permitted only on snapshots
- **NOT_ENOUGH_SPACE**
  No space to allocate volume
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **VOLUME_HAS_MIRROR**
  Mirror is defined for this volume
- **VOLUME_LOCKED**
  Volume is locked
- **SNAPSHOTS_BELONG_TO_DIFFERENT_MASTERS**
  Target snapshot and source snapshot should be snapshots of the same volume
- **TARGET_SNAPSHOT_BAD_NAME**
  Target snapshot name does not exist
- **TARGET_SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Target snapshot is part of a Snapshot Group
- **TARGET_SNAPSHOT_IS_MASTER**
  Target snapshot is a master volume
- **TARGET_SNAPSHOT_SAME_AS_SNAPSHOT**
  Source snapshot cannot be the target snapshot
- **TARGET_SNAPSHOT_HAS_ACTIVE_SYNC_JOB**
  Traget snapshot is currently a target of an active sync job
  Troubleshooting: Please wait for sync job to complete
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Chapter 5. Consistency group management commands

This section describes the command-line interface (CLI) for consistency group management.

See also:

- Volume management commands
- Volume snapshot management commands
- Storage pool management commands

Adding a volume to a consistency group

Use the **cg_add_vol** command to add a volume to a consistency group.

```
cg_add_vol cg=cgName vol=VolName
```

Parameters

Name	Type	Description	Mandatory
cg	Object name	Name of a consistency group.	Y
vol	Object name	Name of the volume to be added.	Y

This command adds a volume to a consistency group. The consistency group can contain up to 128 volumes.

Requirements for successful command completion:

- The volume and consistency group are associated with the same pool.
- The volume is not already part of a consistency group.
- The volume is not a snapshot.
- The consistency group has less than the maximum number of volumes (see above).

Adding a mirrored volume to a non-mirrored consistency group:

- Such an addition always succeeds and the volume will retain its mirroring settings.

Requirements for successful command completion for a mirrored consistency group:

- The command must be issued only on the master consistency group.
- The command cannot be run during the initialization of the volume or consistency group.
- The volume does not have any outstanding ad-hoc sync jobs.
- The volume has to be mirrored, and its following mirroring settings must be identical to those of the consistency group: mirroring type (for example, synchronous), mirroring status, mirroring target, target pool, designation.

- In addition, for a mirrored consistency group that is defined as `sync_best_effort` (synchronous):
  - The synchronization status of both volume and consistency group has to be Synchronized.
- For a mirrored consistency group that is defined as `async_interval` (asynchronous):
  - The volume and consistency group must have the following identical settings and values: schedule, remote schedule, timestamp of the last replicated snapshot.
  - The synchronization status of the volume and consistency group must be `RPO_OK`
- The link has to be up.

Adding a mirrored volume to a mirrored volume and consistency group also adds the volume's peer to the volume and consistency group's peer. Once added, the mirrored volume will be set the RPO of the mirrored volume and consistency group.

The mirrored consistency group has one sync job for all pertinent mirrored volumes within the consistency group.

In case of acknowledgment timeout:

- If the command is issued on a mirrored master consistency group, which does not receive an acknowledgment from the slave until the command times out or due to an unexpected failure, a return code is returned (**`MIRROR_POSSIBLE_CONS_GROUP_MEMBERSHIP_MISMATCH`**).

If the command **`cg_add_vol`** is issued on a mirrored master consistency group, which does not receive an acknowledgment from the slave until the command times out or due to an unexpected failure, a new return code is returned (**`MIRROR_POSSIBLE_CONS_GROUP_MEMBERSHIP_MISMATCH`**, meaning that the member lists of the mirror consistency group peers might not be the same).

Example:

```
cg_add_vol cg=DBGroup vol=DBLog
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **CONS_GROUP_MIRROR_DESIGNATION_MISMATCH**

  Volume Mirror has different designation than Consistency Group Mirror. Are you sure you want to add that Volume to that CG?

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_IS_SLAVE**

  Consistency Group is mirroring slave.
- **MAX_VOLUMES_IN_CONS_GROUP_REACHED**

  The maximum permitted number of volumes per Consistency Group is reached.

  Consistency Group contains maximum number of volumes.
- **MAX_VOLUMES_IN_REMOTE_CONS_GROUP_REACHED**

  The maximum permitted number of volumes per the remote Consistency Group is reached.

  Remote Consistency Group contains maximum number of volumes.
- **MIRROR_HAS_SYNC_JOB**

  Operation is not permitted on a mirror with active sync jobs
- **MIRROR_IS_NOT_SYNCHRONIZED**

  Mirror is not synchronized
- **MIRROR_LAST_SYNC_TIMES_DIFFER**

  All mirrors should have the same last sync time.
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds
- **REMOTE_VOLUME_BAD_POOL**

  Remote volume and remote Consistency Group belong to different Storage Pools
- **REMOTE_VOLUME_BELONGS_TO_CONS_GROUP**

  Remote Volume belongs to a Consistency Group
- **TARGET_NOT_CONNECTED**

  There is currently no connection to the target system
- **VOLUME_BAD_POOL**

  Volume belongs to a different Storage Pool
- **VOLUME_BELONGS_TO_CG**

  Volume belongs to a Consistency Group
- **VOLUME_DATA_MIGRATION_UNSYNCHRONIZED**

  Data Migration has not completed to this volume
- **VOLUME_IS_SNAPSHOT**

  Operation is not permitted on snapshots
- **CONS_GROUP_MIRROR_SCHEDULE_MISMATCH**

  Volumes under Consistency Group Mirror should have the same mirroring schedule.

- **CONS_GROUP_MIRROR_TARGET_MISMATCH**

  Volumes under Consistency Group Mirror should have the same mirroring Target.
- **CONS_GROUP_MIRROR_ROLE_MISMATCH**

  Volumes under Consistency Group Mirror should have the same mirroring role.
- **CONS_GROUP_MIRROR_ACTIVATION_MISMATCH**

  Volumes under Consistency Group Mirror should have the same mirroring activation state.
- **REMOTE_CONS_GROUP_MIRROR_SCHEDULE_MISMATCH**

  Volumes under Consistency Group Mirror in remote machine should have identical mirroring schedule.
- **CONS_GROUP_MIRROR_TYPE_MISMATCH**

  Volumes under Consistency Group Mirror should have the same mirroring type.
- **MIRROR_POSSIBLE_CONS_GROUP_MEMBERSHIP_MISMATCH**

  Mirrored CG may contain different volumes on Master and Slave. This problem occurs whenever the cg_add_vol command results with the Master not receiving an acknowledgment from the Slave until the command timed out, or any other unexpected failure.
- **REMOTE_CONS_GROUP_APPLICATION_CONSISTENCY_MISMATCH**

  Application consistency of the volume doesn't match the state of other volumes in the group on the remote machine.
- **CONS_GROUP_APPLICATION_CONSISTENCY_MISMATCH**

  Application consistency of the volume doesn't match the state of other volumes in the group.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **VOLUME_HAS_OLVM**

  IBM Hyper-Scale Mobility relation is defined for this volume
- **VOLUME_HAS_MULTIPLE_MIRRORS**

  volume has multiple mirrors, operation not allowed or target must be specified
- **REMOTE_MIRROR_IS_STANDBY**

  remote mirror is marked as standby

Creating consistency groups

Use the **cg_create** command to create a consistency group.

```
cg_create cg=cgName pool=PoolName
```

Parameters

Name	Type	Description	Mandatory
cg	Object name	Name of the consistency group.	Y
pool	Object name	Storage pool of the consistency group.	Y
gp	Object name	Grouped Pool of the Consistency Group.	N

This command creates a consistency group. A consistency group is a group of volumes that can all be snapshotted at the same point of time. This is essential for snapshotting several volumes used by the same application or by applications that interact with each other in order to generate a consistent set of snapshots.

The name of the consistency group must be unique in the system. The system can contain up to 256 consistency groups.

The storage pool of the consistency group must be specified.

The consistency group is initially empty, containing no volumes.

A consistency group always belongs to a specific storage pool. All the volumes in the consistency group belong to the same storage pool as the consistency group itself.

Example:

```
cg_create pool=p_1 cg=DBgroup
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CONS_GROUP_NAME_EXISTS**
  Consistency Group name already exists.
- **MAX_CONS_GROUPS_REACHED**
  Maximum number of Consistency Groups already defined.
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **DOMAIN_MAX_CONS_GROUPS_REACHED**
  The domain exceeds the maximum allowed number of consistency groups.
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **GROUPED_POOL_DOES_NOT_EXIST**
  Grouped Pool does not exist.

Deleting a consistency group

Use the **cg_delete** command to delete a consistency group.

```
cg_delete cg=cgName
```

Parameters

Name	Type	Description	Mandatory
cg	Object name	Name of the consistency group to be deleted.	Y

This command fails if:

- The consistency group is not empty, that is, it still contains volumes.
- The consistency group is mirrored, even if it is empty.

All snapshot groups associated with the consistency group are disbanded, that is the snapshots contained in these snapshot groups become independent snapshots.

Example:

```
cg_delete cg=DBvolumes
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_NOT_EMPTY**

  This operation is only allowed on an empty Consistency Group.
- **CONS_GROUP_HAS_MIRROR**

  Consistency Group has mirroring defined for it.
- **CONS_GROUP_BELONGS_TO_XCG**

  Consistency Group belongs to another Cross Consistency Group.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Listing consistency groups

Use the **cg_list** command to list consistency groups.

```
cg_list [ cg=cgName ] [ managed=<yes|no|all> ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
cg	Object name	Name of a consistency group.	N	All
managed	Boolean	Determines whether to show unmanaged consistency groups (no), managed consistency groups (yes) or both (all).	N	no
domain	Object name	The domain name.	N	All Domains

This command lists the specified details for all consistency groups. If a consistency group name is indicated, only this consistency group is listed.

Field ID	Field output	Default position
name	Name	1
pool	Pool Name	2
gp_based	GP Based	N/A
mirrored	Mirrored	N/A
managed	Managed	N/A

Example:

```
cg_list cg=DBgroup
```

Output:

```
Name     Pool Name Mirrored GP Based
DBgroup  default   Yes      No
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Removing a volume from a consistency group

Use the command **cg_remove_vol** to remove a volume from a consistency group.

```
cg_remove_vol vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Name of the volume to be removed.	Y

This command removes a volume from a consistency group.

A consistency group's name is deduced from the volume name. A unique name is ensured because each volume belongs to only a single consistency group. Future snapshot groups created from this consistency group will not include the snapshot associated with the removed volume.

All the snapshots of the removed volume that were created as part of this consistency group will be permanently removed from the snapshot groups they were associated with.

Following the volume removal:

- The corresponding peer volume is removed from the peer consistency group. If the consistency group is mirrored, the mirroring definition of the removed volume is retained (based on the same settings as the consistency group from which it was removed).
- The peer volume is also removed from the peer consistency group.
- The removed mirrored volume acquires the RPO of the mirrored consistency group from which it was removed.
- An event is generated.

This command succeeds even if the volume is not included in any consistency group.

Requirements for a successful command completion:

- The command can be issued only on the master.
- The link has to be up.
- The consistency group cannot have ongoing sync jobs.

If the command is issued on a mirrored consistency group master, and the master does not receive an acknowledgment from the slave because the command times out or due to an unexpected failure, a return code is returned: (**MIRROR_POSSIBLE_CONS_GROUP_MEMBERSHIP_MISMATCH**).

Example:

```
cg_remove_vol vol=DBLog
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_REMOVE_VOLUME_FROM_CONS_GROUP**

  Are you sure you want to remove volume '*Volume*' from its Consistency Group?

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_NOT_IN_CONS_GROUP**

  Volume does not belong to a Consistency Group
- **TARGET_NOT_CONNECTED**

  There is currently no connection to the target system
- **VOLUME_IS_SNAPSHOT**

  Operation is not permitted on snapshots
- **CONS_GROUP_IS_SLAVE**

  Consistency Group is mirroring slave.
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds
- **MIRROR_HAS_SYNC_JOB**

  Operation is not permitted on a mirror with active sync jobs
- **MIRROR_POSSIBLE_CONS_GROUP_MEMBERSHIP_MISMATCH**

  Mirrored CG may contain different volumes on Master and Slave. This problem occurs whenever the cg_add_vol command results with the Master not receiving an acknowledgment from the Slave until the command timed out, or any other unexpected failure.
- **VOLUME_IS_NOT_CONSISTENT_SLAVE**

  Operation not allowed on slave volume that is not consistent.
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**

  Snapshot is currently a target of an active sync job

  Troubleshooting: Please wait for sync job to complete
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

- **VOLUME_HAS_OLVM**
  IBM Hyper-Scale Mobility relation is defined for this volume
- **REMOTE_MIRROR_IS_STANDBY**
  Remote mirror is marked as standby

Renaming a consistency group

Use the **cg_rename** command to rename consistency groups.

```
cg_rename cg=cgName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
cg	Object name	The name of the consistency group to be renamed.	Y
new_name	Object name	The new name of the consistency group.	Y

The new name of the consistency group must be unique in the system.

This command succeeds even if the new name is identical with the current name.

Example:

```
cg_rename cg=DBgroup new_name=DBvolumes
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_NAME_EXISTS**
  Consistency Group name already exists.
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Suspending I/O execution on a consistency group

Use the **io_pause** command to suspend I/O execution on a consistency group.

```
io_pause  cg=cgName [ milli_seconds_to_resume=MilliSecondsTimeout ] [ allow_read=AllowRead ]
```

Parameters

Name	Type	Description	Mandatory	Default
milli_seconds_ to_resume	Positive integer	Timeout for auto resume. The measurement starts when current I/O execution on the consistency group is completed.	N	10000
allow_read	Boolean	Controls whether to continue reading I/Os while I/Os are suspended.	N	yes
cg	Object name	CG name	Y	N/A

The I/O execution is suspended with an auto-resume timeout.

It is possible to suspend execution of all I/Os or writes only.

Example:

```
io_pause cg=test_cg milli_seconds_to_resume=10000
```

Output:

```
command:
    code = "SUCCESS"
    status = "0"
    status_str = "Command completed successfully"
    return:
        token_id = "6343971831808"
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **COMMAND_IS_NOT_VALID_IN_CURRENT_SYSTEM_STATE**
  The requested command cannot be invoked in the current system state
- **PAUSE_IO_TIMEOUT_OUT_OF_RANGE**
  Timeout parameter is out of range
- **TOO_MANY_IO_PAUSE_ISSUED**
  Too many Pause IOs are in progress
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_IS_SLAVE**
  Consistency Group is mirroring slave.
- **IO_PAUSE_ALREADY_ISSUED_FOR_CONS_GROUP**
  Volume(s) belonging to the Consistency Group are already paused

Resuming I/O execution

Use the **io_resume** command to resume I/O execution on a consistency group, previously suspended with the **io_pause** command.

```
io_resume  token_id=Token
```

Parameters

Name	Type	Description	Mandatory
token_id	Positive integer	The token returned by the io_resume command.	Y

Example:

```
io_resume token_id=6343971831808
```

Output:

```
command:
    code = "SUCCESS"
    status = "0"
    status_str = "Command completed successfully"
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A

User Category	Permission	Condition
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **CONS_GROUP_IS_NOT_PAUSED**
  Consistency Group is not paused or auto-resume timeout expired
- **CONS_GROUP_DEFINITION_MODIFIED_DURING_IO_PAUSE**
  Consistency Group definitions changed during pause io period

Listing the status of consistency groups with paused I/O

Use the **io_pause_list** command to list the status of consistency groups for which the **io_pause** command was invoked.

```
io_pause_list  [ token_id=Token ]
```

Parameters

Name	Description	Mandatory	Default
token_id	Optional filter value to show the status for a specific token. 0 means that the filter is not applied.	N	0

This command displays the detailed status of the consistency groups on which I/O was suspended with the **io_pause** command.

Example:

```
io_pause_list
```

Output:

```
command:
    code = "SUCCESS"
    status = "0"
    status_str = "Command completed successfully"
    return:
        stop_io 0:
            allow_read = "yes"
            cg_name = "cg_test"
            config_changed = "no"
            inode_list_changed = "no"
            num_volumes = "1"
            resume_pending = "no"
            stop_io_elapsed_time = "4062"
            timeout = "10000"
            token = "6343971831808"
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Allowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Creating a cross-system consistency group

Use the **xcg_create** command to create a cross-system consistency group (XCG) definition.

```
xcg_create xcg=XcgName
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	The name of the new cross-system consistency group.	Y

This command creates a cross-system consistency group (XCG) definition, with which consistency groups on different systems can be associated.

Example:

```
xcg_create xcg=DBbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_NAME_EXISTS**
  Cross Consistency Group name already exists.
- **MAX_XCGS_REACHED**
  Maximum number of Cross Consistency Groups already defined.

Associating an existing consistency group with a cross-system consistency group definition

Use the **xcg_add_cg** command to associate an existing consistency group to a cross-system consistency group definition.

```
xcg_add_cg xcg=XcgName cg=cgName
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	Name of a cross-system consistency group.	Y
cg	Object name	Name of a consistency group.	Y

Example:

```
xcg_add_cg xcg=DBbackup cg=CGbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_BAD_NAME**
  Cross Consistency Group name does not exist.

- **MAX_CONS_GROUPS_IN_XCG_REACHED**
  Cross Consistency Group contains maximum number of cgs.
- **CONS_GROUP_IS_SLAVE**
  Consistency Group is mirroring slave.
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_ALREADY_IN_XCG**
  Consistency Group already belongs to Cross Consistency Group.
- **CONS_GROUP_BELONGS_TO_XCG**
  Consistency Group belongs to another Cross Consistency Group.

Removing a consistency group from a cross-system consistency group

Use the **xcg_remove_cg** command to remove an existing consistency group from a cross-system consistency group definition.

```
xcg_remove_cg xcg=XcgName cg=cgName
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	Name of a Cross-system Consistency Group.	Y
cg	Object name	Name of a Consistency Group.	Y

Example:

```
xcg_remove_cg xcg=DBbackup cg=CGBackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_REMOVE_CONS_GROUP_FROM_XCG**

  Are you sure you want to remove cons group '*CG*' from its cross Consistency Group?

Return codes

- **XCG_BAD_NAME**

  Cross Consistency Group name does not exist.
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **XCG_IS_EMPTY**

  Consistency Group is empty.
- **CONS_GROUP_NOT_IN_XCG**

  Consistency Group doesnt belong to Cross Consistency Group.

Adding a remote system name to a cross-system consistency group definition

Use the **xcg_add_remote_system** command to add a remote system name to a cross-system consistency group definition.

```
xcg_add_remote_system xcg=XcgName remote_system=RemoteSystem
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	Name of a cross-system consistency group.	Y
remote_system	String	Name of a remote system.	Y

Example:

```
xcg_add_remote_system xcg=DBbackup remote_system=CGbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A

User Category	Permission	Condition
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_BAD_NAME**
  Cross Consistency Group name does not exist.
- **MAX_REMOTE_SYSTEMS_IN_XCG_REACHED**
  Cross Consistency Group contains maximum number of remote systems.
- **REMOTE_SYSTEM_ALREADY_ADDED**
  Remote system belongs to Cross Consistency Group

Removing a remote system from a cross-system consistency group

Use the **xcg_remove_remote_system** command to remove a remote system name from a cross-system consistency group definition.

```
xcg_remove_remote_system xcg=XcgName remote_system=RemoteSystem
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	Name of a Cross-system Consistency Group.	Y
remote_system	String	Name of a remote system.	Y

Example:

```
xcg_remove_remote_system xcg=DBbackup remote_system=CGbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A

User Category	Permission	Condition
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_BAD_NAME**

  Cross Consistency Group name does not exist.
- **REMOTE_SYSTEM_NOT_IN_XCG**

  Remote system doesnt belong to Cross Consistency Group

Listing cross-system consistency group definitions

Use the **xcg_get_local_cgs** command to list cross-system consistency group definitions together with the contained consistency groups.

```
xcg_get_local_cgs [ xcg=XcgName ]
```

Parameters

Name	Type	Description	Mandatory	Default
xcg	Object name	Name of a cross-system consistency group.	N	All Cross-system Consistency Groups.

Example:

```
xcg_get_local_cgs
```

Output:

```
Command completed successfully.
```

Field ID	Field output	Default position
name	Name	1
xcg	XCG Name	2

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Allowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_BAD_NAME**

  Cross Consistency Group name does not exist.

Retrieving remote systems in a specified cross-system consistency group

Use the **xcg_get_remote_systems** command to retrieve the names of remote systems that are a part of the specified cross-system consistency group.

```
xcg_get_remote_systems xcg=XcgName
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	Name of a Cross-system Consistency Group.	Y

Example:

```
xcg_get_remote_systems xcg=XcGroup1
```

Output:

```
Command completed successfully.
```

Field ID	Field output	Default position
name	Name	1
xcg	XCG Name	2

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Allowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_BAD_NAME**

  Cross Consistency Group name does not exist.

Deleting a cross-system consistency group

Use the **xcg_delete** command to delete a cross-system consistency group (XCG) definition.

```
xcg_delete xcg=XcgName
```

Parameters

Name	Type	Description	Mandatory
xcg	Object name	Name of a cross-system consistency group.	Y

Example:

```
xcg_delete xcg=DBbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **XCG_BAD_NAME**

  Cross Consistency Group name does not exist.
- **XCG_NOT_EMPTY**

  Consistency Group is not empty.

Listing cross-system consistency group definitions

Use the **xcg_list** command to list cross-system consistency group definitions together with the contained consistency groups.

```
xcg_list [ xcg=XcgName ]
```

Parameters

Name	Type	Description	Mandatory	Default
xcg	Object name	Name of a Cross-system Consistency Group.	N	All Cross-system Consistency Groups.

Field ID	Field output	Default position
name	Name	1
num_of_cgs	Num Of CGs	2
num_of_remote_systems	Num Of Remote Systems	3

Example:

```
xcg_list
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Allowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Chapter 6. Grouped pool management commands

This chapter describes the grouped pool management commands.

Listing grouped pools

Use the **gp_list** command to list grouped pools.

```
gp_list [ gp=gpName ] [ domain=DomainName ]
```

Parameters:

Name	Type	Description	Mandatory	Default
gp	Object name	The name of a consistency group.	N	All
domain	Object name	The domain name.	N	All Domains

This command lists select details for all grouped pools. If a grouped pool name is specified, it is the only one to be listed.

Listed details include the following:

- Name
- Meta pool name
- Thin pool name
- Thick pool name

Field ID	Field output	Default position
name	Name	1
meta_pool	Meta pool name	2
thin_pool	Thin pool name	3
thick_pool	Thick pool name	4

Example:

```
gp_list gp=gp_1
```

Output:

```
Name   Meta Pool Name   Thin Pool Name   Thick Pool Name
------ ---------------- ---------------- -----------------
gp_1   metaPool         thinPool         thickPool
```

Access control

User category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed

User category	Permission
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Chapter 7. Snapshot set management commands

This section describes the command-line interface (CLI) for snapshot set management.

See also:

- Volume management commands
- Volume snapshot management commands
- Consistency group management commands

Snapshotting a consistency group

Use the **cg_snapshots_create** command to create a snapshot group of a consistency group.

```
cg_snapshots_create cg=cgName < [ snap_group=SnapshotGroupName ]
[ delete_priority=del_value ] [ auto_resume=token_id ] > | <overwrite=Name>
```

Parameters

Name	Type	Description	Mandatory	Default
cg	Object name	The name of the consistency group whose snapshot will be created.	Y	N/A
snap_group	Object name	The name of the newly created snapshot group.	N	Automatically generated name.
delete_priority	Integer	The priority for deleting this volume when the system runs out of snapshot space.	N	1
overwrite	Object name	An existing snapshot group that will be overwritten with the current content.	N	N/A
auto_resume	Positive integer	Defines whether to resume IO to the consistency group by providing the token ID.	N	0

This command creates a consistent snapshot group of a consistency group. The snapshot group includes a snapshot for each of the volumes contained in the consistency group.

Logically, this command is comprised of the following steps:

- Suspending all I/O activity on all the volumes in the group and waiting for all pending I/Os to complete.
- Creating a snapshot for each volume in the group.

- Resuming I/O activity on all the volumes.

The main advantage of using this command (as opposed to a manual procedure) is that all snapshots are taken at the same point of time, thus ensuring that they are consistent with each other.

The snapshots in the created snapshot group are consistent with each other in the following aspects:

- They are created synchronously at the same point of time.
- All I/Os to the consistency group's volumes that were completed prior to this point of time are recorded in the snapshot's image.
- Neither I/O that was completed after this point of time is recorded in the snapshot's image.

In addition to their regular attributes, all the snapshots in the snapshot group are also associated with the consistency group.

The name of the snapshot group is either automatically generated or provided in the command line.

The delete priority of the snapshots in the snapshot group can also be provided (see Creating a snapshot). The delete priority controls which snapshots or snapshot groups are deleted first when the system runs out of space for snapshots.

The `overwrite` option causes the current content of the consistency group to be copied into one of its existing snapshot groups (indicated as parameter's argument). The snapshots of the overwritten snapshot group keep the same SCSI device WWN and same mapping, so hosts maintain a continuous mapping of the snapshots, and a rescan or similar operation is not needed. The overwritten snapshot group must be an existing snapshot group of the respective consistency group.

This command fails if no snapshot space is defined for the storage pool containing the consistency group.

This command fails if one or more of the volumes in the consistency group are slaves in the synchronous mirroring, and the synchronous mirroring is currently inconsistent due to either a re-synchronization or an initialization process.

Mirroring limitations:

- This command fails if the volume is a slave of an asynchronous mirroring coupling.
- This command fails if the volume is a slave of an inconsistent synchronous coupling.

Example:

```
cg_snapshots_create cg=DBgroup snap_group=DBbackupdaily
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the group is mapped to a host or cluster associated with the user. If a Snapshot Group overwrite is used, then the target Snapshot Group must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **SNAPSHOT_GROUP_BAD_NAME**
  Snapshot Group name does not exist.
- **SNAPSHOT_GROUP_BAD_PREFIX**
  Snapshot Group name has a reserved prefix.
- **SNAPSHOT_GROUP_NAME_EXISTS**
  Snapshot Group name already exists.
- **CONS_GROUP_EMPTY**
  Operation is not allowed on an empty Consistency Group.
- **CONS_GROUP_MISMATCH**
  Snapshot Group does not match Consistency Group volumes.
- **OVERWRITE_SNAPSHOT_GROUP_DOES_NOT_BELONG_TO_GIVEN_GROUP**
  Snapshot Group belongs to another Consistency Group.
- **POOL_SNAPSHOT_LIMIT_REACHED**
  There is not enough space to create a snapshot.
- **VOLUME_IS_NOT_CONSISTENT_SLAVE**
  Operation not allowed on slave volume that is not consistent.
- **SNAPSHOT_GROUP_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified in any way or deleted.
- **SNAPSHOT_GROUP_ILLEGAL_PRIORITY**
  Illegal snapshot group priority; must be an integer between 1 and 4.
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**
  Snapshot is currently a target of an active sync job
  Troubleshooting: Please wait for sync job to complete
- **OPERATION_DENIED_OBJECT_MANAGED**

This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

- **CONS_GROUP_TOKEN_MISMATCH**

  Token does not match Consistency Group.

Changing a snapshot group deletion priority

Use the **snap_group_change_priority** command to change the deletion priority of a snapshot group.

```
snap_group_change_priority snap_group=SnapshotGroupName delete_priority=del_value
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group whose delete_priority is to be changed.	Y
delete_priority	Integer	Priority according to which this snapshot group is deleted.	Y

This command changes the priority of the deletion of an existing snapshot group. Similarly to snapshots, the system determines which of the snapshot groups is deleted first when it runs out of snapshot storage, in accordance with the redirect-on-write mechanism. When the system runs out of space, it deletes the snapshot or snapshot group with the highest deletion priority, and among them the unmapped snapshots or snapshot groups, and the snapshot or snapshot group which was created first.

See Changing a snapshot deletion priority for more details about the valid deletion priority values and their meaning.

Example:

```
snap_group_change_priority snap_group=DBbackup delete_priority=4
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A

User Category	Permission	Condition
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**
  Snapshot Group name does not exist.
- **SNAPSHOT_ILLEGAL_PRIORITY**
  Illegal snapshot priority; must be an integer between 1 and 4.
- **SNAPSHOT_GROUP_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified in any way or deleted.

Deleting a snapshot group

Use the **snap_group_delete** command to delete a snapshot group and all its snapshots.

```
snap_group_delete snap_group=SnapshotGroupName
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group to be deleted.	Y

This command deletes the snapshot group, as well as all of the snapshots that are contained in the snapshot group. Refer to the documentation on Deleting a snapshot for more information about deleting snapshots.

If one of the members of the snapshot group is mapped to a host, then the entire snapshot group cannot be deleted.

The command is inapplicable for a snapshot group that is still associated with a mirrored consistency group.

Example:

```
snap_group_delete snap_group=DBBackupweekly
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.
- **SNAPSHOT_IS_MAPPED**

  Snapshot that is mapped to a host cannot be deleted
- **VOLUME_IS_BOUND**

  Volume is bound to a ALU

  Troubleshooting: Unbound the volume from the ALU
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**

  Snapshot is currently a target of an active sync job

  Troubleshooting: Please wait for sync job to complete

Disbanding a snapshot group

Use the **snap_group_disband** command to disband a snapshot group into independent snapshots.

```
snap_group_disband snap_group=SnapshotGroupName
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Snapshot group to be disbanded.	Y

This command disbands the snapshot group into independent snapshots. After executing this command, the snapshots can be individually deleted, restored, unlocked, duplicated, and so on. The snapshot group does not exist anymore after this command. The snapshots retain the same names (**snap_group_name.volumename**).

The command is inapplicable for a snapshot group of a mirrored consistency group.

Example:

```
snap_group_disband snap_group=DBbackup_copy
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.

Duplicating a snapshot group

Use the **snap_group_duplicate** command to duplicate an existing snapshot group.

```
snap_group_duplicate snap_group=SnapshotGroupName [ new_snap_group=NewName ]
```

Parameters

Name	Type	Description	Mandatory	Default
snap_group	Object name	Name of the snapshot group to be duplicated.	Y	N/A
new_snap_group	Object name	Name of the newly generated snapshot group.	N	Autogenerated name.

This command duplicates the specified snapshot group. This is functionally equivalent to duplicating all the snapshots in the snapshot group using Duplicating a snapshot and creating a new snapshot group that contains all the generated snapshots.

The name of the new snapshot group is either specified as a parameter or generated automatically.

Refer to Duplicating a snapshot for more details about the snapshot duplication operation.

Deletion priority:

- The deletion priority of the duplicated snapshots is 0.

Example:

```
snap_group_duplicate snap_group=DBbackup new_snap_group=DBbackup_copy
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.
- **MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined
- **DOMAIN_MAX_VOLUMES_REACHED**

  The domain exceeds the maximum allowed number of volumes.
- **SNAPSHOT_GROUP_NAME_EXISTS**

  Snapshot Group name already exists.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Formatting a snapshot group

Use the **snap_group_format** command to format a snapshot group.

```
snap_group_format  snap_group=SnapshotGroupName
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	The snapshot group to be formatted.	Y

This command deletes the content of a snapshot group while maintaining its snapshots mapping to the host. The format operation results with:

- The snapshots of the formatted snapshot group are read-only
- The format operation has no impact on performance
- The snapshots of the formatted snapshot group do not consume space
- Reading from the snapshots of the formatted snapshot group always returns zeroes
- The snapshots can be overridden
- The snapshots can be deleted
- The snapshots deletion priority can be changed

Example:

```
snap_group_format snap_group
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**
  Snapshot is currently a target of an active sync job
  Troubleshooting: Please wait for sync job to complete
- **SNAPSHOT_GROUP_IS_FORMATTED**
  Snapshot group is formatted.
- **ELCS_GROUP_CANNOT_BE_FORMATTED**
  The snapshot group is an ELCS and cannot be formatted.
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **SNAPSHOT_GROUP_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified in any way or deleted.
- **VOLUME_IS_NOT_A_SNAPSHOT**

Operation is permitted only on snapshots

- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.

- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Listing snapshot groups

Use the **snap_group_list** command to list all snapshot groups or a specific one.

```
snap_group_list [ snap_group=SnapshotGroupName | cg=cgName ] [ managed=<yes|no|all> ]
```

Parameters

Name	Type	Description	Mandatory	Default
snap_group	Object name	Name of a specific snapshot group to be listed.	N	All snapshot groups.
cg	Object name	List all the snapshot groups of this Consistency Group.	N	All snapshot groups.
managed	Boolean	Defines whether to show unmanaged snap groups (no), managed (yes) or both (all).	N	no.

This command lists snapshot groups. When a snapshot group name is specified, then only that specific snapshot group is listed. When a consistency group name is specified, then the snapshot groups of this consistency group are listed.

This command displays the following snapshot group format field (available in the XML output format):

- **snap_group_format**

Field ID	Field output	Default position
name	Name	1
cg	CG	2
snapshot_time	Snapshot Time	3
locked	Locked	N/A
modified	Modified	N/A
delete_priority	Deletion Priority	4
snap_group_format	Snapshot Group Format	N/A
snap_group_descriptor	Snapshot Group Descriptor	N/A
managed	Managed	N/A

Example:

```
snap_group_list cg=DBvolumes
```

Output:

```
Name           CG         Snapshot Time       Deletion Priority
DBbackup       DBvolumes  2007-01-03 17:46:29 1
DBbackupdaily  DBvolumes  2007-01-03 17:49:36 1
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Completion codes

- **CONS_GROUP_DOES_NOT_EXIST**

  Consistency Group does not exist.
- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.

Locking a snapshot group

Use the **snap_group_lock** command to lock a snapshot group by locking all its snapshots.

```
snap_group_lock snap_group=SnapshotGroupName
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group to be locked.	Y

This command is functionally equivalent to locking all snapshots individually (through executing Locking a volume on each snapshot). Refer to the documentation of Locking a volume for a description of locking behavior.

Example:

```
snap_group_lock snap_group=DBbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**
  Snapshot Group name does not exist.
- **SNAPSHOT_GROUP_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified in any way or deleted.

Renaming a snapshot group

Use the **snap_group_rename** command to rename a snapshot group.

```
snap_group_rename snap_group=SnapshotGroupName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group to be renamed.	Y
new_name	Object name	New name for the snapshot group.	Y

The command is inapplicable for a snapshot group of a mirrored snapshot group.

Example:

```
snap_group_rename snap_group=DBbackup new_name=DBBackupweekly
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator

User Category	Permission	Condition
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.
- **SNAPSHOT_GROUP_NAME_EXISTS**

  Snapshot Group name already exists.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Restoring a consistency group from a snapshot group

Use the **snap_group_restore** command to restore the master volumes of a consistency group, or of a snapshot group from one of its associated snapshot groups.

```
snap_group_restore snap_group=SnapshotGroupName [ target_snap_group=SnapshotGroupName ]
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group from which to restore its master volumes.	Y
target_snap_group	Object name	Snapshot group to be restored.	N

Using this command is equivalent to restoring all the volumes in the consistency group, or all the snapshots in the target snapshot group from their snapshots in the snapshot group.

It is possible to restore a snapshot group from a snapshot group.

Requirements for a successful command completion:

- The consistency group or the target snapshot group must contain the exact same volumes that they contained when the snapshot group was generated.
  - Each volume added to the consistency group after the creation of the snapshot group must be removed from the consistency group before restoration is completed.
- The command is inapplicable for a snapshot group of a mirrored consistency group.

See Restoring a volume from a snapshot for more information about the restoring.

Example:

```
snap_group_restore snap_group=DBbackup_copy
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	Both target and source are snapshots groups of the same master Consistency Group, where at least one of the master volumes in this Consistency Group is mapped to a host or cluster associated with the user, and the target Snapshot Group was created by an application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for this volume
- **SNAPSHOT_GROUP_BAD_NAME**
  Snapshot Group name does not exist.
- **CONS_GROUP_MISMATCH**
  Snapshot Group does not match Consistency Group volumes.
- **NOT_ENOUGH_SPACE**
  No space to allocate volume
- **VOLUME_HAS_MIRROR**
  Mirror is defined for this volume
- **CONS_GROUP_HAS_MIRROR**
  Consistency Group has mirroring defined for it.
- **VOLUME_LOCKED**
  Volume is locked
- **TARGET_SNAPSHOT_GROUP_BAD_NAME**
  Target Snapshot Group name does not exist.
- **SNAPSHOT_GROUP_MISMATCH**
  Snapshot Group does not match target Snapshot Group.
- **TARGET_SNAPSHOT_GROUP_SAME_AS_SOURCE**
  Target Snapshot Group is the same as Snapshot Group.
- **OPERATION_DENIED_OBJECT_MANAGED**

This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Unlocking a snapshot group

Use the **snap_group_unlock** command to unlock a snapshot group by unlocking all its snapshots.

```
snap_group_unlock snap_group=SnapshotGroupName
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group to be unlocked.	Y

This command unlocks a snapshot group by unlocking all its snapshots. This is equivalent to executing Unlocking a volume on each snapshot. Refer to the documentation of Unlocking a volume for a description of unlocking behavior.

Example:

```
snap_group_unlock snap_group=DBbackup
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.
- **SNAPSHOT_GROUP_IS_INTERNAL**

  Internal snapshots cannot be mapped, modified in any way or deleted.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Setting a snapshot group descriptor

Use the **snap_group_set_descriptor** command to set a snapshot group descriptor.

```
snap_group_set_descriptor snap_group=SnapshotGroupName descriptor=Descriptor
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group.	Y
descriptor	String	A snap group descriptor to be used by external software.	Y

Provides external software with the ability to mark the snapshot as part of a consistency group for various usage scenarios. The command replaces an existing descriptor with a newly specified one.

Example:

```
snap_group_set_descriptor snap_group=DBbackup descriptor=blabla
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	At least one of the volumes in the master Consistency Group is mapped to a host or cluster associated with the user and Snapshot Group was created by a server administrator
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.

Returning a snapshot group's descriptor

Use the **snap_group_get_descriptor** command to return a snapshot group's descriptor.

```
snap_group_get_descriptor snap_group=SnapshotGroupName
```

Parameters

Name	Type	Description	Mandatory
snap_group	Object name	Name of the snapshot group.	Y

The command provides an external software with the ability to obtain the descriptor attribute value for a snapshot group.

Example:

```
snap_group_get_descriptor snap_group=DBbackup
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SNAPSHOT_GROUP_BAD_NAME**

  Snapshot Group name does not exist.

Chapter 8. Storage pool management commands

This section describes the command-line interface (CLI) for storage pool management.

See also:

- Volume management commands
- Volume snapshot management commands
- Consistency group management commands

Moving a consistency group between storage pools or grouped pools

Use the **cg_move** command to move a consistency group, all its volumes, and all their snapshots and snapshot sets from one storage pool or consistency pool to another.

```
cg_move cg=cgName <pool=PoolName | gp=gpName> [ domain_adjust=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
cg	Object name	Name of the consistency group to be moved.	Y	N/A
pool	Object name	Name of the target storage pool.	Y	N/A
gp	Object name	Name of the targer grouped pool.	N	N/A
domain_adjust	Boolean	Adjusts domain resources. If set to True, the resources of the consistency group source domain and target domain are adjusted to accommodate the consistency group being moved.	N	no

Requirements for successful command completion:

- Sufficient space on the target pools
- If the CG is mirrored, it can only be moved to a pool that is not thin-provisioned.

Example:

```
cg_move cg=DBGroup pool=DBPool
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **NOT_ENOUGH_SPACE**
  No space to allocate for volume's current usage
- **NOT_ENOUGH_SNAPSHOT_SPACE**
  Snapshot usage will exceed snapshot limit
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **DOMAIN_MAX_CONS_GROUPS_REACHED**
  The domain exceeds the maximum allowed number of consistency groups.
- **MAX_CONS_GROUPS_REACHED**
  Maximum number of Consistency Groups already defined.
- **DOMAIN_USED_TARGET_NOT_IN_DESTINATION**
  A target that is used by mirror in the pool is not associated with the target domain.
- **DOMAIN_USED_SCHEDULE_NOT_IN_DESTINATION**
  A schedule that is used by a mirror in the pool is not associated with the target domain.
- **MAPPED_HOSTS_NOT_IN_DESTINATION**
  A host that is mapped to a volume in the pool is not associated with the target domain.
- **MAPPED_CLUSTERS_NOT_IN_DESTINATION**
  A cluster that is mapped to a volume in the pool is not associated with the target domain.
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **CONS_GROUP_REQUIRES_DESTINATION_POOL**
  A destination Pool must be entered.

- **GROUPED_POOL_DOES_NOT_EXIST**
  Grouped Pool does not exist.
- **CONS_GROUP_REQUIRES_DESTINATION_GROUPED_POOL**
  A destination Grouped Pool must be entered.
- **CANNOT_MOVE_CONS_GROUP_TO_A_GP_WITH_NO_META_POOL**
  Cannot move Consistency Group to a grouped pool with no meta pool.
- **BOUND_ALUS_NOT_IN_DESTINATION**
  An ALU that is bound to a volume in the pool is not associated with the target domain.
- **MAX_DMS_REACHED**
  Maximum number of remote volumes (mirror/migration) is already defined
  Troubleshooting: Delete unnecessary Data Migration objects
- **DOMAIN_MAX_DMS_REACHED**
  The domain exceeds the maximum allowed number of data migrations.

Changing the pool limitation, performance class, or threshold parameters

Use the **pool_change_config** command to change a storage pool configuration.

```
pool_change_config pool=PoolName [ lock_behavior=<read_only|no_io> ]
[ perf_class=perfClassName ] [ restore_thresholds=<yes|no> | hysteresis=HysteresisValue |
< code=EventCode severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL|NONE>
threshold=<ThresholdValue|NONE> > ]
```

Parameters

Name	Type	Description	Mandatory	Default
pool	Object name	The name of a storage pool.	Y	N/A
lock_behavior	Enumeration	Determines whether and how the pool is locked upon space depletion.	N	read_only
perf_class	Object name	The name of the performance class pool.	N	No performance class
code	N/A	Event code.	N	No code
severity	Enumeration	Severity.	N	No severity
threshold	Integer	The threshold value. None indicates that an event with this severity is not created.	N	No threshold
restore_ thresholds	Boolean	Restore thresholds to default values.	N	no
hysteresis	Integer	The hysteresis of the event throwing.	N	"3"

This command changes the pool behavior when the pool runs out of thin provisioning space.

For thin provisioned storage pools, the **lock_behavior** parameter sets how the pool is locked upon space depletion. The pool can be locked for write, or for both read and write.

Example:

```
pool_change_config pool=VOL_BREED_None_0 lock_behavior=read_only
```

This command changes the Performance Class of the pool.

Example:

```
pool_change_config pool=VOL_BREED_None_1 perf_class=valid_perf_class_name
```

This command changes the thresholds parameters of the pool or reset it to default thresholds value.

Example:

```
pool_change_config pool=VOL_BREED_None_1 code=STORAGE_POOL_VOLUME_USAGE_INCREASED
severity=INFORMATIONAL threshold=40 pool_change_config pool=VOL_BREED_None_1
code=STORAGE_POOL_SNAPSHOT_USAGE_INCREASED severity=INFORMATIONAL threshold=50
pool_change_config pool=VOL_BREED_None_1 restore_thresholds=yes
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **POOL_DOES_NOT_EXIST**

  Storage Pool does not exist
- **PERF_CLASS_BAD_NAME**

  Performance Class does not exist
- **POOL_ALREADY_IN_PERF_CLASS**

  Pool *pool name* already in Performance Class *Performance Class*.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

- **UNRECOGNIZED_EVENT_CODE**
  '*String*' is not a recognized event code
  Troubleshooting: Consult the manual for the list of event codes
- **EVENT_DOES_NOT_HAVE_THRESHOLDS**
  Event does not have thresholds
- **EVENT_THRESHOLD_IS_ILLEGAL**
  Illegal value for event threshold
  Troubleshooting: Event threshold values must be monotonic
- **PERF_CLASS_ASSOCIATED_WITH_HOSTS**
  Performance Class *Performance Class* is already in use by host.

Changing pool settings for snapshots

Use the **pool_config_snapshots** command to change storage pool snapshot settings.

```
pool_config_snapshots pool=PoolName [ protected_snapshot_priority=<0|1|2|3|4> ]
```

Parameters

Name	Type	Description	Mandatory	Default
pool	Object name	The name of a storage pool.	Y	N/A
protected_ snapshot_priority	Integer	Specifies the snapshot delete priority from 0 to 4 (see full explanation below).	N	unchanged

This command changes the storage pool snapshot limitation policy.

The *create_last_consistent_snapshot* attribute (used for systems which have no space):

- If the value of the attribute is No, no last consistent snapshot is generated.
- If the value is changed while synchronizing, the existing snapshot is not deleted.

The **protected_snapshot_priority** parameter:

- Snapshots with a lower delete priority (that is, a higher number) than the specified value might be deleted by the system automatically, in order to free space, before pausing the mirroring, thus protecting snapshots with a priority equal or higher than the value.
- If, for example, the value is set to 3:
  - The system will deactivate mirroring if not enough space can be freed even after the deletion of snapshots with deletion priority of 4.
  - Snapshots with priority level 1, 2 and 3 will not be deleted.
- If the value is set to 4, the system will deactivate mirroring before deleting any of the snapshots.
- If the value is set to 0, the system can delete any snapshot regardless of deletion priority.

Example:

```
pool_config_snapshots pool=DBPool
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_CHANGE_THE_PROTECTED_LEVEL_OF_SNAPSHOTS**

  Are you sure you want to change the protected level of snapshot in Storage Pool *Pool*? Note that in case of pool space depletion the system will delete protected snapshots only after deleting unprotected snapshots and internal asynchronous mirror snapshots
- **ARE_YOU_SURE_YOU_WANT_TO_INCREASE_THE_PROTECTED_LEVEL_OF_EXISTING_SNAPSHOTS**

  Are you sure you want to increase the protected level of snapshot in Storage Pool *Pool*? Note that the pool contains unprotected snapshots that will become protected after issuing this command. In case of pool space depletion the system will delete protected snapshots only after deleting unprotected snapshots and internal asynchronous mirror snapshots
- **ARE_YOU_SURE_YOU_WANT_TO_DECREASE_THE_PROTECTED_LEVEL_OF_EXISTING_SNAPSHOTS**

  Are you sure you want to decrease the protected level of snapshot in Storage Pool *Pool*? Note that the pool contains protected snapshots that will become unprotected after issuing this command.In case of pool space depletion the system will delete internal asynchronous mirror snapshots only after deleting unprotected snapshots

Return codes

- **POOL_DOES_NOT_EXIST**

  Storage Pool does not exist
- **SNAPSHOT_ILLEGAL_PRIORITY**

  Illegal snapshot priority; must be an integer between 1 and 4.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Creating storage pools

Use the **pool_create** command to create a storage pool.

```
pool_create pool=PoolName size=GB snapshot_size=GB [ lock_behavior=<read_only|no_io> ]
[ perf_class=perfClassName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
pool	Object name	The name of the new storage pool.	Y	N/A
size	Positive integer	Effective capacity of the storage pool (in gigabytes).	Y	N/A
hard_size	Positive integer	Hard size of the storage pool (actual physical capacity).	N	N/A
snapshot_size	Positive integer	Effective capacity allocated for snapshots.	Y	N/A
lock_behavior	Enumeration	Determines whether and how the pool is locked upon space depletion.	N	read_only
perf_class	Object name	The name of the performance class pool.	N	No performance class
domain	Object name	Add the pool to the specified domain.	N	none

This command creates a storage pool. The name of the storage pool must be unique in the system. Upon creation, the storage pool is initially empty and does not contain volumes.

The size of the storage pool is specified as an integer multiple of 10^9 bytes, but the actual size of the created storage pool is rounded up to the nearest integer multiple of $16x2^{30}$ bytes. The **size** parameter is used when hard size and soft size are identical (no thin provisioning). If only the size is specified, then **hard_size** and **soft_size** are identical to the size. Otherwise, a storage pool with thin provisioning is created.

The created pool has the following values:

- **create_last_consistent_snapshot=yes** - meaning the volumes of this pool can be mirrored.
- **protected_snapshot_priority=2** - managing the way **last_consistent** snapshot are preserved.

When a storage pool is defined, the new storage pool's capacity is reduced from the system's free space (hard and soft). This operation fails if the system hard or soft free space does not have free capacity of at least the size of the new storage

pool. The sum of the capacities of all the storage pools in the system, together with the free space, is always equal to the entire system capacity available for the user.

The system allows for the assignment of the entire available capacity to user created storage pools, while leaving the free space at zero size.

Both hard and soft sizes are subtracted from the free hard/soft space.

For thin provisioned storage pools, the **lock_behavior** parameter sets whether and how the pool is locked upon space depletion. The pool can be locked for write, or for both read and write.

Example:

```
pool_create pool=DBPool size=1000
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **POOL_SNAPSHOT_SIZE_TOO_SMALL**

  Snapshot size is very small. It will only allow snapshots of volumes which do no change. All other snapshots will be deleted immediately. Are you sure?

Return codes

- **POOL_NAME_EXISTS**

  Storage Pool name already assigned to another Storage Pool
- **PERF_CLASS_BAD_NAME**

  Performance Class does not exist
- **MAX_POOLS_REACHED**

  Maximum number of Storage Pools already defined
- **NO_HARD_SPACE**

  The system does not have enough free hard space for the requested Storage Pool hard size
- **NO_SOFT_SPACE**

  The system does not have enough free soft space for the requested Storage Pool soft size
- **NO_SPACE**

  The system does not have enough free space for the requested Storage Pool size

- **SOFT_SIZE_SMALLER_THAN_HARD_SIZE**
  Soft size must be equal or larger than hard size
- **HARD_SIZE_SMALLER_THAN_SNAPSHOT_SIZE**
  Snapshot size must be equal or smaller than hard size
- **REACHED_POOL_MAX_HARD_CAPACITY**
  Reached max pool hard capacity
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **USER_ASSOCIATED_TO_MORE_THAN_ONE_DOMAIN**
  As the user that runs this command is attached to more than one domain, it is not clear in which domain the pool is created. Run the command again and specify a domain.
- **NO_FREE_HARD_CAPACITY_IN_DOMAIN**
  There is not enough free hard space in the domain.
- **NO_FREE_SOFT_CAPACITY_IN_DOMAIN**
  There is not enough free soft space in the domain.
- **NO_FREE_CAPACITY_IN_DOMAIN**
  There is not enough free space in the domain.
- **DOMAIN_MAX_POOLS_REACHED**
  The maximum number of domain pools was reached.
- **PERF_CLASS_ASSOCIATED_WITH_HOSTS**
  Performance Class *Performance Class* is already in use by host.

Deleting a storage pool

Use the **pool_delete** command to delete a storage pool.

```
pool_delete pool=PoolName
```

Parameters

Name	Type	Description	Mandatory
pool	Object name	The name of the storage pool to be deleted.	Y

This command fails if the storage pool is not empty, that is it still contains volumes.

The capacity of the deleted storage pool is added to the free space.

Example:

```
pool_delete pool=ERPPool
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_POOL**

  Are you sure you want to delete Storage Pool *Pool*?

Return codes

- **POOL_DOES_NOT_EXIST**

  Storage Pool does not exist
- **POOL_HAS_CG**

  Storage Pool has Consistency Groups defined
- **POOL_IN_USE**

  Storage Pool has volumes allocated in it
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **POOL_BELONGS_TO_A_GROUPED_POOL**

  Pool belongs to a Grouped Pool.

Listing storage pools

Use the **pool_list** command to list all storage pools or the specified one.

```
pool_list [ pool=PoolName ] [ managed=<yes|no|all> ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
pool	Object name	The name of a storage pool.	N	All pools.
gp	Object name	Name of a group pool.	N	All pools.
managed	Boolean	Determines whether to show unmanaged pools (no), managed (yes), or both (all).	N	No
domain	Object name	The domain name.	N	All Domains

When the **pool** parameter is provided, only the specified storage pool is listed.

Example:

```
pool_list
```

Output:

```
Name     Size (GB)  Empty Space (GB)
default  24292      9225
DBPool   1013       1013
```

Field ID	Field output	Default position
name	Name	1
soft_size	Size (GB)	2
soft_size_MiB	Size (MiB)	N/A
hard_size	Hard Size (GB)	6
hard_size_MiB	Hard Size (MiB)	N/A
snapshot_size	Snap Size (GB)	4
snapshot_size_MiB	Snap Size (MiB)	N/A
total_volume_size	Soft Vols (GB)	3
total_volume_size_MiB	Soft Vols (MiB)	N/A
empty_space_soft	Soft Empty (GB)	5
empty_space_soft_MiB	Soft Empty (MiB)	N/A
empty_space_hard	Hard Empty (GB)	10
empty_space_hard_MiB	Hard Empty (MiB)	N/A
used_by_volumes	Hard Vols (GB)	7
used_by_volumes_MiB	Hard Vols (MiB)	N/A
used_by_snapshots	Hard Snaps (GB)	9
used_by_snapshots_MiB	Hard Snaps (MiB)	N/A
creator	Creator	N/A
locked	Locked	8
lock_behavior	Lock Behavior	N/A
create_last_consistent_snapshot	Create Last Consistent Snapshot	N/A
protected_snapshot_priority	Protected Snapshots Priority	N/A
managed	Managed	N/A
perf_class	Perf Class Name	11
domain	Domain	12

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Renaming a storage pool

Use the **pool_rename** command to rename the specified storage pool.

```
pool_rename pool=PoolName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
pool	Object name	The current name of the storage pool.	Y
new_name	Object name	The new name of the storage pool.	Y

The new name of the storage pool must be unique in the system.

This command succeeds even if the new name is identical with the current name.

Example:

```
pool_rename pool=DBPool new_name=ERPPool
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **POOL_DOES_NOT_EXIST**

  Storage Pool does not exist
- **POOL_NAME_EXISTS**

  Storage Pool name already assigned to another Storage Pool
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.

Resizing a storage pool

Use the **pool_resize** command to resize a storage pool.

```
pool_resize pool=PoolName [ size=GB ] [ snapshot_size=GB ]
```

Parameters

Name	Type	Description	Mandatory	Default
pool	Object name	The name of the storage pool to be resized.	Y	N/A
size	Positive integer	The new size of the storage pool (in gigabytes)	N	N/A
hard_size	Positive integer	Hard size of the storage pool (actual physical capacity).	N	N/A
soft_size	Positive integer	Soft size of the storage pool (maximal size of capacity seen by the hosts, used for thin provisioning).	N	N/A
snapshot_size	Integer	The new limit on snapshot capacity usage of the storage pool.	N	Leave unchanged.

The command can either increase or decrease the storage pool size.

The new size of the storage pool is specified as an integer multiple of 10^9 bytes, but the actual size of the created Storage Pool is rounded up to the nearest integer multiple of $16x2^{30}$ bytes.

Capacity accounting is performed in respect to the free space.

You can either specify both **hard_size** and **soft_size** or to only specify size (which specifies that the **hard_size** and the **soft_size** are identical).

- When increasing a storage pool size, the command succeeds only if the free space holds enough free capacity to allow such an increase in size.
- When decreasing a storage pool size, the command succeeds only if the storage pool itself holds enough free capacity to allow such a reduction in size.
- If the new size equals the current size, the command succeeds without changes to the storage pool.

This command fails if either the current storage pool's size (hard or soft) cannot be decreased or if free space (hard or soft) cannot be decreased.

When resizing a pool that stores asynchronous-mirrored volumes or consistency groups, make sure that the pool's hard and soft sizes are identical.

Example:

```
pool_resize pool=DBPool size=1300
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **POOL_SNAPSHOT_SIZE_TOO_SMALL**

  Snapshot size is very small. It will only allow snapshots of volumes which do no change. All other snapshots will be deleted immediately. Are you sure?

Return codes

- **POOL_DOES_NOT_EXIST**

  Storage Pool does not exist
- **NO_SOFT_SPACE**

  The system does not have enough free soft space for the requested Storage Pool soft size
- **SOFT_SIZE_SMALLER_THAN_HARD_SIZE**

  Soft size must be equal or larger than hard size
- **HARD_SIZE_SMALLER_THAN_SNAPSHOT_SIZE**

  Snapshot size must be equal or smaller than hard size
- **POOL_SOFT_TOO_SMALL**

  Requested soft size is smaller than the sum of sizes of volumes in the Storage Pool
- **POOL_TOO_SMALL**

  Storage Pool usage exceeds requested size
- **POOL_HARD_TOO_SMALL**

  Storage Pool usage exceeds requested hard size
- **NO_SPACE**

  The system does not have enough free space for the requested Storage Pool size
- **NO_HARD_SPACE**

  The system does not have enough free hard space for the requested Storage Pool hard size
- **REACHED_POOL_MAX_HARD_CAPACITY**

  Reached max pool hard capacity
- **POOL_MUST_BE_THIN**

  This pool has a golden snapshot and therefore must be thin provisioned.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **GROUPED_POOL_THIN_MUST_BE_THIN**

  Thin pool must be thin provisioned.
- **NO_FREE_HARD_CAPACITY_IN_DOMAIN**

There is not enough free hard space in the domain.

- **NO_FREE_SOFT_CAPACITY_IN_DOMAIN**
  There is not enough free soft space in the domain.
- **NO_FREE_CAPACITY_IN_DOMAIN**
  There is not enough free space in the domain.

Moving a volume between storage pools

Use the **vol_move** command to move a volume and all its snapshot from one storage pool to another.

```
vol_move vol=VolName pool=PoolName [ domain_adjust=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Name of the volume to move.	Y	N/A
pool	Object name	Name of the storage pool to which to move.	Y	N/A
domain_adjust	Boolean	Adjust domain resources. If set to *true*, the resources of the volume source domain and destination domain are adjusted to accommodate the volume being moved.	N	no

When moving a master volume from one storage pool to another, all of its snapshots are moved together with it to the destination storage pool.

This command fails when trying to move a snapshot of a volume on its own. This command can fail due to the lack of either soft or hard space.

The command succeeds only if the destination storage pool has enough free storage capacity to accommodate the volume and its snapshots. The exact amount of storage capacity allocated from the destination storage pool is released at the source storage pool.

A volume that is asynchronously mirrored cannot be moved into a thin provisioning pool.

Example:

```
vol_move vol=DBLog pool=DBPool
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **POOL_DOES_NOT_EXIST**

  Storage Pool does not exist
- **NOT_ENOUGH_SPACE**

  No space to allocate volume
- **NOT_ENOUGH_HARD_SPACE**

  No space to allocate for volume's current usage
- **VOLUME_IS_SNAPSHOT**

  Operation is not permitted on snapshots
- **VOLUME_HAS_OLVM**

  IBM Hyper-Scale Mobility relation is defined for this volume
- **VOLUME_BELONGS_TO_CG**

  Volume belongs to a Consistency Group
- **NOT_ENOUGH_SNAPSHOT_SPACE**

  Snapshot usage will exceed snapshot limit
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **CANNOT_MOVE_TO_THICK_POOL_VOLUME_HAS_GOLDEN_SNAPSHOTS**

  Volume has golden snapshots and therefore cannot be moved to a thick pool.
- **MAPPED_HOSTS_NOT_IN_DESTINATION**

  A host that is mapped to a volume in the pool is not associated with the target domain.
- **MAPPED_CLUSTERS_NOT_IN_DESTINATION**

  A cluster that is mapped to a volume in the pool is not associated with the target domain.
- **DOMAIN_USED_SCHEDULE_NOT_IN_DESTINATION**

  A schedule that is used by a mirror in the pool is not associated with the target domain.
- **DOMAIN_USED_TARGET_NOT_IN_DESTINATION**

  A target that is used by mirror in the pool is not associated with the target domain.
- **DOMAIN_MAX_MIRRORS_REACHED**

  The domain exceeds the maximum allowed number of mirrors.
- **DOMAIN_MAX_DMS_REACHED**

The domain exceeds the maximum allowed number of data migrations.

- **DOMAIN_MAX_VOLUMES_REACHED**

  The domain exceeds the maximum allowed number of volumes.
- **MAX_MIRRORS_REACHED**

  Maximum number of mirrors already defined
- **MAX_DMS_REACHED**

  Maximum number of remote volumes (mirror/migration) is already defined

  Troubleshooting: Delete unnecessary Data Migration objects
- **MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined
- **BOUND_ALUS_NOT_IN_DESTINATION**

  An ALU that is bound to a volume in the pool is not associated with the target domain.

Chapter 9. System management commands

This section describes the command-line interface (CLI) for system management.

Displaying current consumed capacity of the system

Use the **cod_list** to display current consumed capacity of the system.

```
cod_list [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Name of parameter to display.	N	All parameters

Field ID	Field name	Default position
name	Name	1
value	Value	2

This command displays current consumed capacity of a given system.

Example:

```
cod_list
```

Output:

```
Name                   Value
---------------------- ----------------
consumed_capacity      1039
date                   2009-05-27
dst                    yes
machine_model          A14
machine_serial_number  MN00013
machine_type           2810
system_id              13
system_name            XIV MN00013a
time                   10:13:31
timezone               Asia/Jerusalem
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CONF_SERVER_UNREACHABLE**
  Configuration server unreachable
- **UNRECOGNIZED_CONFIG_PARAMETER**
  Unrecognized configuration parameter: '*name*'.
  Troubleshooting: Use a valid configuration parameter as an input.

Displaying the values of configuration parameters

Use the **config_get** command to show the values of configuration parameters.

```
config_get [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Name of parameter to print.	N	All parameters.

Field ID	Field output	Default position
name	Name	1
value	Value	2

This command shows the name and value of the specified configuration parameter or of all of them, if no parameter is provided.

The values of the following parameters can be shown:

- **dns_primary** - IP address of the master DNS server.
- **dns_secondary** - IP address of the slave DNS server.
- **email_reply_to_address** - Reply-to address to be used when sending emails. This is useful for troubleshooting errors in email addresses.
- **email_sender_address** - Email address used as the sender's address when sending email messages.
- **email_subject_format** - Controls the formatting of the email subject line. To insert the event's data, use the following tags: **{severity}**, **{description}**, or **{system_name}**. System default is **"{severity}: {description}"**.
- **iscsi_name** - iSCSI initiator name. Used when configuring a non-XIV system for data migration over iSCSI.
- **machine_model**
- **machine_serial_number**
- **machine_type**
- **ntp_server** - IP address or DNS name of the NTP server.
- **snmp_community** - Community used for SNMP queries of the system.
- **snmp_location** - SNMP location as shown in the SNMP MIB. (.1.3.6.1.2.1.1.6.0).
- **snmp_contact** - SNMP contact as shown in the SNMP MIB. (.1.3.6.1.2.1.1.4.0).
- **snmp_trap_community** - Community used for SNMP traps sent by the system.
- **support_center_port_type** -
- **system_id** - Unique system identifier (equivalent to a serial number).

- **system_name**

Example:

```
config_get
```

Output:

```
Name                         Value
---------------------- ----------------------------------
email_sender_address     support@ibm.com
email_reply_to_address   storage@ibm.com
dns_primary              10.0.0.10
dns_secondary
iscsi_name               iqn.2005-10.com.xivstorage:010140
system_name              IBM Storage System
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CONF_SERVER_UNREACHABLE**
  Configuration server unreachable
- **UNRECOGNIZED_CONFIG_PARAMETER**
  Unrecognized configuration parameter: '*name*'.
  Troubleshooting: Use a valid configuration parameter as an input.

Setting configuration parameters

Use the **config_set** command to set configuration parameters.

```
config_set name=Name value=ParamValue
```

Parameters

Name	Type	Description	Mandatory
name	String	Name of the parameter to set.	Y
value	String	Value of the parameter.	Y

This command sets the values of configuration parameters.

The values of the following parameters can be set:

- **dns_master** - IP address of the master DNS server.
- **dns_slave** - IP address of the slave DNS server.

- **email_sender_address** - Email address used as the sender's address when sending email messages. Once set, this parameter cannot be set to null.
- **email_reply_to_address** - Reply-to address to be used when sending emails. This is useful for troubleshooting errors in email addresses.
- **system_name** - Name used as the sender's name when sending email messages.
- **defaultuser** - Default user to be used if no user is specified for the CLI. If null, a user must be specified.
- **snmp_sysname** - SNMP system name as shown in the SNMP MIB. (.1.3.6.1.2.1.1.5.0)
- **snmp_location** - SNMP location as shown in the SNMP MIB. (.1.3.6.1.2.1.1.6.0)
- **snmp_contact** - SNMP contact as shown in the SNMP MIB. (.1.3.6.1.2.1.1.4.0)
- **email_subject_format** - Controls the formatting of the email subject line. To insert the event's data, use the following tags: **{severity}**, **{description}**, or **{system_name}**. System default is **"{severity}: {description}"**.
- **ntp_server** - IP address or DNS name of the NTP server.
- **snmp_community** - Community used for SNMP queries of the system.
- **snmp_trap_community** - Community used for SNMP traps sent by the system.

Example:

```
config_set name=dns_secondary value=10.0.0.119
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNRECOGNIZED_CONFIG_PARAMETER**

  Unrecognized configuration parameter: '*name*'.

  Troubleshooting: Use a valid configuration parameter as an input.
- **READ_ONLY_CONFIG_PARAMETER**

  Configuration parameter: '*name*' is read-only.

  Troubleshooting: You cannot modify read-only parameters.
- **IPV4_NOT_CONFIGURED**

  IPv4 address is not configured on management interface

  Troubleshooting: Define IPv4 address for management before disabling IPv6

Testing the DNS

Use the **dns_test** command to test the DNS (Domain Naming Service).

```
dns_test name=Name [ type=<A|AAAA> ]
```

Parameters

Name	Description	Mandatory	Default
name	Name of the host to be resolved.	Y	N/A
type	Type of query.	N	According to the DNS server type

This command attempts to translate the DNS name into an IP address. Translation is attempted through each of the defined DNS servers.

This command fails if no DNS servers are defined. A failure of the translation from a name to an IP address is not considered a failure of the command.

The result of each defined DNS server is displayed.

Field ID	Field output	Default position
name	Name	1
primary_ip	IP (Primary DNS)	2
secondary_ip	IP (Secondary DNS)	3

Example:

```
dns_test name=hermes.xiv
```

Output:

```
Name         IP (Primary DNS)   IP (Secondary DNS)
------------ ------------------ --------------------
hermes.xiv   212.143.102.243    Not Found
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DNS_SERVER_NOT_DEFINED**

  No DNS servers are defined

Displaying help

Use the **help** command to display system help.

```
help [ category=Category | search=SearchString | command=CommandName ]
```

Parameters

Name	Type	Description	Mandatory
category	String	Category name.	N
search	String	Search string.	N
command	String	Command name.	N
format	Enumeration	Output format for command help.	N

This command displays the help as follows:

- No parameters - Lists all the commands with their short descriptions, grouped by categories.
- Category - Lists all the commands in the category, with their short descriptions.
- Search - Lists the short descriptions of all the commands in which the search string appears in their name or short description.
- Command with short output (default for command) - Displays the command name and short description.
- Command with full output (default when used in XIV-internal mode) - Displays the command name, short description, syntax, list of parameters and their description, types and default values. If output is table, displays all possible table columns.

Example:

```
help category=volume
```

Output:

```
Category  Name       Description

volume    vol_copy   Copies a source volume onto a target volume.

volume    vol_create Creates a new volume.

volume    vol_delete Deletes a volume

volume    vol_format Formats a volume.

volume    vol_list   Lists all volumes, or a specific one.

volume    vol_lock   Locks a volume, so that it is read-only.

volume    vol_rename Renames a volume

volume    vol_resize Resizes a volume

volume    vol_unlock Unlocks a volume, so that it is no longer read-only,
                     and can be written to.
```

Field ID	Field output	Default position
category	Category	1
name	Name	2
access_control	Access Control	N/A
syntax	Syntax	N/A
fields	Fields	N/A
description	Description	3
example	Example	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying the current maintenance urgency

Use the **maintenance_urgency_list** command to display the current maintenance urgency of the system.

```
maintenance_urgency_list
```

Example:

```
maintenance_urgency_list
```

Output:

```
maintenance_urgency = "NONE"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Adding a patch script to be run on system modules

Use the **patch_script_add** command to add a patch script that will be run on system module(s).

```
patch_script_add tar_file=TarFile name=Name exe_file=ExeFile [ module_list=ModuleList ]
 [ module_type=<specific|all> ] [ version=Version ] [ persistence=<yes|no> ]
 [ run_option=<Always|Once> ] [ parameters=(p1,p2,p3....p10) ] [ enabled=<yes|no> ]
 [ description=Description ]
```

Parameters

Name	Type	Description	Mandatory	Default
module_list	N/A	The numbers of modules on which to execute the script. Multiple values must be separated with a forward slash (/), for example: 4/5/6/.	N	None
module_type	Enumeration	The types of modules on which to execute the script. The default is *all*. If a specific type is defined, define the module parameter as well.	N	all
name	String	The script name.	Y	N/A
exe_file	String	The name of the script's executable file.	Y	N/A
tar_file	String	The name of the script's tar.gz loaded file.	Y	N/A
version	String	The script's version.	N	None
persistence	Boolean	Defines whether the script is persistent.	N	yes
run_option	Enumeration	Defines whether the script is to be run Always or Once.	N	Once
parameters	String	Patch script parameters divided by " ".	N	None
enabled	Boolean	Defines whether the patch script is user enabled.	N	no
description	String	The script's description.	N	None

Example:

```
patch_script_add module_type=specific module_list=1/2/3
tar_file=upgrade_script.tar.gz exe_file=upgrade_script.sh version=10.2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **PATCH_SCRIPT_NOT_ALL_RAS_NODES_ARE_UP**

  Not all RAS nodes in OK modules are available. Do you want to continue any way?
- **PATCH_SCRIPT_NOT_ALL_LOCAL_STORAGES_ARE_MOUNTED**

  Local is not mounted on all OK modules with alive RAS node. Do you want to continue anyway and upload the script to available modules only?

Return codes

- **PATCH_SCRIPT_MODULE_LIST_IS_NOT_RELEVANT**

  Module list is relevant only when using specific module type.
- **PATCH_SCRIPT_MODULE_LIST_MUST_BE_SPECIFIED**

  Module list must be specified when using specific module type.
- **PATCH_SCRIPT_MAX_REACHED**

  Exceed max patch script objects.
- **PATCH_SCRIPT_ALREADY_EXISTS**

  Patch script already exists.
- **PATCH_SCRIPT_TAR_FILE_DOES_NOT_EXIST**

  The tar file does not exist.

  Troubleshooting: Upload the tar file before executing the command again.
- **PATCH_SCRIPT_EXE_FILE_DOES_NOT_EXIST**

  The exe file does not exist in the supplied tar file.
- **PATCH_SCRIPT_FAILED_CREATING_DIRECTORY**

  Failed creating directory for the patch script.
- **PATCH_SCRIPT_FAILED_UNPACKING**

  Failed unpacking patch script tar.gz file.
- **PATCH_SCRIPT_FAILED_CHMOD**

  Failed chmod patch script directory.
- **PATCH_SCRIPT_SIGNATURE_IS_NOT_VERIFIED**

  The patch script signature is not verified.
- **PATCH_SCRIPT_FAILED_TO_DISTRIBUTE**

  Failed to distribute the patch script.

Deleting a patch script

Use the **patch_script_delete** command to delete a patch script.

```
patch_script_delete name=Name
```

Parameters

Name	Type	Description	Mandatory
name	String	The name of the script to be deleted.	Y

Example:

```
patch_script_delete name=upgrade_script
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **PATCH_SCRIPT_DOESNT_EXIST**

  Patch script does not exist.

Listing patch scripts

Use the **patch_script_list** command to list patch scripts.

```
patch_script_list
```

Example:

```
patch script_list
```

Output:

```
This command is run from the Technician Assistant Tool.
```

Field ID	Field output	Default position
super.name	Name	1
execution_flags.enabled	Enabled	2
general_info.tar_file	Tar File	3
general_info.exe_file	Exe File	4
general_info.parameters	Parameters	5
execution_flags.module_type	Module Type	6
execution_flags.module_list	Module List	7
execution_flags.run_option	Run Option	8
execution_flags.persistence	Persistence	9
description_info.version	Version	10
description_info.description	Description	11

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Updating a patch script to be run on system modules

Use the **patch_script_update** command to update a patch script that will be run on system module(s).

```
patch_script_update name=Name [ module_list=ModuleList ] [ module_type=<specific|all> ]
 [ version=Version ] [ persistence=<yes|no> ] [ run_option=<Always|Once> ]
 [ parameters=(p1,p2,p3....p10) ] [ enabled=<yes|no> ] [ description=Description ]
```

Parameters

Name	Type	Description	Mandatory	Default
module_list	N/A	The numbers of modules on which to execute the script. Multiple values must be separated with a forward slash (/), for example: 4/5/6/.	N	None
module_type	Enumeration	The types of modules on which to execute the script. The default is *all*. If a specific type is defined, define the module parameter as well.	N	all
name	String	The script name.	Y	N/A

Name	Type	Description	Mandatory	Default
persistence	Boolean	Defines whether the script is persistent.	N	yes
run_option	Enumeration	Defines whether the script is to be run Always or Once.	N	Once
parameters	String	Patch script parameters divided by " ".	N	None
enabled	Boolean	Defines whether the patch script is user enabled.	N	no
version	String	Script version.	N	None
description	String	Script description.	N	None

Example:

```
patch_script_update module_type=all name=upgrade_script
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **PATCH_SCRIPT_DOESNT_EXIST**
  Patch script does not exist.
- **PATCH_SCRIPT_MODULE_LIST_IS_NOT_RELEVANT**
  Module list is relevant only when using specific module type.
- **PATCH_SCRIPT_MODULE_LIST_MUST_BE_SPECIFIED**
  Module list must be specified when using specific module type.

Retrieving a patch script log

Use the **patch_script_get_log** command to retrieve a patch script log.

```
patch_script_get_log name=Name module=ModuleNumber
```

Parameters

Name	Type	Description	Mandatory
module	N/A	ID of the module from which to retrieve the log.	Y
name	String	The script name.	Y

Field ID	Field output	Default position
index	Index	1
line	Line	2

Example:

```
patch_script_get_log module=1:Module:3 name=test1
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **PATCH_SCRIPT_DOESNT_EXIST**

  Patch script does not exist.
- **CANNOT_READ_FROM_FILE**

  Cannot read from file '*Filename*'

  Troubleshooting: Contact support

Triggering patch script execution on one or all modules

Use the **patch_script_activate** command to trigger patch script execution on one or all modules.

```
patch_script_activate  name=Name [ module=ModuleNumber ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Patch script name.	Y	N/A

Name	Type	Description	Mandatory	Default
module	N/A	Specific module to send activate request. If this parameter is not mentioned by default the request will be sent to all modules.	N	All modules

Example:

```
patch_script_activate name=my_script module=1:Module:3
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **PATCH_SCRIPT_CANNOT_SEND_ACTIVATE_NOW_REQUEST_TO_ALL_MODULES**

  Cannot send activate now request to all modules. do you want to send anyway to available modules?

Return codes

- **PATCH_SCRIPT_IS_DISABLED**

  Patch script is disabled.
- **PATCH_SCRIPT_NOT_ALL_MODULES_GOT_ACTIVATE_NOW_REQUEST**

  One or more modules didn't get the activate now request.
- **PATCH_SCRIPT_DOESNT_EXIST**

  Patch script does not exist.

Retrieving the patch script execution information

Use the **patch_script_status** command to retrieve the patch script execution information.

```
patch_script_status  [ module=ModuleNumber ] [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	The patch script name. If not specified all scripts will be shown.	N	All scripts
module	N/A	Specific module id to show information about. If not specified all modules will be shown.	N	All modules

Example:

```
patch_script_status_list module name
```

Output:

```
Script Name  Module ID     Current PID   Last Execution Time   Times Executed
------------ ------------- ------------- --------------------- ----------------
my_script    1:Module:3    2357          2013-05-01 17:51:16   1

Times Failed Executing   Last Execution Status   Last Return Code
------------------------ ---------------------- ------------------
0                        Finished               2
```

Field ID	Field output	Default position
script_uid	Patch Script UID	N/A
script_name	Script Name	1
module_id	Module ID	2
current_pid	Current PID	3
last_execution_time	Last Execution Time	4
number_of_times_executed	Times Executed	5
number_of_times_failed_to_execute	Times Failed Executing	6
last_execution_status	Last Execution Status	7
last_execution_return_code	Last Return Code	8

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Shutting down the system

Use the **shutdown** command to shut down the system.

```
shutdown [ emergency=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
emergency	Boolean	Instructs the system to shut down within a timeout even if some of the disks could not be saved, much like in an emergency shutdown performed when the system loses power.	N	no

The system stops serving hosts, de-stages all information to disks and then turns itself off. If the **emergency** parameter is defined, the system shuts down within the timeout period.

NOTE: USING THIS OPTION MAY CAUSE DATA LOSS.

Important: Issuing the **shutdown** command on an IBM Spectrum Accelerate system, shuts down virtual machines only. If Self-Encrypting Drives (SED) are attached to the system, they will remain activated and unlocked on ESXi until ESXi is physically powered down.

Example:

```
shutdown
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_SHUT_DOWN**

  Are you sure you want to shut down the machine and all its components?

Return codes

- **COMMAND_IS_NOT_VALID_IN_CURRENT_SYSTEM_STATE**

  The requested command cannot be invoked in the current system state
- **FIRMWARE_UPGRADE_IN_PROGRESS**

  Firmware upgrade in progress

  Troubleshooting: Contact support
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Listing the operational state

Use the **state_list** command to display the current operational state of the system.

```
state_list
```

Field ID	Field output	Default position
category	Category	1
value	Value	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Checking free space in the local storage

Use the **local_storage_show** command to display the amount of free space (in bytes) left in the local storage.

```
local_storage_show
```

Field ID	Field output	Default position
module_id	Module	1
free_bytes	Free space in bytes	2

Example:

```
local_storage_show
```

Output:

```
Module   Free space in bytes
-------- --------------------
3        2017837056
6        2042654720
9        2041233408
14       2037891072
15       2042384384
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying system capacity

Use the **system_capacity_list** command to display capacity of the system (hard, usable and soft).

```
system_capacity_list
```

The command output includes the following fields:

Example:

```
system_capacity_list
```

Field ID	Field output	Default position
soft	Soft	1
hard	Hard	2

Field ID	Field output	Default position
usable	Usable	3
usable_set_to_hard	Usable Follow Hard	4
max_pool_size	Max_Pool_Size	5
free_hard	Free Hard	6
free_soft	Free Soft	7
free_usable	Free Usable	8
spare_modules	Spare Modules	9
spare_disks	Spare Disks	10
target_spare_modules	Target Spare Modules	11
target_spare_disks	Target Spare Disks	12
soft_MiB	Soft (MiB)	N/A
hard_MiB	Hard (MiB)	N/A
usable_MiB	Usable (MiB)	N/A
free_hard_MiB	Free Hard (MiB)	N/A
free_soft_MiB	Free Soft (MiB)	N/A
free_usable_MiB	Free Usable (MiB)	N/A
capacity_limit_percentage	Capacity Limit (%)	13

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Displaying the capacity history for the last 31 days

Use the to list the system's hard and usable capacity history for the last 31 days.

```
system_capacity_history_list
```

The output includes a list of the last 31 days. Each of the entries contains the following fields:

- Time
- System hard capacity [in GB]
- System usable capacity [in GB]

Field ID	Field output	Default position
time	Time	1
hard	Hard capacity (GB)	2
usable	Usable capacity (GB)	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Displaying the current time

Use the **time_list** command to display the current system time.

```
time_list
```

This command shows the current time, date and time zone.

Field ID	Field output	Default position
time	Time	1
date	Date	2
timezone	Time Zone	3
dst	Daylight Saving Time	4

Example:

```
time_list
```

Output:

```
Time       Date         Time Zone        Daylight Saving Time
---------- ------------ ---------------- ----------------------
10:09:47   2008-02-19   Asia/Jerusalem   no
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Setting the system's time

Use the **time_set** command to set the system's time in YYYY-MM-DD.HH:MM:SS format.

```
time_set time=Timestamp
```

Parameters

Name	Description	Mandatory
time	New current time.	Y

Example:

```
time_set time=2016-03-04.03:02:01
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SYSTEM_TIME_NOT_CHANGED**

  System time was not changed

  Troubleshooting: Please try again.
- **BAD_TIMESTAMP**

  Timestamp cannot be deciphered

Listing optional time zones

Use the **timezone_list** command to list all optional time zones.

```
timezone_list
```

Standard POSIX time zones are used. http://www.timeanddate.com/worldclock/ provides a full description of all time zones.

Example:

```
timezone_list
```

Output:

```
Timezone
---------------------------------
Africa/Abidjan
Africa/Accra

...

WET
Zulu
```

Field ID	Field output	Default position
Timezone	Timezone name	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Setting the time zone

Use the **timezone_set** command to set the time zone of the system.

```
timezone_set timezone=TimeZone
```

Parameters

Name	Type	Description	Mandatory
timezone	String	New time zone of the system.	Y

See Listing optional time zones for a complete list of optional time zones.

Standard POSIX time zones are used. http://www.timeanddate.com/worldclock/ provides a full description of all time zones.

Example:

```
timezone_set timezone=Etc/GMT+1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **BAD_TIMEZONE_NAME**

  Timezone is not recognized by the system

Aborting the upgrade to a new software version

Use the **upgrade_abort_ongoing** command to abort the system upgrade process.

```
upgrade_abort_ongoing
```

In case the I/O are not stopped, the command aborts the upgrade and returns the system to full operation.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **HOT_UPGRADE_IS_NOT_ONGOING**

  Hot upgrade is not currently ongoing

Initiating the download of a new software version

Use the **upgrade_download** command to initiate the download of a new software version.

```
upgrade_download version=Version interface_type=<laptop|management|maintenance|
vpn> [ repository_ip=DownloadServer ]
```

Parameters

Name	Type	Description	Mandatory
version	String	Version number of the new software to be downloaded.	Y

Name	Type	Description	Mandatory
interface_type	Enumeration	Type of IP interface where the repository IP resides.	Y
repository_ip	N/A	Network server used as the source for the new version.	N

The command fails only if there is another download process in effect. All other failures are reported asynchronously in the **upgrade_status** command.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SYSTEM_UPGRADE_IS_ALREADY_RUNNING**

  Upgrade is already running
- **NO_ACTIVE_PORTS_OF_SPECIFIED_ROLE**

  None of the ports of the specified role is active.
- **UPGRADE_DOWNLOAD_COULD_NOT_BE_STARTED**

  Failed starting upgrade download of an unknown reason.
- **REPOSITORY_IP_MUST_BE_SUPPLIED_FOR_DOWNLOAD**

  Repository IP must be supplied for download if the interface type is Management or VPN.
- **NO_PORTS_OF_SPECIFIED_ROLE**

  The system does not have any ports of the specified roles.
- **PORT_ROLE_IS_INVALID**

  Specified port role is invalid.

Canceling the upgrade download process

Use the **upgrade_download_cancel** command to cancel the upgrade download process.

```
upgrade_download_cancel
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SYSTEM_UPGRADE_CANNOT_BE_CANCELED**
  Upgrade is already underway and cannot be canceled.
- **SYSTEM_UPGRADE_NOT_RUNNING**
  Upgrade is not underway

Displaying the status of the upgrade process

Use the **upgrade_get_status** command to display the status of the upgrade process.

```
upgrade_get_status
```

The output of this command displays the status of the upgrade process:

- Downloading - the upgrade package
- Ready for upgrade
- Preparing
- Finalizing upgrade (after the I/Os resumes)

Additional upgrade-related values:

- Requires a reboot
- Update is required
- The number of times the system attempted to stop I/Os
- Time to the next try
- Abort reason (in case the upgrade was aborted)
- Failed to communicate with server
- Server does not have the required software version
- No upgrade path from the current version to the new version
- The new version is a downgrade
- Download done
- Limitations on the upgrade (for example: upgrade to this version is not allowed if data migration is in progress, or if mirroring of a primary volume is defined as mandatory).

In addition, once the download is complete, a message is displayed, informing the user whether the upgrade would be hot (no I/O interrupted) or cold (interrupting I/Os).

Example:

```
upgrade_get_status
```

Output:

```
Name                       Value
-------------------------- ---------------------------------------
io_stopping_attempts_num   -1
is_restart_needed          Unknown
last_upgrade_result        System has never performed an upgrade
last_upgrade_start_time
seconds_for_next_attempt   -1
upgrade_state              Upgrade Not Underway
upgrade_substate           NO_UPGRADE
was_firmware_updated       Unknown
```

Field ID	Field output	Default position
name	Name	1
value	Value	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Appending data to an upgrade package file

Use the **upgrade_package_append** command to append data to an upgrade package file.

```
upgrade_package_append  offset=Offset fragment=Base64Data
[ last_fragment=<yes|no> version=Version ]
```

Parameters

Name	Type	Description	Mandatory
offset	N/A	Offset of the fragment in the file. The offset must be identical to the current size of the file.	Y
fragment	N/A	Base-64 data encoded fragment of the file.	Y
last_fragment	Boolean	Whether the fragment is the last in the file and the upgrade should commence.	Y
version	String	The version to which the package will upgrade the system.	Y

Appends data to an upgrade package file.

Example:

```
upgrade_package_append offset=0 last_fragment=no fragment=BASE64ENCODEDBINARYDATA
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SYSTEM_UPGRADE_IS_ALREADY_RUNNING**

  Upgrade is already running
- **UPGRADE_FRAGMENT_IS_NOT_CONSECUTIVE**

  The current size of the upgrade package file size is *File Size* but fragment offset is *Fragment Offset*.
- **BAD_BASE64_DATA**

  Data cannot be decoded as base-64 data.
- **CANNOT_WRITE_TO_FILE**

  Cannot write to file.
- **MALFORMATTED_UPGRADE_PACKAGE_METADATA**

  Cannot read metadata of upgrade package.
- **COMPONENT_DOES_NOT_EXIST**

  Component does not exist

Appending data to an uploaded file

Use the **upload_file_append** command to append data to an uploaded file.

```
upload_file_append offset=Offset fragment=Base64Data name=Name path=Path
[ last_fragment=<yes|no> ] [ module_type=ModuleType ]
```

Parameters

Name	Type	Description	Mandatory	Default
offset	N/A	Offset of the fragment in the file. The offset must be identical to the current size of the file.	Y	N/A
fragment	N/A	Base-64 data encoded fragment of the file.	Y	N/A
last_fragment	Boolean	Whether the fragment is the last in the file and the upgrade should commence.	Y	N/A

Name	Type	Description	Mandatory	Default
name	String	The name of the file.	Y	N/A
path	String	The path of the file.	Y	N/A
module_type	Enumeration	The module type to copy the file to (can be manager or misc_manager)	N	manager

Example:

```
upload_file_append name=file path=/local/scratch/ offset=0 last_fragment=no
fragment=BASE64ENCODEDBINARYDATA
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **FILE_FRAGMENT_IS_NOT_CONSECUTIVE**

  The current size of the upload file size is *File Size* but fragment offset is *Fragment Offset*.
- **BAD_BASE64_DATA**

  Data cannot be decoded as base-64 data.
- **CANNOT_WRITE_TO_FILE**

  Cannot write to file.

Deleting an existing upgrade package file

Use the **upgrade_package_delete** command to delete an existing upgrade package file.

```
upgrade_package_delete
```

Example:

```
upgrade_package_delete
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_REMOVE_UPGRADE_PACKAGE**

  Upgrade package could not be removed.

Upgrading a system

Use the **upgrade_system** command to upgrade the software version of the system.

```
upgrade_system upgrade_type=<hot|utilities_only>
```

Parameters

Name	Type	Description	Mandatory
upgrade_type	Enumeration	The type can be "hot" (for hot upgrade) or "utilities_only" (for warm upgrade).	Y

The command fails if:

- The download has not been initiated
- The download has not been completed

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SYSTEM_UPGRADE_NOT_FINISHED_DOWNLOADING**

  System cannot switch to new version until the new version is downloaded to all modules of the system.

  Troubleshooting: Make sure that all nodes finished downloading the new software version

- **FIRMWARE_UPGRADE_IN_PROGRESS**

  Firmware upgrade in progress

Troubleshooting: Contact support

- **PRE_UPGRADE_VALIDATIONS_ALREADY_RUNNING**

  Pre-upgrade validations cannot be invoked since the system is already in the process of performing those validations
- **NO_LIVE_ADMIN_SERVER_FOUND**

  Could not invoke pre-upgrade script because no module can run cli commands
- **PRE_UPGRADE_VALIDATION_FAILED**

  One or more of the conditions for starting an upgrade sequence failed
- **UPGRADE_RELATED_SCRIPT_ALREADY_RUNNING**

  Pre-upgrade or post-upgrade script cannot be invoked since an upgrade related script is currently running
- **SYSTEM_UPGRADE_INCOMPATIBLE_UPGRADE_TYPE_SPECIFIED**

  The specified upgrade type specified is incompatible with the kind of change imposed by the new version's files

  Troubleshooting: Specify the correct upgrade type

Validating the prerequisites of an upgrade to a new software version

Use the **upgrade_validate_prerequisites** command to validate the ability to upgrade to a specified system version.

```
upgrade_validate_prerequisites [ upgrade_type=<hot|utilities_only> ]
```

Parameters

Name	Type	Description	Mandatory	Default
upgrade_type	Enumeration	The type can be "hot" (for hot upgrade) or "utilities_only" (for warm upgrade).	N	hot

This command runs the prerequisites validation script of the upgrade, and returns its result.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **PRE_UPGRADE_VALIDATIONS_ALREADY_RUNNING**

  Pre-upgrade validations cannot be invoked since the system is already in the process of performing those validations
- **UPGRADE_RELATED_SCRIPT_ALREADY_RUNNING**

Pre-upgrade or post-upgrade script cannot be invoked since an upgrade related script is currently running

- **SYSTEM_UPGRADE_NOT_FINISHED_DOWNLOADING**

  System cannot switch to new version until the new version is downloaded to all modules of the system.

  Troubleshooting: Make sure that all nodes finished downloading the new software version
- **PRE_UPGRADE_VALIDATION_FAILED**
- **NO_LIVE_ADMIN_SERVER_FOUND**

  Could not invoke pre-upgrade script because no module can run cli commands

Printing the current system version

Use the **version_get** command to print the current version of the system.

```
version_get
```

Field ID	Field output	Default position
system_version	Version	1

Example:

```
version_get
```

Output:

```
Version
10.2
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying the values of VPD parameters

Use the **vpd_config_get** command to display the values of VPD parameters.

```
vpd_config_get  [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Name of the parameter to print.	N	All parameters.

Field ID	Field output	Default position
name	Name	1
value	Value	2

See Setting VPD parameters for a full list of available settings.

Example:

```
vpd_config_get name=site.city
```

Output:

```
Name        Value
----------- --------
site.city   Gotham
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CONF_SERVER_UNREACHABLE**
  Configuration server unreachable
- **UNRECOGNIZED_CONFIG_PARAMETER**
  Unrecognized configuration parameter: '*name*'.
  Troubleshooting: Use a valid configuration parameter as an input.

Setting VPD parameters

Use the **vpd_config_set** command to set the values of VPD (Vital Product Data) parameters.

```
vpd_config_set name=Name value=ParamValue
```

Parameters

Name	Type	Description	Mandatory
name	String	Name of the parameter to set.	Y
value	String	Value of the parameter.	Y

This command sets the following values of VPD parameters, where only the `name` is mandatory.:

- `customer.name`
- `customer.primary_contact.calling_hours`
- `customer.primary_contact.email`
- `customer.primary_contact.mobile_phone`
- `customer.primary_contact.name`
- `customer.primary_contact.office_phone`
- `customer.primary_contact.time_zone`
- `customer.secondary_contact.calling_hours`
- `customer.secondary_contact.email`
- `customer.secondary_contact.mobile_phone`
- `customer.secondary_contact.name`
- `customer.secondary_contact.office_phone`
- `customer.secondary_contact.time_zone`
- `customer.icn`
- `hardware_info.hw_ats_monitoring`
- `hardware_info.hw_ats_type`
- `hardware_info.hw_cable_bundle`
- `hardware_info.hw_door`
- `hardware_info.hw_patch_panel`
- `hardware_info.hw_patch_panel_label`
- `hardware_info.hw_power_cable_config`
- `hardware_info.hw_rack_type`
- `hardware_info.hw_rps`
- `interface_config.model`
- `machine_model`
- `machine_type`
- `main_ibm_contact.calling_hours`
- `main_ibm_contact.email`
- `main_ibm_contact.mobile_phone`
- `main_ibm_contact.name`
- `main_ibm_contact.office_phone`
- `main_ibm_contact.time_zone`
- `non_mutable_vpd_info.original_flashed_version`
- `non_mutable_vpd_info.original_flashing_date`
- `disk_size`
- `remote_support.customer_contact.calling_hours`
- `remote_support.customer_contact.email`
- `remote_support.customer_contact.mobile_phone`
- `remote_support.customer_contact.name`
- `remote_support.customer_contact.office_phone`
- `remote_support.customer_contact.time_zone`
- `remote_support.modem_phone_number`
- `remote_support.primary_ibm_ip`

- remote_support.secondary_ibm_ip
- remote_support.special_instructions
- remote_support.vpn_ip_1
- remote_support.vpn_ip_2
- site.building_location
- site.city site.country
- site.name
- site.postal_code
- site.state
- site.street_address
- site.off_premise
- system_info.sys_ec_level
- system_info.sys_hw_level

Example:

```
vpd_config_set name= value=
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **READ_ONLY_CONFIG_PARAMETER**

  Configuration parameter: '*name*' is read-only.

  Troubleshooting: You cannot modify read-only parameters.
- **UNRECOGNIZED_CONFIG_PARAMETER**

  Unrecognized configuration parameter: '*name*'.

  Troubleshooting: Use a valid configuration parameter as an input.

Displaying values of maintenance module parameters

Use the **mm_config_get** command to display the values of maintenance module parameters.

```
mm_config_get  [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Name of the parameter to print.	N	All of the parameters.

Field ID	Field output	Default position
name	Name	1
value	Value	2

Example:

```
mm_config_get name=mm_mutable_info.should_run_package_daemon
```

Output:

```
Name                                        Value
------------------------------------------- -------
mm_mutable_info.should_run_package_daemon   yes
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CONF_SERVER_UNREACHABLE**
  Configuration server unreachable
- **UNRECOGNIZED_CONFIG_PARAMETER**
  Unrecognized configuration parameter: '*name*'.
  Troubleshooting: Use a valid configuration parameter as an input.

Displaying the system's MIB file

Use the **mib_get** command to display the system's MIB file.

```
mib_get
```

Field ID	Default position
line	1

Example:

```
mib_get
```

Output:

```
-----------------------------------------------
-----------------------------------------------
-----------------------------------------------
-- -*- SNMP -*- mode for Emacs
XIV-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,
        NOTIFICATION-TYPE,
        Gauge32, Integer32   FROM SNMPv2-SMI
                ucdavis FROM UCD-SNMP-MIB
    OBJECT-GROUP, NOTIFICATION-GROUP,
        MODULE-COMPLIANCE    FROM SNMPv2-CONF

    TEXTUAL-CONVENTION, DisplayString
                             FROM SNMPv2-TC;
...
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_READ_FROM_FILE**

  Cannot read from file '*Filename*'

  Troubleshooting: Contact support

Retrieving the electronic license acceptance status

Use the **elicense_status_get** command to retrieve the electronic license acceptance status.

```
elicense_status_get
```

Example:

```
elicense_status_get
```

Output:

```
Status
----------
Accepted
```

Field ID	Field output	Default position
status	Status	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Retrieving a fragment of the electronic license file

Use the **elicense_blob_get** command to retrieve a fragment of the electronic license file.

```
elicense_blob_get beg=BeginIndex size=Number
```

Parameters

Name	Type	Description	Mandatory
beg	Positive integer	Beginning of the fragment in bytes.	Y
size	Positive integer	Length of the fragment in bytes. The maximum length allowed is 1000000.	Y

Example:

```
elicense_blob_get beg=0 size=20
```

Output:

```
<file_size value="1300473"/>
<fragment value="425a6839314159265359ba94ca1106dd587f84fe"/>
<fragment_size value="20"/>
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_READ_FROM_FILE**

  Cannot read from file '*Filename*'

Troubleshooting: Contact support

Accepting the electronic license agreement

Use the **elicense_accept** command to accept the electronic license agreement.

```
elicense_accept version=Version [ approver_name=UserName ]
```

Parameters

Name	Type	Description	Mandatory	Default
version	String	The electronic license version.	Y	N/A
approver_name	String	The approver's name.	N	none

Example:

```
elicense_accept version approver_name
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **ELICENSE_INCOMPATIBLE_VERSION**

  The accepted version of the Electronic license dose not match the current version

  Troubleshooting: Please retrieve the current electronic license version and accept it
- **ELICENSE_ALREADY_ACCEPTED**

  Electronic license already accepted

  Troubleshooting: You do not need to accept the electronic license
- **ELICENSE_DISABLED**

  Electronic license check is disabled

  Troubleshooting: You do not need to accept the electronic license

Enabling command auditing

Use the **audit_enable** command to enable CLI command auditing

```
audit_enable
```

This command is used by a security administrator to enable the auditing of user-entered CLI commands on an external auditing server. For this command to

complete successfully, the current auditing state must be DISABLED (that is, the **audit_show** command returns a *no*), and at least one audit server must be configured successfully by the **audit_config_set** command.

Example:

```
audit_enable
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **AUDIT_ALREADY_ENABLED**
  Command auditing already enabled.
- **AUDIT_NO_AUDIT_SERVER_DEFINED**
  No audit logging server is configured.

Disabling command auditing

Use the **audit_disable** command to disable CLI command auditing.

```
audit_disable
```

This command disables command auditing, provided that auditing is currently enabled, that is the **audit_show** command returns a *yes*.

Example:

```
audit_disable -y
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed

User Category	Permission
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **AUDIT_NOT_ENABLED**
  Command auditing is not enabled.

Displaying the command audit state

Use the **audit_show** command to show the current state of CLI command auditing.

```
audit_show
```

Field ID	Field output	Default position
audit_enabled	Auditing Enabled	1

Example:

```
audit_show
```

Output:

```
Auditing Enabled
------------------
yes
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Configuring audit servers

Use the **audit_config_set** command to configure CLI command auditing.

```
audit_config_set primary_server=Address [ primary_port=port ] [ secondary_server=Address ]
 [ secondary_port=port ] [ protocol=protocol ]
```

Parameters

Name	Type	Description	Mandatory	Default
primary_server	N/A	IP address of the primary auditing server.	Y	N/A
primary_port	Positive integer	IP port number of the primary auditing server.	N	Default for protocol
secondary_server	N/A	IP address of the secondary auditing server.	N	empty
secondary_port	Positive integer	IP port number of the secondary auditing server.	N	Default for protocol
protocol	Enumeration	Transport protocol. Only RFC-5424 Syslog over UDP is currently supported.	N	syslog

This command configures the primary and, optionally, the secondary auditing server for CLI command logging.

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **AUDIT_PRIMARY_SAME_AS_SECONDARY**

  The same audit server is defined as both primary and secondary.

Checking the command audit state

Use the **audit_config_get** command to show the current configuration of CLI command auditing.

```
audit_config_get
```

Field ID	Field output	Default position
primary_server	Primary Server	1
primary_port	Primary Port	2
secondary_server	Secondary Server	3
secondary_port	Secondary Port	4
audit_protocol	Protocol	5

Example:

```
audit_config_get
```

Output:

```
Primary Server   Primary Port   Secondary Server   Secondary Port   Protocol
---------------- -------------- ------------------ ---------------- ----------
198.51.100.42    514                               0                syslog
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Triggering networking diagnostics

Use the **networking_diagnostic_execute** command to trigger the execution of networking diagnostics on one or all modules.

```
networking_diagnostic_execute [ module=ModuleNumber ]
```

Parameters

Name	Description	Mandatory	Default
module	The specific module where the activate request is to be sent. If not defined, the request will be sent to all modules by default.	N	All modules

Example:

```
networking_diagnostic_execute module=1:Module:3
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **FAILED_TO_FIND_REQUESTED_RAS_NODE**
  The requested RAS node was not found or not accessible.

Listing slices

Use the **hsa_slice_list** command to list slices.

```
hsa_slice_list iqn=IqnNumber
```

Parameters:

Name	Type	Description	Mandatory
iqn	String	IQN identifier.	Y

Example:

```
xcli.py hsa_slice_list iqn=iqn.xiv.internal.iscsi.name:1
```

Output:

```
Slice   Primary       Secondary #0
------- ------------- --------------
0       1:Disk:4:5     1:Disk:15:5
1       1:Disk:6:8     1:Disk:11:5
2       1:Disk:1:8     1:Disk:5:5
3       1:Disk:5:11    1:Disk:14:11
4       1:Disk:1:4     1:Disk:10:8
5       1:Disk:8:4     1:Disk:4:2
6       1:Disk:2:3     1:Disk:12:3
7       1:Disk:1:11    1:Disk:5:10
```

Field ID	Field output	Default position
slice	Slice	1
primary	Primary	2
secondary	Secondary	3

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Allowed

Listing the IP interface configuration

Use the **hsa_ip_list** command to list the configuration of a specific, or of all IP interfaces, including management.

```
hsa_ip_list iqn=IqnNumber
```

Parameters

Name	Type	Description	Mandatory
iqn	String	IQN identifier.	Y

The following information is listed:

- Module (for iSCSI only)
- IP address (or comma-separated addresses for management and VPN)

Field ID	Field output	Default position
module	Module	1
address	IP Address	2

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Allowed

Listing all offsets for every LUN mapped to a given IQN

Use the **hsa_lun_offset_list** command to list all offsets for every LUN which is mapped to a given IQN.

```
hsa_lun_offset_list iqn=IqnNumber
```

Parameters

Name	Type	Description	Mandatory
iqn	String	IQN identifier.	Y

The command output list contains two columns: the LUN mapped to host, and a slice offset of the volume.

Example:

```
hsa_lun_offset_list
```

Field ID	Field output	Default position
lun	LUN	1
offset	Slice offset	2

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Allowed

Retrieving the system platform information

Use the **system_platform_info_get** command to retrieve the system platform information.

```
system_platform_info_get
```

Example:

```
system_platform_info_get
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Printing the ILMT identity tag

Use the **identity_get** command to print the ILMT identity tag of the system.

```
identity_get
```

This commands prints the ILMT identity tag for the current code.

Example:

```
identity_get
```

Output:

```
ilmt_identity_list = "\n"'\n<?xml version="1.0" encoding="UTF-8"?>\n<SoftwareIdentity
name="IBM Spectrum Accelerate" uniqueId="84fb85a32c58445987a25cd0f43eeb63-11.5.1"
version="11.5.1" versionScheme="multipartnumeric"\nxmlns=
"http://standards.iso.org/iso/19770/-2/2014-CD1/schema.xsd"
xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"\nxsi:schemaLocation=
"http://standards.iso.org/iso/19770/-2/2014-CD1/schema.xsd swid.xsd">
\n<Meta persistentId="84fb85a32c58445987a25cd0f43eeb63"/>\n<Meta
taxonomyCode="STZSWD"/>\n<Meta taggingProcess="4-1-20150707"/>\
n<Entity name="IBM" regid="regid.1986-03.com.ibm"
role="licensor publisher tagcreator"/>\n</SoftwareIdentity>'"\n"
ilmt_identity_filename = "'1986-03.com.ibm_IBM_Spectrum_Accelerate-11.5.1.swidtag'"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Chapter 10. Remote target connectivity commands

This section describes the command-line interface (CLI) for defining remote target connectivity.

Setting the threshold of a link disruption duration that triggers an event

Use the **target_change_connection_threshold** command to set the threshold of a link disruption that lasts more than a specified duration.

```
target_change_connection_threshold target=TargetName [ duration=duration ]
```

Parameters

Name	Type	Description	Mandatory	Default
duration	Integer	Duration for link down that will trigger an event, in seconds. Valid value is between 1 and 1000000 seconds.	N	30
target	Object name	The name of the target system for which the threshold is set.	Y	N/A

This command is used to set the duration of a link disruption that will trigger an event.

Example:

```
target_change_connection_threshold target="XIV MN00043" duration=25
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **TARGET_INVALID_CONNECTION_DURATION_THRESHOLD**

Target connection duration threshold should be in [1,1000000] range

Updating the target's mirroring configuration

Use the **target_config_sync_rates** command to change the target's mirroring configuration.

```
target_config_sync_rates target=TargetName [ max_initialization_rate=MaxInitializationRate ]
[ max_syncjob_rate=MaxSyncjobRate ] [ max_resync_rate=MaxResyncRate ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	The updated target.	Y	N/A
max_initialization_rate	Positive integer	Specifies the maximum rate for initial synchronization. Cannot be larger than **max_syncjob_rate**.	N	Unchanged
max_syncjob_rate	Positive integer	Specifies the default maximum rate for sync job synchronization. Cannot be larger than **max_resync_rate**.	N	Unchanged
max_resync_rate	Positive integer	Specifies the maximum rate for re-synchronization	N	Unchanged

This command changes the system ID of the remote target. The synchronization rate units are MB per second. The default rates are: 100 MB/s for initialization rate, 300 MB/s for resync rate. The default system_id is the value that is set with the **config_set** command.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **TARGET_ILLEGAL_RATE_VALUES**

  max init rate should be smaller or equal to max sync job rate. max sync job rate should not be greater than max resync rate.

Activating connectivity to a remote target

Use the **target_connectivity_activate** command to activate connectivity between a port on the local storage system and a port on a remote target.

```
target_connectivity_activate target=TargetName
< ipaddress=IPaddress local_ipinterface=IPInterface > |
< fcaddress=wwpn local_port=PortID >
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Remote target of the connectivity definition.	Y
ipaddress	N/A	IP address of the port on the remote target (iSCSI targets only).	N
local_ipinterface	Object name	Local IP interface to be connected to the remote port (iSCSI only)	N
fcaddress	N/A	FC address of the port on the remote target (FC targets only).	N
local_port	N/A	Port identifier.	N

Each connectivity definition can be either active or inactive. The system does not use inactive connectivity definitions. Target connectivity is active by default.

This command has no effect if the connectivity is already active.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**
  Target name does not exist
- **CONNECTIVITY_NOT_DEFINED**
  Remote port is not connected through this local port
- **COMPONENT_IS_NOT_AN_FC_PORT**
  Component must specify an FC port
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**
  Operation is not allowed on Management or VPN IP Interface
- **IPINTERFACE_DOES_NOT_EXIST**
  IP Interface name does not exist

- **TARGET_PORT_BAD_ADDRESS**
  Remote port address is illegal or does not belong to the remote target
- **BAD_LOCAL_IP_PORT**
  An ID of a local IP port must be specified

Deactivating connectivity to a remote target

Use the **target_connectivity_deactivate** command to deactivate connectivity between a port on the local storage system and a port on a remote target.

```
target_connectivity_deactivate target=TargetName
< ipaddress=IPaddress local_ipinterface=IPInterface > |
< fcaddress=wwpn  local_port=PortID > [ force_on_olvm_peer=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Remote target of the connectivity definition.	Y	N/A
ipaddress	N/A	IP address of the port on the remote target (iSCSI targets only).	N	N/A
local_ipinterface	Object name	Local IP interface that is connected to the remote port (iSCSI only).	N	N/A
fcaddress	N/A	FC address of the port on the remote target (FC targets only).	N	N/A
local_port	N/A	Port identifier.	N	N/A
force_on_olvm_peer	Boolean	Reserved	N	No

This command deactivates connectivity.

Each connectivity definition can be either active or inactive. The system does not use inactive connectivity definitions. Target connectivity is active by default. Connectivity can be reactivated using Activating connectivity to a remote target.

This command has no effect if the connectivity is already deactivated.

Example:

```
target_connectivity_deactivate
target=Nextra2 local_module=101
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**

  Operation is not allowed on Management or VPN IP Interface
- **CONNECTIVITY_NOT_DEFINED**

  Remote port is not connected through this local port
- **COMPONENT_IS_NOT_AN_FC_PORT**

  Component must specify an FC port
- **TARGET_PORT_BAD_ADDRESS**

  Remote port address is illegal or does not belong to the remote target
- **BAD_LOCAL_IP_PORT**

  An ID of a local IP port must be specified
- **IPINTERFACE_DOES_NOT_EXIST**

  IP Interface name does not exist
- **TARGET_HAS_OLVM_RELATIONSHIP**

  Target has an IBM Hyper-Scale Mobility relationship - cannot be deactivated or deleted

Defining connectivity to a remote target

Use the **target_connectivity_define** command to define connectivity between a port on the local storage system and a port on a remote target.

```
target_connectivity_define target=TargetName
< ipaddress=IPaddress local_ipinterface=IPInterface > |
< fcaddress=wwpn local_port=PortID >
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Remote target of the connectivity definition.	Y
ipaddress	N/A	IP address of the port on the remote target (iSCSI targets only).	N
local_ipinterface	Object name	Local IP interface to be connected to the remote port (iSCSI only).	N

Name	Type	Description	Mandatory
fcaddress	N/A	FC address of the port on the remote target (FC targets only).	N
local_port	N/A	FC port (FC only).	N

Connectivity between a local and a target storage system is defined between a specific port on a local storage system and a port on the target storage system.

Each connectivity definition can be either active or inactive. The system does not use inactive connectivity definitions. Target connectivity is active by default. An option is provided to de-activate (**target_connectivity_deactivate**) and then re-activate (**target_connectivity_activate**) it, if required. Target connectivity can be deleted (Deleting connectivity to a remote target) and a list of target connectivity definitions (Listing target connectivity definitions) can be displayed.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**
  Target name does not exist
- **CONN_EXISTS**
  Remote port is already connected through this local port
- **MAX_CONNECTIONS_REACHED**
  Maximum number of connections already defined
- **MAX_ISCSI_CONNECTIONS_PER_MODULE_REACHED**
  Maximal number of iSCSI connectivities already defined for that module.
- **COMPONENT_IS_NOT_AN_FC_PORT**
  Component must specify an FC port
- **COMPONENT_IS_NOT_FC_INITIATOR_PORT**
  Component must specify FC initiator port
- **BAD_LOCAL_IP_PORT**
  An ID of a local IP port must be specified
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**
  Operation is not allowed on Management or VPN IP Interface
- **IPINTERFACE_DOES_NOT_EXIST**
  IP Interface name does not exist
- **TARGET_PORT_BAD_ADDRESS**
  Remote port address is illegal or does not belong to the remote target

Deleting connectivity to a remote target

Use the **target_connectivity_delete** command to delete connectivity between a port on the local storage system and a port on a remote target.

```
target_connectivity_delete target=TargetName
< ipaddress=IPaddress local_ipinterface=IPInterface > |
< fcaddress=wwpn local_port=PortID > [ force_on_olvm_peer=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Remote target of the connectivity definition.	Y	N/A
ipaddress	N/A	IP address of the port on the remote target (iSCSI targets only).	N	N/A
local_ipinterface	Object name	Local IP interface that is connected to the remote port (iSCSI only).	N	N/A
fcaddress	N/A	FC address of the port on the remote target (FC targets only).	N	N/A
local_port	N/A	Port number on the local module (FC only).	N	N/A
force_on_olvm_peer	Boolean	Reserved	N	No

Only a previously defined connectivity definition can be deleted.

Example:

```
target_connectivity_delete target=XIV2 local_module=101
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**
  Target name does not exist
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**
  Operation is not allowed on Management or VPN IP Interface
- **CONNECTIVITY_NOT_DEFINED**
  Remote port is not connected through this local port
- **COMPONENT_IS_NOT_AN_FC_PORT**
  Component must specify an FC port
- **TARGET_PORT_BAD_ADDRESS**
  Remote port address is illegal or does not belong to the remote target
- **BAD_LOCAL_IP_PORT**
  An ID of a local IP port must be specified
- **IPINTERFACE_DOES_NOT_EXIST**
  IP Interface name does not exist
- **TARGET_HAS_OLVM_RELATIONSHIP**
  Target has an IBM Hyper-Scale Mobility relationship - cannot be deactivate or deleted

Listing target connectivity definitions

Use the **target_connectivity_list** command to list all the connectivity definitions of a remote target.

```
target_connectivity_list [ target=TargetName ]  [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Target name that is listed.	N	All targets
domain	Object name	The domain name.	N	All Domains

Field ID	Field output	Default position
target_name	Target Name	1
remote_port_address	Remote Port	2
local_fc_port	FC Port	3
local_ip_port	IP Interface	4
active	Active	5
up	Up	6

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed

User Category	Permission
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Defining a remote target

Use the **target_define** command to define a new remote target for remote mirroring or data migration.

```
target_define target=TargetName  protocol=<FC|iSCSI> [ iscsi_name=iSCSIName ]
[ xiv_features=<yes|no> ]  [ system_id=SystemId ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Local name of the remote target.	Y	N/A
protocol	Enumeration	FC (Fiber Channel) or iSCSI, depending on the communication protocol supported by the remote host.	Y	N/A
iscsi_name	iSCSI initiator name	iSCSI name of the remote target. This field is mandatory for iSCSI hosts.	N	N/A
system_id	String	ID of the remote system. Should be the same as the output of the **system_id** parameter on the remote system (see Displaying the values of configuration parameters.	N	N/A
xiv_features	Boolean	Defines the remote system as an XIV system. Non-XIV systems are used only for data migration.	N	Yes
domain	N/A	The cluster will be attached to the specified domains. To define more than one domain, separate them with a comma. To specify all existing domains, use "*".	N	none

This command defines the communication topology between a local storage system and a remote storage system to enable various features, such as remote mirroring. The local storage system can write to or read from the remote storage system, or allow the target storage system to write to or read from it.

The first step when defining a new target connectivity is to specify the name of the remote storage system and the protocol used to communicate with it. There are two possible protocols: Fiber Channel (FC) and iSCSI. Each remote target is available through only one of these protocols.

This step only defines the remote system object. No connectivity definitions are defined yet and no communications are performed yet.

Once you have defined a remote target, the only way to change its protocol type is to delete the remote target and define it again.

Example:

```
target_define target=Nextra2 protocol=FC
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DEFINE_ANOTHER_TARGET_ON_SYSTEM**

  Defining more than one target to the same remote system is not supported, and may compromise the data on the slave system. Are you sure the remote system is not already defined as a target?

Return codes

- **MAX_TARGETS_REACHED**

  Maximum number of targets already defined
- **TARGET_NAME_EXISTS**

  Target name is already assigned to another target
- **TARGET_ISCSI_MUST_HAVE_A_NAME**

  iSCSI Target must have an iscsi_name
- **ISCSI_NAME_NOT_ALLOWED_FOR_FC**

  FC Target does not have an iscsi_name
- **TARGET_BAD_SCSI_TYPE**

  Target SCSI type does not exist
- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.

Deleting a remote target

Use the **target_delete** command to delete the definition of the specified remote target.

```
target_delete target=TargetName [ force_on_olvm_peer=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Target that is deleted.	Y	N/A
force_on_olvm_peer	Boolean	Reserved	N	No

A target that contains port definitions cannot be deleted. A target with remote mirroring or data migration definitions cannot be deleted.

Example:

```
target_delete target=Nextra2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **TARGET_HAS_PORTS**

  Ports are defined for this target
- **TARGET_HAS_ASSOCIATIONS**

  Remote volumes are defined on this target
- **TARGET_HAS_OLVM_RELATIONSHIP**

  Target has an IBM Hyper-Scale Mobility relationship - cannot be deactivate or deleted

Listing remote targets

Use the **target_list** command to list a specified remote target definition, or all target definitions.

```
target_list [ target=TargetName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Target name that is listed.	N	All targets
domain	Object name	The domain name.	N	All Domains

The following is listed for each target: port groups, ports, active/inactive status for each port, and the following mirroring-related values: max initialization rate, max resync rate, and max sync job rate.

Field ID	Field output	Default position
name	Name	1
scsi_type	SCSI Type	2
connected	Connected	3
xiv_target	XIV Target	N/A
iscsi_name	iSCSI Name	N/A
system_id	System ID	N/A
num_ports	Number of Ports	N/A
creator	Creator	N/A
max_initialization_rate	Max Initialization Rate	4
max_resync_rate	Max Resync Rate	5
max_syncjob_rate	Max Syncjob Rate	6
connectivity_lost_event_ threshold	Connection Threshold	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Allowing remote mirroring access

Use the **target_mirroring_allow** command to allow remote mirroring operations initiated from a remote target.

```
target_mirroring_allow target=TargetName
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Remote target name.	Y

This command is performed on a local storage system in order to allow the target storage system to read, write, view, create volumes and define the existing volumes as slaves. This command is used when allowing remote mirroring operations. Otherwise, the target storage system cannot access the local storage system. This command also allows a remote target to read and write through the SCSI interface.

Once mirroring is allowed, this permission cannot be revoked.

This operation should also be run on the target storage system so that it gives permission to the local storage system to access it.

This step must be performed before mirroring is defined (**mirror_create**).

Example:

```
target_mirroring_allow target=Nextra2
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **TARGET_BAD_TYPE**

  Target machine is not XIV machine

Activating a port

Use the **target_port_activate** command to activate a port on a remote target.

```
target_port_activate target=TargetName < ipaddress=IPaddress | fcaddress=wwpn >
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Remote target of the port.	Y
ipaddress	N/A	IP address of the port on the remote target (iSCSI targets only).	N
fcaddress	N/A	FC address of the port on the remote target (FC targets only).	N

Each port in a remote system can be configured as either active or inactive. The system does not use inactive ports. After a port is defined, it is active by default. This command reactivates a port if it was de-activated (by using the **target_port_deactivate** command).

This command has no effect, if the port is already active.

Example:

```
target_port_activate
target=Nextra2 fcaddress=10:00:00:17:38:27:ec:11
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_PORT_BAD_ADDRESS**
  Remote port address is illegal or does not belong to the remote target
- **TARGET_BAD_PORT_STATE**
  Port is already in requested activation state
- **TARGET_BAD_NAME**
  Target name does not exist

Adding a new port to a remote target

Use the **target_port_add** command to add a port to a remote target.

```
target_port_add target=TargetName < ipaddress=IPaddress | fcaddress=wwpn >
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Remote target to which to add the port.	Y
ipaddress	N/A	IP address of the port on the remote target (for iSCSI type targets only).	N
fcaddress	N/A	FC address of the remote port (for FC type targets only).	N

This command adds a new port to a specified target. A port can be either FC or iSCSI, and its type must conform to the remote target's communication protocol type.

Specify the IP address or the FC address according to communication protocol of the target.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **PORT_EXISTS**

  Port is already defined
- **MAX_PORTS_REACHED**

  Maximum number of ports already defined in the system
- **TARGET_PORT_BAD_ADDRESS**

  Remote port address is illegal or does not belong to the remote target
- **ISCSI_HOST_ILLEGAL_PORT_NAME**

  Port name for iSCSI Host is illegal

  Troubleshooting: Port names for iSCSI Hosts must contain only printable characters.
- **HOST_PORT_EXISTS**

  Host with this port ID already defined

Deactivating a port

Use the **target_port_deactivate** command to deactivate a port of a remote target.

```
target_port_deactivate target=TargetName
< ipaddress=IPaddress | fcaddress=wwpn > [ force_on_olvm_peer=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	The remote target that includes the port to be deactivated.	Y	N/A
ipaddress	N/A	IP address of the port on the remote target (iSCSI targets only).	N	N/A
fcaddress	N/A	FC address of the port on the remote target (FC targets only).	N	N/A
force_on_olvm_peer	Boolean	Reserved	N	No

Each port in a remote system can be configured as either active or in-active. The system does not use an inactive port. After a port is defined, it is active by default. To re-activate a port, issue the **target_port_activate** command (see Activating a port).

Example:

```
target_port_deactivate target=XIV2 fcaddress=10:00:00:17:38:27:ec:11
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist
- **TARGET_PORT_BAD_ADDRESS**

Remote port address is illegal or does not belong to the remote target

- **TARGET_BAD_PORT_STATE**

  Port is already in requested activation state

- **TARGET_HAS_OLVM_RELATIONSHIP**

  Target has an IBM Hyper-Scale Mobility relationship - cannot be deactivate or deleted

Deleting a port from a remote system

Use the **target_port_delete** command to delete a port from the specified remote target.

```
target_port_delete target=TargetName < ipaddress=IPaddress | fcaddress=wwpn >
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Remote target from which the port is that is deleted.	Y
ipaddress	N/A	IP address of the port (for iSCSI targets only).	N
fcaddress	N/A	FC address of the remote port (for FC targets only).	N

Example:

```
target_port_delete
target=Nextra2
fcaddress=10:00:00:17:38:27:ec:11
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist

- **TARGET_PORT_BAD_ADDRESS**

  Remote port address is illegal or does not belong to the remote target

- **TARGET_PORT_HAS_CONNECTIVITY**
  Port has connectivity defined to it

Listing the ports of a remote target

Use the **target_port_list** command to list all ports of a target.

```
target_port_list [ target=TargetName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
target	Object name	Target for which all ports should be listed.	N	All systems
domain	Object name	The domain name.	N	All Domains

Field ID	Field output	Default position
target_name	Target Name	1
scsi_type	Port Type	2
active	Active	3
fc_wwpn	WWPN	4
iscsi_ip_addr	iSCSI Address	5
iscsi_ip_port	iSCSI Port	6

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Renaming a remote target

Use the **target_rename** command to rename a remote target.

```
target_rename target=TargetName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Tne target to be renamed.	Y
new_name	Object name	New name of the target.	Y

Example:

```
target_rename target=Nextra2 new_name=Nextra-DRP
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**
  Target name does not exist
- **TARGET_NAME_EXISTS**
  Target name is already assigned to another target

Updating the target configuration

Use the **target_update** command to update the target's configuration.

```
target_update target=TargetName system_id=SystemId
```

Parameters

Name	Type	Description	Mandatory
target	Object name	Target to be updated.	Y
system_id	String	ID of the remote system. Should be the same as the output of Displaying the values of configuration parameters of the *system_id* variable on the remote system.	Y

This command changes the system ID of the remote target.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed

User Category	Permission
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **TARGET_BAD_NAME**

  Target name does not exist

Chapter 11. Remote mirroring commands

This section describes the command-line interface (CLI) for remote mirroring.

Another command relevant to this topic is: Setting the threshold of a link disruption duration that triggers an event.

Canceling a snapshot mirror (ad hoc sync job)

Use the **mirror_cancel_snapshot** command to cancel all snapshot mirrors ('ad-hoc' sync jobs) of a specified master volume or a master consistency group, that have not run yet.

```
mirror_cancel_snapshot <vol=VolName | cg=cgName> [ target=TargetName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Name of the (local) master volume whose non-started snapshot mirrors should be canceled.	N	N/A
cg	Object name	Name of the (local) master consistency group whose non-started snapshot mirrors should be canceled.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]

Only sync jobs that have not started are cancelled. The command does not delete the snapshots themselves.

Upon running the command:

- A warning message is presented to the user for confirmation.
- An event is generated.
- Non-started snapshot mirrors are canceled.

The command fails under the following conditions:

- The command is issued on a slave volume or consistency group.

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	The volume is mapped to a host or a cluster associated with the user. If a snapshot overwrite is used, the target snapshot must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_CANCEL_SNAPSHOT_MIRRORS_FOR_THE_VOLUME**
  Are you sure you want to delete snapshot mirrors for *Volume*?
- **ARE_YOU_SURE_YOU_WANT_TO_CANCEL_SNAPSHOT_MIRRORS_FOR_THE_CONSISTENCY_GROUP**
  Are you sure you want to delete snapshot mirrors for *Consistency Group*?

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**
  Local peer is not the master
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **MIRROR_RETRY_OPERATION**
  There is an operation in progress on this mirror , please try again your request in a few seconds
  Troubleshooting: Please try again the command in a few seconds
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Creating a snapshot mirror (ad hoc sync job)

Use the **mirror_create_snapshot** command to create a snapshot mirror.

```
mirror_create_snapshot <vol=VolName | cg=cgName> [ target=TargetName ]
name=Name [ delete_priority=del_value ]
slave_name=SnapshotName [ slave_delete_priority=del_value ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The name of the volume to create a snapshot for.	N	N/A
cg	Object name	Local master consistency group name.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]
name	Object name	The name of the new snapshot.	Y	N/A
delete_priority	Integer	The deletion priority of the volume's snapshot.	N	1
slave_name	Object name	The name of the new snapshot on the slave.	Y	N/A
slave_delete_ priority	Integer	The deletion priority of the slave volume's snapshot.	N	1

In synchronous replication, this command takes a snapshot of the source peer (master) and the target peer (slave) at exactly the same time. In asynchronous replication, the command establishes a process that takes a point-in-time snapshot of the source peer (master) and synchronizes that point-in-time with the slave. The process sets a new sync job to copy the differences between that snapshot and the most recent snapshot that is guaranteed to be synchronized with the target peer.

Prerequisite (for both synchronous and asynchronous mirroring):

- The coupling has to be operational.

Multiple snapshot mirrors:

- Multiple snapshot mirrors can be issued; each mandates the creation of a corresponding sync job.
- Corresponding sync jobs are queued one after another.

Prioritization of sync jobs:

- The snapshot mirror delays the execution of an interval-based mirror if it is running upon arrival of a new interval.
- The snapshot mirror does not, however, cancel the creation of the interval-based sync job. The interval-based mirror will be calculated based on the differences between the most recent snapshot and the last snapshot mirror.

Precedence of the last snapshot mirror over the last replicated snapshot:

- The last replicated snapshot of the master will be updated to reflect the completed snapshot mirror. Following the completion of the snapshot mirror, its snapshot is duplicated and the duplicate is named **last_replicated** (the previous last replicated snapshot is deleted).

Canceling a snapshot mirror:

- The administrator has the ability to cancel snapshot mirrors that have not yet started.

Important: The snapshots created concurrently on the master and slave are identical.

The snapshot mirror results with two last replicated snapshots that are different and denoted "Master" and "Slave" accordingly:

- On the slave, a snapshot is taken and named **last_replicated**
- On the master, the pertinent snapshot that is mirrored onto the slave is also named **last_replicated**

The outcome for the synchronous mirroring:

- The master blocks host I/O for the duration of creating the snapshots
- The master completes synchronizing pending writes
- A snapshot of the master and slave is taken
- The master no longer blocks host I/O
- An event is generated

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	The volume is mapped to a host or a cluster associated with the user. If a snapshot overwrite is used, the target snapshot must be one created by a server administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **CONS_GROUP_MISMATCH**

  Snapshot Group does not match Consistency Group volumes.
- **CONS_GROUP_EMPTY**

  Operation is not allowed on an empty Consistency Group.
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**

  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**

Local peer is not the master

- **MIRROR_IS_NOT_SYNCHRONIZED**

  Mirror is not synchronized
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds
- **MIRROR_IS_NON_OPERATIONAL**

  Mirror is non-operational
- **MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined
- **DOMAIN_MAX_VOLUMES_REACHED**

  The domain exceeds the maximum allowed number of volumes.
- **OPERATION_NOT_ALLOWED_ON_LOOPBACK**

  Requested operation is not allowed on loopback target
- **OVERWRITE_SNAPSHOT_BAD_NAME**

  Snapshot name does not exist
- **OVERWRITE_SNAPSHOT_GROUP_DOES_NOT_BELONG_TO_GIVEN_GROUP**

  Snapshot Group belongs to another Consistency Group.
- **POOL_SNAPSHOT_LIMIT_REACHED**

  There is not enough space to create a snapshot.
- **REMOTE_MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined on remote machine
- **REMOTE_MAX_SNAPSHOTS_FOR_VOLUME_REACHED**

  Maximal number of snapshots per volume is already reached on a remote whose version is not 10.2.4.
- **REMOTE_VOLUME_IS_MASTER**

  Volume on remote machine is currently defined as Master
- **REMOTE_SNAPSHOT_NAME_EXISTS**

  Remote snapshot name already exists
- **REMOTE_SNAPSHOT_ILLEGAL_PRIORITY**

  Illegal snapshot priority (remote); must be an integer between 1 and 4.
- **REMOTE_SNAPSHOT_GROUP_NAME_EXISTS**

  Remote Snapshot Group name already exists
- **REMOTE_SNAPSHOT_GROUP_ILLEGAL_PRIORITY**

  Illegal snapshot group priority (remote); must be an integer between 1 and 4.
- **REMOTE_SNAPSHOT_GROUP_BAD_PREFIX**

  Remote Snapshot Group name has a reserved prefix.
- **REMOTE_SNAPSHOT_BAD_PREFIX**

  Remote snapshot name has a reserved prefix
- **SNAPSHOT_HAS_ACTIVE_SYNC_JOB**

  Snapshot is currently a target of an active sync job

  Troubleshooting: Please wait for sync job to complete
- **SNAPSHOT_ILLEGAL_PRIORITY**

  Illegal snapshot priority; must be an integer between 1 and 4.

- **SNAPSHOT_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified or deleted.
- **SNAPSHOT_GROUP_IS_INTERNAL**
  Internal snapshots cannot be mapped, modified in any way or deleted.
- **SNAPSHOT_GROUP_NAME_EXISTS**
  Snapshot Group name already exists.
- **SNAPSHOT_GROUP_ILLEGAL_PRIORITY**
  Illegal snapshot group priority; must be an integer between 1 and 4.
- **SNAPSHOT_GROUP_BAD_NAME**
  Snapshot Group name does not exist.
- **SNAPSHOT_GROUP_BAD_PREFIX**
  Snapshot Group name has a reserved prefix.
- **SNAPSHOT_IS_PART_OF_SNAPSHOT_GROUP**
  Snapshot is part of a Snapshot Group
- **SYNCHED_SNAPSHOTS_NOT_SUPPORTED_IN_TARGET**
  Synchronized Snapshot capability is not supported by the Mirror's Target.
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **VOLUME_DATA_MIGRATION_UNSYNCHRONIZED**
  Data Migration has not completed to this volume
- **VOLUME_EXISTS**
  Volume name already exists
- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **VOLUME_IS_NOT_CONSISTENT_SLAVE**
  Operation not allowed on slave volume that is not consistent.
- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots
- **VOLUME_IS_OLVM_PROXY**
  The volume is in an IBM Hyper-Scale Mobility Proxy phase.
- **OPERATION_DENIED_REMOTE_OBJECT_MANAGED**
  The remote object is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **REMOTE_MIRROR_IS_STANDBY**
  remote mirror is marked as standby

- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **XMIRROR_SNAPSHOT_MIRROR_NOT_SUPPORTED**
  Volume is part of an xmirror, snapshot mirrors are not supported for xmirrors.
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Activating mirroring

Use the **mirror_activate** command to activate mirroring for a defined mirror coupling.

```
mirror_activate < vol=VolName | cg=cgName > [ target=TargetName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Master volume.	N	N/A
cg	Object name	Master consistency group name or a list of master consistency groups.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]

This command activates the coupling - either volumes or consistency groups - and switches it to the Active state.

Requirements for a successful command completion:

- The specified target must exist
- The specified target must be mirrored
- The specified target is a volume that does not belong to a consistency group, or is a consistency group
- The specified target is not a master
- The Standby state was explicitly set by issuing the **mirror_deactivate** command on the same peer

If the new activation state is the same as the existing state, nothing is done and a success code is returned.

The mirroring cannot be activated:

- If the time stamps of the last replicated snapshots on the master and slave do not match.
- If the command is issued on a master that did not receive acknowledgment from the slave following the **cg_add_volume** or **cg_remove_volume** command (due to the command's timeout or to an unexpected failure), the command fails and the MIRROR_CONS_GROUP_MEMBERSHIP_MISMATCH code is returned. It means that the member lists of the mirror consistency group peers are not the same.

- If the command is issued on a master that did not receive acknowledgment from the slave following a **vol_resize** command (due to the command's timeout or to an unexpected failure), the command fails and the MIRROR_CONS_GROUP_MEMBERSHIP_MISMATCH code is returned. It means that the sizes of the mirror volume peers are not the same.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_NO_MIRROR**

  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**

  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**

  Local peer is not the master
- **MIRROR_CONFIGURATION_ERROR**

  Mirror local configuration does not match remote configuration
- **REMOTE_MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined on remote machine
- **SYNC_ALREADY_ACTIVE**

  Synchronization is already active
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**

  Volume mirror is part of Consistency Group mirror.
- **MIRROR_CAN_NOT_BE_ACTIVATED**

  Mirroring cannot be activated
- **MIRROR_CONS_GROUP_MEMBERSHIP_MISMATCH**

  Mirrored CG contains different volumes on Master and Slave. This problem occurs whenever the cg_add_vol or cg_remove_vol commands were previously issued and the Master did not receive an acknowledgment from the Slave until the command timed out, or any other unexpected failure.
- **MIRROR_SIZE_MISMATCH**

  Slave volume and Master Volume sizes are different
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds

- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **VOLUME_TOO_MANY_ACTIVE_MIRRORS**
  This command cannot be used if more than one mirror is active on the volume
- **REMOTE_MIRROR_IS_STANDBY**
  remote mirror is marked as standby
- **REMOTE_DOMAIN_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine domain
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Changing the RPO for local or remote system

Use the **mirror_change_rpo** command to change a local or remote RPO for a mirror relation.

```
mirror_change_rpo  <vol=VolName | cg=cgName> [ target=TargetName ] [ rpo=rpo ]
 [ remote_rpo=rpo ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local volume name. Must be specified if the command is applied to a volume.	N	N/A
cg	Object name	Consistency group name on the local system.	N	N/A
target	Object name	Target name of the mirror, mandatory if there are 2 mirrors defined on the volume.	N	[none]
remote_rpo	Integer	RPO on a remote system.	N	[Unchanged]
rpo	Integer	RPO on the local system	N	[Unchanged]

- The command must be run on the master.
- The RPO must be greater than the interval.
- The link has to be up.

Example:

```
mirror_change_rpo vol=volname rpo=100
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **ASYNC_MIRROR_REMOTE_RPO_TOO_SHORT**
  Specified Remote RPO is too short.
- **ASYNC_MIRROR_RPO_TOO_LONG**
  Specified RPO is too long.
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **ASYNC_MIRROR_RPO_TOO_SHORT**
  Specified RPO is too short.
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **INTERVAL_SHOULD_BE_SHORTER_THAN_RPO**
  Schedule interval must be shorter than the RPO.
- **ASYNC_MIRROR_REMOTE_RPO_TOO_LONG**
  Specified Remote RPO is too long.
- **LOCAL_IS_SLAVE**
  Local mirror peer is not the master
- **SYNC_MIRROR_HAS_NO_RPO**
  Synchronous Mirror does not have an RPO.
- **TARGET_BAD_NAME**
  Target name does not exist

- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Changing the designation of mirroring peers

Use the **mirror_change_designation** command to change the designation of mirroring peers: from primary to secondary, and vice versa.

```
mirror_change_designation < vol=VolName | cg=cgName > [ target=TargetName ]
 [ new_designation=<Primary|Secondary|None> ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Master volume name.	N	N/A
cg	Object name	Master consistency group name.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]
new_designation	Enumeration	The new designation of the peer If not specified, the command swaps the designation of the primary and secondary peer.	N	none

The command is issued on the master peer and affects both peers. The coupling has to be operational.

The designation change implied by this command reflects a decision to reset the designation of the mirroring peers, in contrast with the operational role, which is denoted by the master/slave title.

There is no obligation to issue the command with a specification of the new designation. If the new designation is not specified, the command swaps the designations of both peers from their current value. The primary changes to secondary, and the secondary - to primary.

Example:

```
mirror_change_designation cg=reggie13_cg new_designation=Secondary
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**
  Local peer is not the master
- **MIRROR_DESIGNATION_NOT_SUPPORTED_BY_TARGET**
  Mirror role designation is not supported by the Mirror's Target.
- **MIRROR_IS_NON_OPERATIONAL**
  Mirror is non-operational
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Changing the mirroring schedule for remote slave peers

Use the **mirror_change_remote_schedule** command to change the replication schedule of a remote slave peer.

```
mirror_change_remote_schedule < vol=VolName | cg=cgName > [ target=TargetName ]
 remote_schedule=Schedule
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local master volume name.	N	N/A
cg	Object name	Local master consistency group name.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]
remote_schedule	Object name	A reference to a remote schedule that should be set for the remote slave peer, which corresponds with the master specified in the command.	Y	N/A

This command changes the replication schedule of an asynchronous coupling in order to make it effective after the role of a specified remote slave peer is changed to master.

Prerequisites:

- The coupling must be ASYNC_INTERVAL.

Following the command execution:

- The system displays a warning
- If the command is approved, it is executed
- An event is generated
- New sync jobs are generated according to the updated schedule
- Existing sync jobs are not affected (that is, they run according to the previous schedule)

Requirements for a successful command completion:

- The specified target exists
- The specified target is mirrored
- The specified target is not a volume that belongs to a mirrored consistency group
- The specified target is of sync type ASYNC_INTERVAL
- The specified target is a master
- The link is up

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **REMOTE_VOLUME_IS_MASTER**
  Volume on remote machine is currently defined as Master
- **REMOTE_CONS_GROUP_IS_MASTER**
  Remote Consistency Group is defined as Master
- **SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist
- **SYNC_MIRROR_DOES_NOT_USE_SCHEDULE**
  Definition of Synchronous Mirror does not require a Schedule object to be specified.
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **INTERVAL_SHOULD_BE_SHORTER_THAN_RPO**
  Schedule interval must be shorter than the RPO.
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **DOMAIN_HAS_NO_ACCESS_TO_SCHEDULE**
  Domain has no access to schedule.
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Changing the roles of a mirrored volume

Use the **mirror_change_role** command to change the role of a local mirroring peer between master and slave.

```
mirror_change_role <vol=VolName | cg=cgName>
[ target=TargetName ] [ new_role=<Master|Slave|None> ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local volume name. Must be specified if the command is applied to a volume.	N	N/A
cg	Object name	CG name Must be specified if the command is applied to a consistency group.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]
new_role	Enumeration	Role name of the peer If not specified, the command swaps peer roles between master and slave.	N	none

This command changes the role of the local peer from master to slave or from slave to master when the coupling is non-operational. It is assumed that the command will be issued on both peers of the coupling before the coupling becomes operational again, so that upon reconnection there still will be one master and one slave.

When the command is applied to the master:

- The command can be issued only if the activation state is Standby.
- The command cannot be issued during the initialization phase.

Changing the roles in synchronous mirroring:

- When applied on the master:
  - All changes made to the master since the last time the peers were synchronized will be reverted to their original value. The master ceases serving host requests, and is set to accept replication from the other peer as a slave. If the command is issued during link unavailability, a most_updated snapshot of the peer will be taken to capture the most recent changes that have not yet been replicated to the other peer.
  - A warning is displayed: `Are you sure to change master to slave?"`
  - An event is generated

  - The master ceases accepting host requests
  - Unsynchronized data at the demoted master is recorded in most updated snapshot
  - The demoted master reverts to the last replicated snapshot
  - Completion of process is recorded in the log
- When applied on the slave:
  - The slave becomes a master, starts accepting requests from hosts, and upon explicit activation starts replicating to the other peer (the original master).
  - If the slave volume has a last consistent snapshot, it means that the mirroring was broken in the middle of the synchronization process and the slave might be inconsistent.
    - In this case, the administrator must choose whether to use the most updated version, which might be inconsistent, or the last consistent snapshot.
    - Reverting the volume to the last consistent snapshot can only be performed by deleting the mirroring, reverting the volume and creating a new mirroring definition.
    - In any case, if a last consistent snapshot exists, a most updated snapshot is created, keeping a copy of the information at the time of the role change.

Changing the roles in asynchronous mirroring:

- When applied on the master:
  - Upon successful issuance of the command on the master, the master is reverted to the image recorded on the last replicated snapshot of the mirror, it ceases accepting host requests, and does not accept replication from the other peer as a slave.
- When applied on the slave:
  - A warning is displayed: `Are you sure to change slave to master?`
  - An event is generated.
  - The new master ceases accepting replication requests from the previous master, and reverts to the last replicated snapshot.
  - The new master starts accepting host requests.
  - The new master establishes asynchronous interval-based sync job process, based on the schedule.
  - Completion of process is recorded in the log.
  - Mirroring state is Standby.
  - Explicit activation of mirroring is required.

Requirements for a successful command completion:

- The command cannot be issued on the master during the Initialization phase.
- The command cannot be issued in the Change Tracking state.
- The activation state is Standby.
- The command can be applied on a volume only if the volume is not part of a mirrored consistency group; if the consistency group is mirrored, the command returns an error and fails.
- The command can be issued on the slave, except during initialization.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **SOME_DATA_WILL_BE_LOST_ARE_YOU_SURE**

  Are you sure you want the mirror's local peer to become Slave and loose data that was not replicated?
- **ARE_YOU_SURE_YOU_WANT_TO_CHANGE_A_PEER_WITH_LCS_TO_MASTER**

  Are you sure you want the mirror's local peer to become Master? The local peer has a last-consistent snapshot

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_NO_MIRROR**

  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**

  Local Consistency Group does not have remote mirroring definitions
- **MIRROR_IS_INITIAL**

  Operation is not permitted during the Initialization phase.
- **MIRROR_IS_ACTIVE**

  Remote mirroring is currently active
- **VOLUME_HAS_DATA_MIGRATION**

  Data Migration is defined for this volume
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**

  Volume mirror is part of Consistency Group mirror.
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds
- **MIRROR_HAS_NO_SYNCHED_SNAPSHOT**

  Mirror does not have a synchronized Snapshot.
- **MASTER_CANNOT_BE_DEMOTED**

  Master cannot be demoted to Slave role, Peer status mismatch
- **VOLUME_HAS_MULTIPLE_MIRRORS**

  volume has multiple mirrors, operation not allowed or target must be specified
- **TARGET_BAD_NAME**

  Target name does not exist

- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **MIRROR_PART_OF_XMIRROR**
  remote mirror is part of xmirror
- **MIRROR_IS_STANDBY**
  mirror is marked as standby
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_VOLUMES**
  This command is not supported for IBM Hyper-Scale Mobility volumes.

Changing a mirroring schedule for local peers

Use the **mirror_change_schedule** command to change the replication schedule for peers on the local system.

```
mirror_change_schedule < vol=VolName | cg=cgName > [ target=TargetName ] schedule=Schedule
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Volume name on the local system.	N	N/A
cg	Object name	Consistency group name on the local system.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]
schedule	Object name	A reference to a mirroring schedule	Y	N/A

This command changes the replication schedule for a peer on the local system. The new scheduling will become effective only if the peer is set as master.

Prerequisites:

- The coupling must be ASYNC_INTERVAL.
- The schedule's interval has to be shorter than the corresponding mirror's RPO.

The command fails under the following conditions:

- The specified target does not exist
- The specified target is non-mirrored
- The specified target is a volume that belongs to a mirrored consistency group
- The specified target synchronization type is not ASYNC_INTERVAL

Setting a scheduling reference:

- The system displays the following warning: Are you sure to change schedule?.
- An event is generated
- New sync jobs will be generated according to updated schedule. A running sync job is unaffected.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist
- **SYNC_MIRROR_DOES_NOT_USE_SCHEDULE**
  Definition of Synchronous Mirror does not require a Schedule object to be specified.
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **INTERVAL_SHOULD_BE_SHORTER_THAN_RPO**
  Schedule interval must be shorter than the RPO.
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Creating a mirroring definition

Use the **mirror_create** command to create a remote mirroring coupling.

```
mirror_create < vol=VolName slave_vol=SlaveVolumeName
[ create_slave=<yes|no> [ remote_pool=RemotePoolName ] ]
[ init_type=<online|offline> ] > | <cg=cgName slave_cg=SlaveCgName>
[ type=<SYNC_BEST_EFFORT|ASYNC_INTERVAL> ] target=TargetName
[ rpo=rpo [ remote_rpo=rpo ] schedule=Schedule remote_schedule=Schedule ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local volume to be mirrored (the master).	N	N/A
slave_vol	Object name	The name of the slave volume on the remote storage system.	N	N/A
create_slave	Boolean	Determines whether to create a new slave volume or to use an existing one.	N	no
remote_pool	Object name	The storage pool on the remote system. Relevant only if creating a slave.	N	N/A
cg	Object name	Local consistency group to be mirrored (the master).	N	N/A
slave_cg	Object name	The name of the slave consistency group on the remote storage system.	N	N/A
type	Enumeration	The name of the replication type	N	SYNC_BEST_ EFFORT
target	Object name	Remote target to contain the slave volume.	Y	N/A
rpo	Positive integer	A mirror recovery point objective value for the master. Ranges from 30 to 86400 seconds (that is, up to 24 hours) Is applicable and mandatory for asynchronous mirroring only.	N	[None]
remote_rpo	Positive integer	Mirror recovery point objective value for a remote peer that becomes master Is applicable and mandatory for asynchronous mirroring only.	N	[Master RPO]
schedule	Object name	A reference to a schedule object Is applicable and mandatory for asynchronous mirroring only.	N	[None]

Name	Type	Description	Mandatory	Default
remote_schedule	Object name	A reference to a schedule object on the remote machine. Is applicable and mandatory for asynchronous mirroring only.	N	[None]
init_type	Enumeration	Specifies the method requested to initialize the slave mirror.	N	[none]
part_of_xmirror	Boolean	Marks the mirror as part of xmirror.	N	no

Mirroring is the process of ensuring that both peers contain identical data at all times. This command defines a new mirroring coupling between a master and a slave peers.

The command supports the creation of an asynchronous mirroring coupling. Asynchronous mirroring is based on schedule-driven replication. The system also offers a predefined schedule object with a non-user-configurable interval of 20 seconds, named **min_interval**.

To create a mirroring coupling, an existing master peer must be specified together with a slave peer. Upon creation, the coupling is not active and the user needs to activate it explicitly in order to start the replication. This slave either already exists or is created by this command. Using an existing slave is allowed only if it is formatted. If the slave already exists, the command receives its name along with the remote system name. If it is created by this command, the input parameters specify the remote storage system name, the name of the slave that is created and the storage pool that will contain the newly created slave.

To add a second mirror (xmirror) for an existing mirrored volume, use the **part_of_xmirror** flag for the new mirror.

Mirroring is created in the standby state. The mirroring coupling must then be activated in order to start the initialization process, which copies the data from the master to the slave.

A storage system can have multiple mirroring definitions between pairs of peers on various remote systems. However, when the peers are consistency groups, all the volumes included in a specific consistency group must be mirrored between only one pair of storage systems. Therefore, when a volume peer on a storage system (for example: A) has a mirroring relationship with a volume on a remote storage system (for example: B), any other volume in the same consistency group on storage system A can only be defined in a remote mirroring relationship with a volume on storage system B. The same goes for volumes from storage system B to A. In addition, the mirrored consistency group has one sync job for all pertinent mirrored volumes within the consistency group.

Prior to issuing this command on a consistency group, make sure that the consistency group is empty.

The command fails if it finds conflicting mirroring snapshots (that were not removed during the deletion of a previous mirroring definition).

Initialization types:

- The `online` option (default)enables an over-the-wire initialization. In other words, it uses an inter-site link to replicate the master peer's initial state to the slave, starting once the mirror is first activated (**`mirror_activate`**). During initialization, the mirror status will be *Initialization*.
- If the `offline` option is selected, the initialization of the slave peer is not done by replicating the master's initial image, but rather by creating its offline replica. In other words, it restores to the slave a mirror image that is backed up on the master.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **`ASYNC_MIRROR_MISSING_RPO`**
  Definition of Asynchronous Mirror requires RPO to be specified.
- **`ASYNC_MIRROR_REMOTE_RPO_TOO_LONG`**
  Specified Remote RPO is too long.
- **`ASYNC_MIRROR_REMOTE_RPO_TOO_SHORT`**
  Specified Remote RPO is too short.
- **`ASYNC_MIRROR_RPO_TOO_SHORT`**
  Specified RPO is too short.
- **`ASYNC_MIRROR_RPO_TOO_LONG`**
  Specified RPO is too long.
- **`ASYNC_NOT_SUPPORTED_IN_TARGET`**
  Asynchronous Mirror is not supported by specified Target.
- **`BAD_REMOTE_VOLUME_NAME`**
  Slave volume name does not exist
- **`BAD_REMOTE_VOLUME_SIZE`**
  Master and slave volumes contain a different number of blocks
- **`CONS_GROUP_BAD_NAME`**
  Consistency Group name does not exist.
- **`CONS_GROUP_HAS_MIRROR`**
  Consistency Group has mirroring defined for it.
- **`CONS_GROUP_MIRRORING_NOT_SUPPORTED_IN_TARGET`**
  Consistency Group mirroring is not supported by target machine.
- **`INTERVAL_SHOULD_BE_SHORTER_THAN_RPO`**
  Schedule interval must be shorter than the RPO.

- **MAX_MIRRORS_REACHED**
  Maximum number of mirrors already defined
- **NOT_ENOUGH_SPACE_ON_REMOTE_MACHINE**
  Not enough free space to set requested size of slave volume
- **NO_ASYNC_IN_THIN_PROVISIONED_POOL**
  Thin provisioned Pool cannot contain Volumes with Asynchronous Mirroring
- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_IS_MASTER**
  Local volume is already defined as a master volume
- **VOLUME_IS_SLAVE**
  Volume is defined as a slave volume
- **REMOTE_VOLUME_EXISTS**
  Slave volume name already exists and cannot be created
- **REMOTE_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine
- **REMOTE_MAX_MIRRORS_REACHED**
  Maximum number of mirrors already defined on remote machine
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **REMOTE_POOL_DOES_NOT_EXIST**
  Pool does not exist on remote machine
- **REMOTE_POOL_NOT_SPECIFIED**
  A Pool on remote machine must be specified when a slave volume is to be created
- **REMOTE_TARGET_NOT_CONNECTED**
  There is currently no connection from the target system
- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots
- **REMOTE_VOLUME_IS_SNAPSHOT**
  Slave volume is a snapshot
- **TARGET_BAD_NAME**
  Target name does not exist
- **TARGET_BAD_TYPE**
  Target machine is not XIV machine
- **TARGET_NO_ACCESS**
  No access permissions to slave machine
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system
- **REMOTE_VOLUME_LOCKED**
  Slave volume is locked
- **TIMEOUT**
  Remote operation did not complete in time
- **VOLUME_HAS_MIRRORING_SNAPSHOTS**
  Volume has snapshots created by previous mirroring process.

- **SLAVE_VOLUME_NOT_FORMATTED**
  Slave volume is not formatted
- **TARGET_DOES_NOT_ACCEPT_XIV_COMMANDS**
  Target system does not accept XIV management commands
- **SYNC_MIRROR_HAS_NO_RPO**
  Synchronous Mirror does not have an RPO.
- **REMOTE_CONS_GROUP_IS_MIRRORED**
  Remote Consistency Group has mirroring defined for it.
- **REMOTE_SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist on remote machine
- **SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist
- **REMOTE_CONS_GROUP_BAD_NAME**
  Remote Consistency Group name does not exist.
- **REMOTE_VOLUME_IS_MASTER**
  Volume on remote machine is currently defined as Master
- **REMOTE_VOLUME_IS_SLAVE**
  Slave volume is already defined as a slave volume
- **REMOTE_MAX_MIRROR_CAPACITY_REACHED**
  Maximum capacity for mirrored volumes already defined on remote machine
- **MIRROR_RETRY_OPERATION**
  There is an operation in progress on this mirror , please try again your request in a few seconds
  Troubleshooting: Please try again the command in a few seconds
- **MIRRORING_INCOMPATIBLE_TARGET_VERSION**
  Mirroring is not supported between the system versions of the specified peers.
- **NO_OFFLINE_INIT_TYPE_WITH_SLAVE_CREATION**
  New Volume will be created as slave. Offline init meaningless.
- **ASYNC_WITH_OFFLINE_INIT_NOT_SUPPORTED_IN_TARGET**
  Asynchronous Mirror with offline initialization option is not supported by the specified Target.
- **VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit
- **REMOTE_VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit of remote machine
- **INVALID_SLICE_OFFSET**
  Slice offset is illegal
- **VOLUME_IS_OLVM_PROXY**
  The volume is in an IBM Hyper-Scale Mobility Proxy phase.
- **REMOTE_VOLUME_IS_OLVM_PROXY**
  The remote volume is in an IBM Hyper-Scale Mobility Proxy phase.
- **ENCRYPTION_IN_PROGRESS**
  System is in the process of changing encryption activation state
- **MIRROR_OF_SAME_TYPE_EXISTS_ON_VOLUME**
  A mirror of the same type already defined on this volume

- **XMIRROR_IS_NOT_SUPPORTED_FOR_CONS_GROUPS**
  A CG cannot be defined as part of xmirror
- **MIRROR_EXISTS_ON_TARGET**
  Volume already has a mirror on this target
- **REMOTE_VOLUME_IS_MIRROR_MASTER**
  Volume is a mirror master. Can't be slave!
- **XMIRROR_MAX_NUM_OF_MIRRORS_REACHED**
  Failed to create mirror, max number of mirrors exceeded
- **REMOTE_VOLUME_TWO_SYNC_MIRRORS_NOT_ALLOWED**
  Two SYNC mirrors detected on remote volume. This is not allowed.
- **REMOTE_VOLUME_MIRROR_LOOP_DETECTED**
  A mirror loop was detected on the remote volume. This means that there is a mirror on the remote system and its target is this system so you can't create a mirror with this target here.
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **DOMAIN_MAX_MIRRORS_REACHED**
  The domain exceeds the maximum allowed number of mirrors.
- **REMOTE_DOMAIN_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine domain
- **REMOTE_DOMAIN_HAS_NO_ACCESS_TO_TARGET**
  Slave machine domain has no access to target
- **REMOTE_DOMAIN_HAS_NO_ACCESS_TO_SCHEDULE**
  Slave machine domain has no access to schedule
- **DOMAIN_HAS_NO_ACCESS_TO_TARGET**
  Domain has no access to target.
- **REMOTE_DOMAIN_MAX_MIRRORS_REACHED**
  Maximum number of mirrors already defined on remote machine domain
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.
- **REMOTE_VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for slave volume
- **REMOTE_VOLUME_MASTER_ASYNC_MIRROR_DETECTED**
  An ASYNC master mirror was detected on the remote volume. Operation not allowed.
- **MAX_XMIRRORS_REACHED**
  The number of xmirror objects exceeded limit
- **XMIRROR_MIRRORING_INCOMPATIBLE_TARGET_VERSION**
  Xmirror Mirroring is not supported between the system versions of the specified peers.
- **MIRROR_IS_NOT_SUPPORTED_FOR_FC_TARGET**
  Mirror is not supported for Fiber Channel target.

Deactivating mirroring

Use the **mirror_deactivate** command to deactivate mirroring for a defined mirror coupling.

```
mirror_deactivate  < vol=<vol1[,vol2]...> |
    cg=cgName > [ target=TargetName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Master volume name or a list of master volumes.	N	N/A
cg	Object name	Master consistency group name or a list of master consistency groups.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]

This command deactivates a coupling and switches it to the Inactive state. While in the Inactive state, only the master volume is updated, as opposed to the Active state, where the slave volume is updated together with the master volume.

The command cannot be issued on a slave.

If the mirroring is already inactive, this command has no effect and a success code is returned.

If more than one volume is specified, mirroring on all the volumes is deactivated. Furthermore, the deactivation of all the volumes is performed as an atomic operation, so that the slave volumes remain consistent with each other.

Deactivating a consistency group affects all of its volumes.

The command fails under the following conditions:

- The specified target does not exist.
- The specified target is non-mirrored.
- The specified target is a volume that belongs to a consistency group (in this case, the entire consistency group must be deactivated).
- Some of the specified targets are masters and some are slaves.
  - Each instance of the command can be applied to either master(s) or slave(s), but not to both.
- The target is a slave, yet the link is up.
- If multiple volumes are specified in the command and some are already part of an inactive mirror, the command will fail for all mirrors, including those that were active. The relevant return code is: **SYNC_ALREADY_INACTIVE**.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_NO_MIRROR**

  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**

  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**

  Local peer is not the master
- **SYNC_ALREADY_INACTIVE**

  Synchronization is already inactive
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**

  Volume mirror is part of Consistency Group mirror.
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds
- **TARGET_BAD_NAME**

  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**

  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**

  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**

  Target name does not match the Consistency Group
- **REMOTE_MIRROR_IS_STANDBY**

  remote mirror is marked as standby
- **MIRROR_IS_STANDBY**

  mirror is marked as standby

Deleting a remote mirroring definition

Use the **mirror_delete** command to delete a remote mirroring coupling definition.

```
mirror_delete < vol=VolName | cg=cgName > [ target=TargetName ] [ force_on_slave=<Yes|No> ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local master volume name.	N	N/A
cg	Object name	Local master consistency group name.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]
force_on_slave	Boolean	Forces the deletion of the remote mirroring coupling definition even of a slave. Deleting a remote mirroring definition can be forced on the slave peer only when it is in the initialization phase.	N	no

When a coupling is initially created or after it is deactivated, it is in *standby* mode. Only a standby coupling can be deleted. The command can only be issued on the master.

After the remote mirroring is deleted, both peers are configured as *none*, meaning that they are no longer configured as either master or slave.

Only the remote mirroring coupling definition is deleted. Neither the volumes themselves, nor their snapshots are deleted.

The local object specified in the **vol** parameter, must be a master.

To delete a remote mirroring coupling, the communication must be established. If there is no communication, mirroring is only deleted on the master, and a configuration error appears on the slave once the communication resumes.

Command outcome:

- An event is generated
- Overall coupling statistics are captured
- The outstanding pertinent sync jobs are deleted
- The process completion is recorded in the log

Deleting the mirroring definition when the link is down:

- When the link is down, this command only deletes the mirroring definition on the master.
- To delete the mirroring definition from the slave:
  - Run the **mirror_change_role** command to turn the slave into the master
  - Run **mirror_delete**

The **force_on_slave** parameter:

- The parameter **force_on_slave** can be issued only if mirroring is in the initialization phase. In any other mode, the role can be changed to master and the peer mirror can be deleted.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_CG_MIRRORING**

  Are you sure you want to delete the mirroring relationships of the CG and of all volumes in the CG?

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_NO_MIRROR**

  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**

  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**

  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**

  Local peer is not the master
- **MIRROR_IS_ACTIVE**

  Remote mirroring is currently active
- **FORCE_DELETE_NOT_ALLOWED_ON_MASTER**

  Only slave mirrors need to be forced to be deleted
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**

  Volume mirror is part of Consistency Group mirror.
- **MIRROR_RETRY_OPERATION**

  There is an operation in progress on this mirror , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds
- **MIRROR_IS_NOT_INITIALIZING**

Operation is permitted only during the Initialization phase.

- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **MIRROR_ASSOCIATED_WITH_XMIRROR**
  This mirror is associated with a defined xmirror, operation not allowed
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **REMOTE_MIRROR_IS_STANDBY**
  remote mirror is marked as standby
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Viewing the mirroring status

Use the **mirror_list** command to list the status and configuration of mirroring couplings.

```
mirror_list [ < [ vol=VolName ]
[ target=TargetName ] > | cg=cgName | < [ scope=<cg|volume> ]
[ sync_type=<sync_best_effort|async_interval> ] > ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
sync_type	Enumeration	List type. The available options are: sync_best_effort, async_interval, or All (if no value is specified)	N	All (if no value is specified)
scope	Enumeration	List type: all mirrors, all volumes, all CGs	N	All (if no value is specified)
vol	Object name	Local volume name.	N	[none]
cg	Object name	Local consistency group name.	N	[none]
target	Object name	Remote target name.	N	[none]
domain	Object name	The domain name.	N	All Domains

This command shows current configuration and status for the remote mirroring of volumes or consistency groups. Size/part/time to synchronize are unknown if this is the slave and connection is broken.

The following default parameters are shown:

- **Name**

- **Mirror Type**: sync_best_effort or async_interval
- **Mirror Object**: CG or Volume
- **Role**: Master or Slave
- **Remote System**: target name
- **Remote Peer**: volume name
- **Active**: Yes or No
- **Status**: Initializing, Synchronized, Unsynchronized, Consistent, Inconsistent, RPO OK, RPO Lagging, or Change Tracking
- **Link Up**: Yes or No

The following optional parameters can be listed by explicitly specifying the proper columns:

- **Designation**: Primary or Secondary
- **Estimated Sync Time**: estimated time to synchronization in seconds
- **Size To Synchronize** (in MB)
- **Operational**: Yes or No
- **Sync Progress** (in %)
- **Mirror Error**: specifies the reason for mirroring deactivation: No_Error, Configuration_Error, Secondary_Pool_Exhausted, Master_Pool_Exhausted, or No_Thin_Provisioning_Resources
- **Schedule Name**
- **Last Replicated Snapshot Time**: the value in presented in yyyy-mm-dd hh:mm:ss format
- **Specified RPO**: the value in presented in h:mm:ss format

The following deactivation reasons can be read from the output list (available only in XML output format):

- INACTIVE_USER - No_Error
- INACTIVE_SECONDARY_LOCKED - Secondary_Pool_Exhausted
- INACTIVE_POOL_EXHAUSTED - Master_Pool_Exhausted
- INACTIVE_VOL_SIZE_MISMATCH - Remote_And_Local_Volume_Size_Mismatch
- INACTIVE_CONS_GROUP_MEMBERSHIP_MISMATCH - Cons_Group_Membership_Mismatch
- INACTIVE_POSSIBLE_VOL_SIZE_MISMATCH - Possible_Remote_And_Local_Volume_Size_Mismatch
- INACTIVE_POSSIBLE_CONS_GROUP_MEMBERSHIP_MISMATCH - Possible_Cons_Group_Membership_Mismatch
- INACTIVE_THIN_PROVISIONING - No_Thin_Provisioning_Resources
- INACTIVE_PEER_STATUS_MISMATCH - Peer_Status_Mismatch
- INACTIVE_UPGRADE - Temporarily_Deactivated_For_Upgrade

Field ID	Field output	Description	Default position
local_peer_name	Name	N/A	1
mirror_object	Mirror Object	N/A	3
designation	Designation	N/A	N/A
current_role	Role	N/A	4
target_name	Remote System	N/A	5
remote_peer_name	Remote Peer	N/A	6
active	Active	N/A	7

Field ID	Field output	Description	Default position
sync_state	Status	N/A	9
connected	Link Up	N/A	10
size_to_synchronize	Size To Sync (MiB)	N/A	N/A
operational	Operational	N/A	N/A
sync_progress	Sync Progress (%)	N/A	N/A
mirror_error	Mirror Error	No Error, Secondary pool exhausted, Configuration error or No thin provisioning resources	N/A
sync_type	Mirror Type	N/A	2
schedule_name	Schedule Name	N/A	N/A
last_replicated_ snapshot_time	Last Replicated	N/A	N/A
last_replicated_ snapshot_exists	Has Last Replicated Snapshot	N/A	N/A
specified_rpo	RPO	N/A	N/A
remote_rpo	Remote RPO	N/A	N/A
application_consistent	App Consistency	N/A	N/A
validate	Validation	N/A	N/A
is_standby	Standby	N/A	8

Output:

```
<command id="0">
<administrator>
    <command>
        <changes_session_id value="1288716489394201:1:1288903896317961:1"/>
        <code value="SUCCESS"/>
        <last_change_index value="32289"/>
        <status value="0"/>
        <status_str value="Command completed successfully"/>
        <return>
            <mirror id="100777">
                <id value="100777"/>
                <creator value=""/>
                <creator_category value="none"/>
                <local_peer_id value="100776"/>
                <local_peer_name value="SYNC_vol_5"/>
                <schedule_name value=""/>
                <designation value="Secondary"/>
                <current_role value="Slave"/>
                <remote_mirror_id value="100872"/>
                <remote_peer_name value="SYNC_vol_4"/>
                <target_id value="100707"/>
                <target_name value="SYNC_target_2"/>
                <sync_type value="sync_best_effort"/>
                <sync_state value="Consistent"/>
                <active value="yes"/>
                <connected value="yes"/>
                <operational value="yes"/>
                <sync_progress value="100"/>
                <size_to_synchronize value="-1"/>
                <estimated_sync_time value="0"/>
                <mirror_error value="No_Error"/>
                <mirror_object value="Volume"/>
                <specified_rpo value=""/>
                <remote_rpo value=""/>
                <last_replicated_snapshot_time value=""/>
                <init_type value="online"/>
            </mirror>
        </return>
    </command>
</administrator>
<aserver status="DELIVERY_SUCCESSFUL"/>
</command>
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Obtaining statistics on past sync jobs

Use the **mirror_statistics_get** command to present statistics that are automatically gathered by the system on past sync jobs per specified mirrored volume or consistency job.

```
mirror_statistics_get <vol=VolName | cg=cgName> [ target=TargetName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local volume name.	N	N/A
cg	Object name	Local consistency group name.	N	N/A
target	Object name	Target mirror name. Mandatory if 2 mirrors are defined on the volume.	N	[none]

The command output includes:

- Date and time created
- Date and time started to run
- Date and time finished
- Job size (MB)

Either a volume or consistency group must be specified.

Field ID	Field output	Default position
created_at	Created	1
started_at	Started	2
finished_at	Finished	3
job_size	Job Size (MiB)	4
duration	Job Duration (Sec)	5
avg_sync_rate	Average Sync Rate (MB/sec)	6

Example:

```
mirror_statistics_get vol=VolName
```

Output:

```
<job id="143">
                <avg_sync_rate value="22.3333"/>
                <created_at value="2011-03-22 11:19:30"/>
                <duration value="6"/>
                <finished_at value="2011-03-22 11:19:36"/>
                <job_size value="134"/>
                <started_at value="2011-03-22 11:19:30"/>
           </job>
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **MIRROR_HAS_NO_STATISTICS**
  Job statistics were not collected for this Mirror.
- **LOCAL_IS_SLAVE**
  Local mirror peer is not the master
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **SYNC_MIRROR_HAS_NO_STATISTICS**
  Job statistics do not exist for Synchronous Mirror.
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **MIRROR_IS_STANDBY**
  mirror is marked as standby

Switching roles between master and slave

Use the **mirror_switch_roles** command to switch roles between master and slave volumes.

```
mirror_switch_roles <vol=VolName | cg=cgName> [ target=TargetName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local volume name.	N	N/A
cg	Object name	Local consistency group name.	N	N/A
target	Object name	N/A	N	[none]

The command can only be issued if coupling is operational and only on the master. For synchronous mirroring it can only be issued when the coupling is

synchronized; for asynchronous mirroring it can only be issued if there are no outstanding sync jobs and the volume and its last replicated snapshot are identical.

Following the execution of the command:

- The volume that was previously the master becomes the slave
- The volume that was previously the slave becomes the master

Before this command switches roles, the system stops accepting new writes to the local volume. With synchronous mirrors the system performs all pending writes, and only after all pending writes have been committed, the roles are switched.

After the command is executed, the mirror remains active.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_MIRROR**
  Local volume does not have remote mirroring definitions
- **CONS_GROUP_BAD_NAME**
  Consistency Group name does not exist.
- **CONS_GROUP_NO_MIRROR**
  Local Consistency Group does not have remote mirroring definitions
- **LOCAL_PEER_IS_NOT_MASTER**
  Local peer is not the master
- **MIRROR_IS_NOT_SYNCHRONIZED**
  Mirror is not synchronized
- **VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for this volume
- **REMOTE_TARGET_NOT_CONNECTED**
  There is currently no connection from the target system
- **VOLUME_BELONGS_TO_MIRRORED_CONS_GROUP**
  Volume mirror is part of Consistency Group mirror.
- **MIRROR_HAS_SYNC_JOB**
  Operation is not permitted on a mirror with active sync jobs
- **MIRROR_RETRY_OPERATION**
  There is an operation in progress on this mirror , please try again your request in a few seconds
  Troubleshooting: Please try again the command in a few seconds

- **MIRROR_MASTER_DIFFERS_FROM_SLAVE**
  Mirror master was written to after the last replicated snapshot was taken
- **REMOTE_MIRROR_IS_NOT_ACTIVE**
  Remote mirroring is not active
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **VOLUME_TARGET_MISMATCH**
  Volume and target do not match
- **CONS_GROUP_BAD_TARGET**
  Target name does not match the Consistency Group
- **REMOTE_MIRROR_IS_STANDBY**
  remote mirror is marked as standby
- **MIRROR_IS_STANDBY**
  mirror is marked as standby
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_VOLUMES**
  This command is not supported for IBM Hyper-Scale Mobility volumes.

Retrieving RPO thresholds

Use the **rpo_thresholds_get** command to list system RPO-related thresholds, that, once crossed, trigger the creation of a corresponding event.

```
rpo_thresholds_get
```

Example:

```
rpo_thresholds_get
```

Output:

```
Increase Percentage   Increase Absolute
--------------------- ------------------
100                   3600
```

Field ID	Field output	Default position
increase_percentage	Increase Percentage	1
increase_absolute	Increase Absolute	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed

User Category	Permission
Host side accelerator client	Disallowed

Setting an RPO threshold

Use the **rpo_thresholds_set** command to set system RPO-related thresholds, that, once crossed, trigger the creation of a corresponding event.

```
rpo_thresholds_set  [ increase_percentage=percentage ] [ increase_absolute=absolute ]
```

Parameters

Name	Type	Description	Mandatory	Default
increase_ percentage	Integer	The threshold for RPO increase (in per cent), beyond which an event should be created.	N	none
increase_absolute	Integer	The threshold for RPO increase, beyond which an event should be created.	N	none

Example:

```
rpo_thresholds_set increase_percentage=percentage
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **INVALID_RPO_THRESHOLD_PERCENTAGE**
  Values should be in [1,10000] range
- **INVALID_RPO_THRESHOLD_ABSOLUTE**
  Values should be in [1,1000000] range

Changing the interval of a schedule

Use the **schedule_change** command to change the interval of a schedule.

```
schedule_change schedule=Schedule interval=IntervalSize  [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
schedule	Object name	The name of the schedule.	Y	N/A
interval	N/A	The interval for asynchronous mirroring. Format: hh:mm [:ss].	Y	N/A
domain	N/A	The schedule will be attached to the specified domains. To specify several domains, separate them with a comma. To specify all existing domains, use "*".	N	none

This command updates the schedule definition. Such definition can be referenced to when specifying asynchronous mirroring couplings.

Limitation:

- The schedule must be one of the following values: 00:00:30, 00:01, 00:02, 00:05, 00:10, 00:15, 00:30, 01:00, 02:00, 03:00, 06:00, 08:00, 12:00.
- A predefined schedule cannot be changed.

Outcome:

- If the update command is issued on a schedule that is not referenced by any object, a confirmation message is displayed.
- If the update command is issued on a schedule that is referenced to by an object (for example, mirroring couplings), a warning message is displayed.
- Sync jobs that are running will not be affected.
- Future sync jobs are scheduled based on the new schedule settings.

Example:

```
schedule_create interval=00:01 schedule=1min domain=* -y
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed

User Category	Permission
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_UPDATE_THE_SCHEDULE**

  Are you sure you want to update this schedule? This change will effect all mirrors using that schedule.

Return codes

- **SCHEDULE_DOES_NOT_EXIST**

  Specified Schedule does not exist
- **BAD_SCHEDULE_TIME_FORMAT**

  Time format for Schedule is HH:MM[:SS]
- **ILLEGAL_INTERVAL**

  Specified interval value is not supported.
- **SCHEDULE_CAN_NOT_BE_UPDATED**

  Specified Schedule cannot be updated
- **INTERVAL_SCHEDULE_REQUIRES_ONLY_ONE_INTERVAL**

  Multiple times should not be defined for Interval Schedule
- **SCHEDULE_EXCLUDE_TIMES_NOT_REQUIRED**

  Exclusion period may defined only is exclude_time is set
- **ZERO_LENGTH_EXCLUSION_PERIOD**

  Exclusion period start time must be differnt than its end time
- **DOMAIN_SCHEDULE_IN_USE**

  Cannot move the schedule to other domain since it is in use.
- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.

Creating a schedule object

Use the **schedule_create** command to define a schedule for replication.

```
schedule_create schedule=Schedule [ interval=IntervalSize ]
 [ type=<manual|interval|max|time> ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
schedule	Object name	The name of the schedule	Y	N/A
interval	N/A	The interval for asynchronous mirroring. Format: hh:mm [:ss].	N	00:10[:00]

Name	Type	Description	Mandatory	Default
type	Enumeration	The schedule type for asynchronous mirroring. Can be **manual** or **interval**.	N	interval
domain	N/A	The schedule will be attached to the specified domains. To specify several domains, separate them with a comma. To specify all existing domains, use "*".	N	none

This command creates a schedule definition. Schedules can be referenced to when specifying asynchronous mirroring couplings.

Limitations:

- Only the following values are allowed in a schedule: 00:00:30, 00:01, 00:02, 00:05, 00:10, 00:15, 00:30, 01:00, 02:00, 03:00, 06:00, 08:00, 12:00.
- The system features a predefined schedule object with a non-user-configurable interval of 20 seconds, named **min_interval**.

The **type** parameter:

Prior to the introduction of this parameter, each asynchronous mirror could be configured with an automatic schedule, whose interval specified how often a replication point and the corresponding replication process (sync job) should be automatically created. It was also possible to instruct the system to create a manual replication point and a corresponding sync job for a mirror using the dedicated CLI command **mirror_create_snapshot**. Finally, a single predefined schedule named *Never* with no interval settings was provided for mirrors that only required manual sync job creation.

The **type** parameter enables you to define multiple custom, user-configurable manual schedules. The creation of consistent, identical replication points for all mirrors set with such schedule, as well as corresponding sync jobs can be triggered using the dedicated CLI command **schedule_create_tick**, that specifies the schedule name as an argument. This facilitates external/scripted replication control for mirrors sharing the same schedule, without requiring them to be interval-based.

When **type=interval**, synchronization jobs for a mirror associated with the schedule will be triggered automatically, based on the specified interval.

When **type=manual**, synchronization jobs for a mirror associated with the schedule can be triggered by the command **schedule_create_tick**.

Once set, the schedule type cannot be changed.

Example:

```
schedule_create interval=00:01 schedule=1min domain=*
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SCHEDULE_EXISTS**
  Schedule name exists
- **BAD_SCHEDULE_TIME_FORMAT**
  Time format for Schedule is HH:MM[:SS]
- **MAX_SYNC_SCHEDULES_REACHED**
  Maximal number of schedule objects has been reached
- **ILLEGAL_INTERVAL**
  Specified interval value is not supported.
- **INTERVAL_SCHEDULE_REQUIRES_ONLY_ONE_INTERVAL**
  Multiple times should not be defined for Interval Schedule
- **ZERO_LENGTH_EXCLUSION_PERIOD**
  Exclusion period start time must be differnt than its end time
- **SCHEDULE_EXCLUDE_TIMES_NOT_REQUIRED**
  Exclusion period may defined only is exclude_time is set
- **ONLY_INTERVAL_SCHEDULE_MAY_HAVE_EXCLUSIONS**
  Exclusion period may defined only for Interval Schedule
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Triggering a schedule

Use the **schedule_create_tick** command to trigger a schedule-equivalent event for the couplings with the specified schedule.

```
schedule_create_tick schedule=Schedule
```

Parameters

Name	Type	Description	Mandatory
schedule	Object name	The name of an asynchronously mirrored schedule.	Y

This command triggers a schedule-equivalent, interval-arrived event for couplings with the specified schedule.

- The command triggers a new sync job for asynchronous mirror definitions that are configured with the manual schedule specified by the command. The command triggers a simultaneous event for all mirrors with the specified schedule (and only whenever the schedule is of a non-interval type) which is equivalent to the 'new-interval-arrived' event triggered automatically by the system for a mirror (with a schedule of type interval).
- The command is different from **mirror_create_snapshot** whereas it is applied to mirrors that do not have an interval-based schedule. Thus, even though an event is triggered immediately (as with **mirror_create_snapshot**), no sync job is created for a pertinent mirror with the specified schedule (in case such a mirror has an outstanding sync job, as one might expect for mirrors with an interval-based schedule, if a new interval arrives during an outstanding job).
- The event is triggered for all pertinent couplings at the same time.
- A warning is displayed, requiring a user confirmation.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SCHEDULE_DOES_NOT_EXIST**

  Specified Schedule does not exist
- **MAX_VOLUMES_REACHED**

  Maximum number of volumes already defined
- **SCHEDULE_IS_NOT_MANUAL**

  Specified Schedule does not allow external trigger

Deleting a schedule object

Use the **schedule_delete** command to delete a schedule for replication.

```
schedule_delete schedule=Schedule
```

Parameters

Name	Type	Description	Mandatory
schedule	Object name	The name of the schedule to be deleted.	Y

This command deletes a schedule definition.

The command can be issued successfully only if the schedule specified is not referenced by a mirror coupling, or if it is not a pre-defined schedule (**min_interval**).

Outcome:

- The command will delete the specified schedule.

Example:

```
schedule_delete schedule=hourly
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SCHEDULE_IS_ASSIGNED**
  Specified Schedule is currently assigned to a mirror
- **SCHEDULE_CAN_NOT_BE_DELETED**
  Specified Schedule cannot be deleted
- **SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist

Listing a schedule object

Use the **schedule_list** command to list the schedule properties for the specified coupling.

```
schedule_list [ schedule=Schedule ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
schedule	Object name	The name of the schedule.	N	All
domain	Object name	The domain name.	N	All Domains

The following default parameters are listed:

- Name
- Interval

The following optional parameters can be listed:

- Predefined (is the schedule a predefined object)
- Last Tick (last timestamp the schedule was fired)

Field ID	Field output	Default position
name	Name	1
interval	Interval	2
predefined	Predefined	N/A

Example:

```
schedule_list
```

Output:

```
Name           Interval
never
min_interval   00:00:20
ASYNC_None_3   00:02:00
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Renaming a schedule

Use the **schedule_rename** command to rename a schedule object.

```
schedule_rename schedule=Schedule new_name=Name
```

Parameters

Name	Type	Description	Mandatory
schedule	Object name	The current name of the schedule.	Y
new_name	Object name	The new name for the schedule.	Y

It is not possible to rename a predefined schedule.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed

User Category	Permission
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist
- **SCHEDULE_NAME_EXISTS**
  New Schedule name already exists
- **SCHEDULE_CAN_NOT_BE_UPDATED**
  Specified Schedule cannot be updated

Viewing sync job status

Use the **sync_job_list** command to list the statuses of queued and running sync jobs for asynchronous couplings

```
sync_job_list [ vol=VolName | cg=cgName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Local volume name.	N	[none]
cg	Object name	Local consistency group name.	N	[none]
domain	Object name	The domain name.	N	All Domains

The following parameters are displayed:

- Mirroring coupling (volume/consistency group)
- Job state: initialization, pending, running, complete
- Type: interval-initiated, Snapshot Mirror, initialization, initializing validate
- Schedule - name of the referenced schedule object
- Interval length (if applicable)
- Job size
- Job progress
- Date created
- Time created
- Date started to run
- Time started to run

Field ID	Field output	Default position
job_object	Job Object	1
mirror_peer	Local Peer	2
source_snap	Source	3
target_snap	Target	4

Field ID	Field output	Default position
job_state	State	5
part_of_cg_job	Part of CG	6
job_type	Job Type	7
created_at	Created	N/A
started_at	Started	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Chapter 12. Data migration commands

This section describes the command-line interface (CLI) for data migration.

Activating data migration

Use the **dm_activate** command to activate the data migration process.

```
dm_activate vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The destination volume for data migration activation.	Y

This command activates the data migration process. This is either an initial activation or an activation after deactivation.

Upon activation, the data migration is tested in the same way as when using **dm_test** (see Testing the data migration definition), and this command fails if the data migration test fails.

This command has no effect if the process is already active.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_DM**
  Local volume does not have Data Migration definitions
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system
- **REMOTE_VOLUME_NO_LUN**
  Remote volume's LUN is unavailable
- **REMOTE_VOLUME_NO_READ_ACCESS**
  Remote volume cannot be read

- **REMOTE_VOLUME_NO_WRITE_ACCESS**
  Remote volume is write protected
- **BAD_REMOTE_VOLUME_SIZE**
  Master and slave volumes contain a different number of blocks

Deactivating data migration

Use the **dm_deactivate** command to deactivate the data migration process.

```
dm_deactivate vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The local volume on which the data migration process is to be deactivated.	Y

Hosts are not served while the data migration process is inactive.

This command has no effect if the data migration process is already inactive.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DEACTIVATE_DATA_MIGRATION**
  Deactivation will stop all applications, data migration can be deleted if it is done

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_DM**
  Local volume does not have Data Migration definitions

Defining data migration configuration

Use the **dm_define** command to define a data migration configuration.

```
dm_define vol=VolName target=TargetName lun=SourceLUN
source_updating=<yes|no> [ create_vol=<yes|no> ] [ pool=PoolName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Data migration destination volume on the local system.	Y	N/A
target	Object name	Remote system containing the source volume.	Y	N/A
lun	Integer	LUN of the source volume.	Y	N/A
source_updating	Boolean	Specifies whether to use source volume updating.	Y	N/A
create_vol	Boolean	A Boolean that determines whether to create a new volume or to use an existing one.	N	No
pool	Object name	Name of the storage pool to contain the volume. Used only when creating a volume. Mandatory when creating a volume.	N	N/A

This command defines a data migration relationship between a local volume and a remote volume. According to this definition, the local volume should reflect the remote volume.

After this configuration has been defined, it can be tested using the **dm_test** command (see Testing the data migration definition) and then activated using the **dm_activate** command (see Activating data migration). After this activation, hosts can read and write to this volume, and these operations are reflected on the remote volume.

The remote volume may be inaccessible when the command is executed. In this case, the definition is only used when data migration is tested.

The local system acts as a host to the remote system. The remote system should be configured to make the remote volume accessible to the local system through the specified LUN.

If **source updating** is specified, each write to the local volume is reflected as a write to the remote volume. Otherwise, writes on the local volume are not reflected and the remote volume is not changed.

The local volume must be formatted.

If **create_vol** is set to *yes*, the volume is created. In this case the size of the newly created volume is identical to the size of the source volume. When creating a volume, a pool name must be specified. Creating a volume fails if there is no connectivity to the target since the volume's size is unknown.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **TARGET_BAD_NAME**
  Target name does not exist
- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots
- **VOLUME_HAS_MIRROR**
  Mirror is defined for this volume
- **VOLUME_BELONGS_TO_CG**
  Volume belongs to a Consistency Group
- **VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for this volume
- **VOLUME_HAS_SNAPSHOTS**
  Volume has snapshots
- **VOLUME_NOT_FORMATTED**
  Local volume is not formatted
- **VOLUME_EXISTS**
  Volume name already exists
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **NOT_ENOUGH_SPACE**
  No space to allocate for volume's current usage
- **NOT_ENOUGH_HARD_SPACE**
  No space to allocate for volume's current usage
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **ILLEGAL_VOLUME_SIZE**
  Illegal volume size
- **REMOTE_VOLUME_NO_LUN**
  Remote volume's LUN is unavailable
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system
- **VOLUME_CANNOT_HAVE_ZERO_SIZE**

Volume size cannot be zero

- **ILLEGAL_LUN**
  LUN is out of range
- **TARGET_IS_MIRRORING**
  Target machine is defined only for remote mirroring
- **NO_ONLINE_MIGRATION_WITHOUT_SOURCE_UPDATING**
  Data Migration without automatic migration must be defined as source-updating
- **MIGRATION_ALREADY_DEFINED_FOR_LUN**
  Data Migration is already defined from lun *LUN* of target '*Target*'
- **VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit
- **INVALID_SLICE_OFFSET**
  Slice offset is illegal
- **ENCRYPTION_IN_PROGRESS**
  System is in the process of changing encryption activation state
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.
- **MAX_DMS_REACHED**
  Maximum number of remote volumes (mirror/migration) is already defined
  Troubleshooting: Delete unnecessary Data Migration objects
- **DOMAIN_MAX_DMS_REACHED**
  The domain exceeds the maximum allowed number of data migrations.

Deleting the data migration process

Use the **dm_delete** command to delete the data migration process.

```
dm_delete vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The name of the volume whose data migration process is to be deleted.	Y

This command deletes the data migration configuration and stops the data migration process.

This command can only be executed if the data migration has reached the state of synchronization.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed

User Category	Permission
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_DM**
  Local volume does not have Data Migration definitions
- **DM_IS_NOT_SYNCHRONIZED**
  Data Migration process has not been completed

Listing data migration statuses

Use the **dm_list** command to list data migration configuration and status.

```
dm_list [ vol=VolName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The name of the volume to be listed.	N	All data migration volumes.
domain	Object name	The domain name.	N	All Domains

This command lists all data migration configuration and statuses, including the following information:

- Volume name
- Target name
- LUN
- Volume size (GB)
- Migration completed (GB)
- Migration activation (active/inactive)
- Migration status (synchronized, unsynchronized)
- Migration remaining (GB)
- Migration remaining (%)
- Estimated time to completion

Field ID	Field output	Default position
local_volume_name	Local Volume	1
target_name	Remote System	2
remote_volume_lun	Remote LUN	3
active	Active	4
sync_state	Status	5
connected	Target Connected	6
size_to_synchronize	Size To Sync (MiB)	N/A
operational	Operational	N/A

Field ID	Field output	Default position
sync_progress	Sync Progress (%)	N/A
start_migration_automatically	Start Data Migration Automatically	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Testing the data migration definition

Use the **dm_test** command to test the data migration configuration.

```
dm_test vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	Destination volume for data migration testing.	Y

Command return codes indicate the types of test failures that may occur. Once a test is successful, then data migration can be activated.

If source updating is not defined for this data migration, the writing is not tested.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NO_DM**
  Local volume does not have Data Migration definitions
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system

- **REMOTE_VOLUME_NO_LUN**
  Remote volume's LUN is unavailable
- **REMOTE_VOLUME_NO_READ_ACCESS**
  Remote volume cannot be read
- **REMOTE_VOLUME_NO_WRITE_ACCESS**
  Remote volume is write protected
- **BAD_REMOTE_VOLUME_SIZE**
  Master and slave volumes contain a different number of blocks

Chapter 13. IBM Hyper-Scale Mobility commands

This section describes the command-line interface (CLI) for IBM Hyper-Scale Mobility.

Creating an IBM Hyper-Scale Mobility relation

Use the **olvm_create** command to define an IBM Hyper-Scale Mobility configuration.

```
olvm_create < vol=VolName remote_pool=RemotePoolName > target=TargetName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	An IBM Hyper-Scale Mobility volume on the local system.	Y
target	Object name	Remote system containing the destination volume.	Y
remote_pool	Object name	Name of the storage pool to contain the destination volume.	Y

This command creates an IBM Hyper-Scale Mobility relation through identifying the source volume and the destination system and storage pool.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_NOT_APPLICABLE_FOR_OLVM**

  The volume is not applicable for IBM Hyper-Scale Mobility.
- **VOLUME_BAD_NAME**

  Volume name does not exist
- **VOLUME_IS_SNAPSHOT**

  Operation is not permitted on snapshots
- **TARGET_BAD_NAME**

  Target name does not exist
- **VOLUME_IS_MASTER**

Local volume is already defined as a master volume

- **TARGET_BAD_TYPE**
  Target machine is not XIV machine
- **TARGET_NO_ACCESS**
  No access permissions to slave machine
- **TARGET_NOT_CONNECTED**
  There is currently no connection to the target system
- **REMOTE_TARGET_NOT_CONNECTED**
  There is currently no connection from the target system
- **MAX_MIGRATIONS_REACHED**
  Maximum number of migrations already defined
- **REMOTE_MAX_MIGRATIONS_REACHED**
  Maximum number of migrations already defined on remote machine
- **REMOTE_POOL_DOES_NOT_EXIST**
  Pool does not exist on remote machine
- **BAD_REMOTE_VOLUME_SIZE**
  Master and slave volumes contain a different number of blocks
- **NOT_ENOUGH_SPACE_ON_REMOTE_MACHINE**
  Not enough free space to set requested size of slave volume
- **REMOTE_VOLUME_EXISTS**
  Slave volume name already exists and cannot be created
- **REMOTE_VOLUME_IS_MASTER**
  Volume on remote machine is currently defined as Master
- **REMOTE_VOLUME_IS_SLAVE**
  Slave volume is already defined as a slave volume
- **REMOTE_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine
- **TIMEOUT**
  Remote operation did not complete in time
- **VOLUME_BAD_PREFIX**
  Volume name has a reserved prefix
- **REMOTE_VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for slave volume
- **REMOTE_VOLUME_LOCKED**
  Slave volume is locked
- **VOLUME_HAS_MIRRORING_SNAPSHOTS**
  Volume has snapshots created by previous mirroring process.
- **REMOTE_MAX_MIRROR_CAPACITY_REACHED**
  Maximum capacity for mirrored volumes already defined on remote machine
- **TARGET_DOES_NOT_ACCEPT_XIV_COMMANDS**
  Target system does not accept XIV management commands
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **VOLUME_LOCKED**
  Volume is locked

- **NO_ASYNC_IN_THIN_PROVISIONED_POOL**
  Thin provisioned Pool cannot contain Volumes with Asynchronous Mirroring
- **BAD_REMOTE_VOLUME_NAME**
  Slave volume name does not exist
- **REMOTE_VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit of remote machine
- **MIRROR_RETRY_OPERATION**
  There is an operation in progress on this mirror , please try again your request in a few seconds
  Troubleshooting: Please try again the command in a few seconds
- **ELECTRONIC_LICENSE_NOT_APPROVED**
  Operation blocked until Electronic license approval
  Troubleshooting: Please retrieve Electronic license version and accept it
- **VOLUME_NOT_FORMATTED**
  Local volume is not formatted
- **MIRRORING_INCOMPATIBLE_TARGET_VERSION**
  Mirroring is not supported between the system versions of the specified peers.
- **NOT_ENOUGH_SPACE**
  No space to allocate volume
- **VOLUME_SIZE_ABOVE_LIMIT**
  Volume size specified is above limit
- **INVALID_SLICE_OFFSET**
  Slice offset is illegal
- **ILLEGAL_VOLUME_SIZE**
  Illegal volume size
- **VOLUME_IS_OLVM_PROXY**
  The volume is in an IBM Hyper-Scale Mobility Proxy phase.
- **VOLUME_IS_SLAVE**
  Volume is defined as a slave volume
- **REMOTE_VOLUME_IS_SNAPSHOT**
  Slave volume is a snapshot
- **VOLUME_EXISTS**
  Volume name already exists
- **SLAVE_VOLUME_NOT_FORMATTED**
  Slave volume is not formatted
- **VOLUME_BELONGS_TO_CG**
  Volume belongs to a Consistency Group
- **VOLUME_HAS_DATA_MIGRATION**
  Data Migration is defined for this volume
- **MAX_MIRRORS_REACHED**
  Maximum number of mirrors already defined
- **VOLUME_CANNOT_HAVE_ZERO_SIZE**
  Volume size cannot be zero
- **ASYNC_MIRROR_REMOTE_RPO_TOO_SHORT**
  Specified Remote RPO is too short.

- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **REMOTE_VOLUME_NOT_APPLICABLE_FOR_OLVM**
  The remote volume is not applicable for IBM Hyper-Scale Mobility.
- **REMOTE_SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist on remote machine
- **ASYNC_MIRROR_REMOTE_RPO_TOO_LONG**
  Specified Remote RPO is too long.
- **OPERATION_DENIED_OBJECT_MANAGED**
  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **ENCRYPTION_IN_PROGRESS**
  System is in the process of changing encryption activation state
- **MAX_OLVM_REACHED**
  Maximum number of IBM Hyper-Scale Mobility Relations already defined
- **DOMAIN_MAX_MIRRORS_REACHED**
  The domain exceeds the maximum allowed number of mirrors.
- **REMOTE_DOMAIN_MAX_MIGRATIONS_REACHED**
  Maximum number of migrations already defined on remote machine domain
- **DOMAIN_HAS_NO_ACCESS_TO_TARGET**
  Domain has no access to target.
- **REMOTE_DOMAIN_HAS_NO_ACCESS_TO_TARGET**
  Slave machine domain has no access to target
- **DOMAIN_MAX_VOLUMES_REACHED**
  The domain exceeds the maximum allowed number of volumes.
- **REMOTE_DOMAIN_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine domain
- **OLVM_BLACKLIST_FULL**
  Cannot create new IBM Hyper-Scale Mobility Relations. Too many volume serials are blacklisted.
- **XMIRROR_MAX_NUM_OF_MIRRORS_REACHED**
  Failed to create mirror, max number of mirrors exceeded
- **REMOTE_VOLUME_TWO_SYNC_MIRRORS_NOT_ALLOWED**
  Two SYNC mirrors detected on remote volume. This is not allowed.
- **REMOTE_VOLUME_IS_MIRROR_MASTER**
  Volume is a mirror master. Can't be slave!
- **REMOTE_VOLUME_MIRROR_LOOP_DETECTED**
  A mirror loop was detected on the remote volume. This means that there is a mirror on the remote system and its target is this system so you can't create a mirror with this target here.
- **REMOTE_VOLUME_MASTER_ASYNC_MIRROR_DETECTED**
  An ASYNC master mirror was detected on the remote volume. Operation not allowed.
- **XMIRROR_MIRRORING_INCOMPATIBLE_TARGET_VERSION**
  Xmirror Mirroring is not supported between the system versions of the specified peers.

- **VOLUME_HAS_MULTIPLE_MIRRORS**
  Volume has multiple mirrors, operation not allowed or target must be specified
- **OLVM_NOT_SUPPORTED_FOR_FC_TARGET**
  IBM Hyper-Scale Mobility is not supported for Fiber Channel target.

Activating a volume migration

Use the **olvm_activate** command to activate an IBM Hyper-Scale Mobility migration for a defined an IBM Hyper-Scale Mobility relationship.

```
olvm_activate vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	IBM Hyper-Scale Mobility source volume.	Y

This command is issued on the source.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_SOURCE_IN_THIS_STATE**
  The source is in an unsupported IBM Hyper-Scale Mobility state
- **MIRROR_CONFIGURATION_ERROR**
  Mirror local configuration does not match remote configuration
- **MIRROR_CONS_GROUP_MEMBERSHIP_MISMATCH**
  Mirrored CG contains different volumes on Master and Slave. This problem occurs whenever the cg_add_vol or cg_remove_vol commands were previously issued and the Master did not receive an acknowledgment from the Slave until the command timed out, or any other unexpected failure.
- **MIRROR_RETRY_OPERATION**
  There is an operation in progress on this mirror , please try again your request in a few seconds
  Troubleshooting: Please try again the command in a few seconds
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_DESTINATION_IN_THIS_STATE**
  The destination is in an unsupported IBM Hyper-Scale Mobility state
- **MIRROR_SIZE_MISMATCH**

Slave volume and Master Volume sizes are different

- **REMOTE_VOLUME_IS_MASTER**
  Volume on remote machine is currently defined as Master
- **REMOTE_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine
- **VOLUME_NOT_DEFINED_FOR_OLVM**
  The volume does not have IBM Hyper-Scale Mobility definitions
- **OLVM_ALREADY_ACTIVE**
  The IBM Hyper-Scale Mobility relation is already active.
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **REMOTE_MIRROR_IS_STANDBY**
  remote mirror is marked as standby
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified
- **REMOTE_DOMAIN_MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined on remote machine domain

Deactivating IBM Hyper-Scale Mobility migration

Use the **olvm_deactivate** command to deactivate IBM Hyper-Scale Mobility migration for a defined IBM Hyper-Scale Mobility relation.

```
olvm_deactivate vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The source volume.	Y

This command is issued on the source.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DEACTIVATE_OLVM**
  Are you sure you want to deactivate IBM Hyper-Scale Mobility?

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **REMOTE_VOLUME_IS_MASTER**
  Volume on remote machine is currently defined as Master
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_SOURCE_IN_THIS_STATE**
  The source is in an unsupported IBM Hyper-Scale Mobility state
- **VOLUME_NOT_DEFINED_FOR_OLVM**
  The volume does not have IBM Hyper-Scale Mobility definitions
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_DESTINATION_IN_THIS_STATE**
  The destination is in an unsupported IBM Hyper-Scale Mobility state
- **OLVM_ALREADY_INACTIVE**
  The IBM Hyper-Scale Mobility relation is already inactive.
- **REMOTE_MIRROR_IS_STANDBY**
  remote mirror is marked as standby
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified

Aborting a defined or activated IBM Hyper-Scale Mobility process

Use the **olvm_abort** command to abort a defined or activated IBM Hyper-Scale Mobility process.

```
olvm_abort < vol=VolName [ force_abort=<yes|no> | force_abort_on_destination=<yes|no> ] >
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The source volume.	Y	N/A
force_abort	Boolean	Determines whether to delete an IBM Hyper-Scale Mobility relationship on the source.	N	No
force_abort_on_destination	Boolean	Determine whether to delete an IBM Hyper-Scale Mobility relationship on the destination.	N	No

This command is issued on the source and has the option to abort the IBM Hyper-Scale Mobility process either from the source or from the destination.

Once issued, the source and destination are no longer part of an IBM Hyper-Scale Mobility relationship. IBM Hyper-Scale Mobility attributes are deleted.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_ABORT_OLVM_RELATIONSHIP_IN_THIS_PHASE**
  Are you sure you want to abort IBM Hyper-Scale Mobility relationship?
- **ARE_YOU_SURE_YOU_WANT_TO_FORCE_ABORT_OLVM_RELATIONSHIP_IN_THIS_PHASE**
  Are you sure you want to force abort IBM Hyper-Scale Mobility relationship?

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NOT_DEFINED_FOR_OLVM**
  The volume does not have IBM Hyper-Scale Mobility definitions
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_SOURCE_IN_THIS_STATE**
  The source is in an unsupported IBM Hyper-Scale Mobility state
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_DESTINATION_IN_THIS_STATE**
  The destination is in an unsupported IBM Hyper-Scale Mobility state
- **OLVM_IS_ACTIVE**
  The IBM Hyper-Scale Mobility relation is active.
- **FORCE_ABORT_NOT_ALLOWED**
  A forced IBM Hyper-Scale Mobility abort is not allowed.
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified

Moving the IBM Hyper-Scale Mobility source volume to a Proxy state

Use the **olvm_proxy** command to move the IBM Hyper-Scale Mobility source volume to a Proxy state.

```
olvm_proxy vol=VolName
```

Parameters

Name	Type	Description	Mandatory
vol	Object name	The source volume.	Y

This command moves the IBM Hyper-Scale Mobility source volume to a Proxy state where the source acts as a proxy to the destination.

The source becomes a proxy and the destination becomes the data 'owner'. Host writes are no longer written to the source and the volume data on the source is freed. The source volume and snapshot data are deleted.

This command is issued on the source.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_OLVM_PROXY**

  Are you sure you want to move the volume *Volume*to a Proxy state? Source volume and all volume snapshots will be deleted.

Return codes

- **VOLUME_BAD_NAME**

  Volume name does not exist
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_SOURCE_IN_THIS_STATE**

  The source is in an unsupported IBM Hyper-Scale Mobility state
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_DESTINATION_IN_THIS_STATE**

  The destination is in an unsupported IBM Hyper-Scale Mobility state
- **VOLUME_NOT_DEFINED_FOR_OLVM**

  The volume does not have IBM Hyper-Scale Mobility definitions
- **OLVM_LINK_IS_NOT_UP**

  IBM Hyper-Scale Mobility link is not up. The mapping list cannot be updated.
- **HOST_BAD_NAME**

  Host name does not exist
- **ISCSI_HOST_ILLEGAL_PORT_NAME**

  Port name for iSCSI Host is illegal

  Troubleshooting: Port names for iSCSI Hosts must contain only printable characters.
- **MAX_PORTS_REACHED**

  Maximum number of ports already defined in the system
- **HOST_PORT_EXISTS**

  Host with this port ID already defined
- **REMOTE_MAX_VIRTUAL_HOSTS_REACHED**

  Maximum number of remote virtual hosts already defined
- **OLVM_RETRY_OPERATION**

  There is an operation in progress on this olvm , please try again your request in a few seconds

  Troubleshooting: Please try again the command in a few seconds

- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified

Deleting an IBM Hyper-Scale Mobility relation

Use the **olvm_delete** command to delete an IBM Hyper-Scale Mobility relation and attributes.

```
olvm_delete vol=VolName [ force_delete=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The volume for IBM Hyper-Scale Mobility abort.	Y	N/A
force_delete	Boolean	Determines whether to delete an IBM Hyper-Scale Mobility relationship on the destination.	N	No

This command is issued on the source. If there is no communication to the destination, the command can force delete the IBM Hyper-Scale Mobility relation.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_OLVM_RELATIONSHIP_IN_THIS_PHASE**
  Are you sure you want to delete IBM Hyper-Scale Mobility relationship?
- **ARE_YOU_SURE_YOU_WANT_TO_FORCE_DELETE_OLVM_RELATIONSHIP_IN_THIS_PHASE**
  Are you sure you want to force delete IBM Hyper-Scale Mobility relationship?

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **VOLUME_NOT_DEFINED_FOR_OLVM**
  The volume does not have IBM Hyper-Scale Mobility definitions
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_SOURCE_IN_THIS_STATE**
  The source is in an unsupported IBM Hyper-Scale Mobility state
- **COMMAND_NOT_SUPPORTED_FOR_OLVM_DESTINATION_IN_THIS_STATE**

The destination is in an unsupported IBM Hyper-Scale Mobility state

- **FORCE_DELETE_NOT_ALLOWED**
  A forced deletion of the IBM Hyper-Scale Mobility relation is not allowed.
- **VOLUME_IS_MAPPED**
  Volume that is mapped to a host cannot be deleted
- **VOLUME_IS_BOUND**
  Volume is bound to a ALU
  Troubleshooting: Unbound the volume from the ALU
- **VOLUME_HAS_MULTIPLE_MIRRORS**
  volume has multiple mirrors, operation not allowed or target must be specified

Listing the IBM Hyper-Scale Mobility status

Use the **olvm_list** command to list the IBM Hyper-Scale Mobility configuration and status.

```
olvm_list [ vol=VolName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The volume name to be listed.	N	Displays details for IBM Hyper-Scale Mobility relationships in the local system.
domain	Object name	The domain name.	N	All Domains

This command is issued on the source. The output includes the following information:

- Volume name
- Role (Source, Destination)
- Remote System
- Active (Yes, No)
- Phase (Migration, Proxy-Ready, Proxy)
- State
- Link Up

Field ID	Field output	Description	Default position
name	Volume name	N/A	1
role	Role	N/A	2
target_name	Remote System	N/A	3
active	Active	N/A	4
phase	Phase	N/A	5
state	State	N/A	6
connected	Link Up	N/A	7
sync_progress	Sync Progress (%)	N/A	N/A
size_to_synchronize	Size To Sync (MiB)	N/A	N/A

Field ID	Field output	Description	Default position
estimated_sync_time	Est. remaining time (sec)	N/A	N/A
mirror_error	Mirror Error	No Error, Secondary pool exhausted, Configuration error or No thin provisioning resources	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Chapter 14. Event handling commands

This section describes the command-line interface (CLI) for event handling, including listing events, filtering and sending notifications.

Generating a custom event

Use the **custom_event** command to generate a custom event.

```
custom_event description=Description
[ severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL> ]
```

Parameters

Name	Type	Description	Mandatory	Default
description	String	Description of the event.	Y	N/A
severity	N/A	Severity of the event.	N	Informational
internal	Boolean	Must be specified for XIV internal custom event.	N	no

This command can be used to either generate an event from a user application or host side software, or to test the event notification procedures.

Example:

```
custom_event description="Test started"
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Defining a new event notification destination

Use the **dest_define** command to define a new destination for event notifications.

```
dest_define
dest=DestName type=<SNMP|EMAIL|SMS|HTTPS>
< snmp_manager=SNMPManager | < uri=HTTPSaddress
[ proxy=ProxyAddress [ proxy_port=ProxyPortNum ] ]
> | email_address=email |
<area_code=AreaCode number=PhoneNumber> | user=UserName>
[ smtpgws=<SMTPGW1[,SMTPGW2]...|ALL> | smsgws=<SMSGW1[,SMSGW2]...|ALL> ]
[ heartbeat_test_hour=HH:MM
[ heartbeat_test_days=Day ] ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
dest	Object name	Destination name.	Y	N/A
type	Enumeration	Destination type for event notifications: be email, SMS, HTTPS or SNMP.	Y	N/A
snmp_manager	N/A	IP address or DNS name of the SNMP manager.	N	N/A
uri	N/A	IP address or DNS name of the HTTPS server. If a port different from the default should be used, specify it here.	N	N/A
proxy	N/A	IP address or DNS name of the proxy server to send HTTPS over.	N	None
proxy_port	Integer	Proxy port number to send HTTPS through. The default is 1080.	N	None
email_address	N/A	Email address.	N	N/A
smtpgws	Object name	List of SMTP gateways to be used.	N	ALL (all gateways).
area_code	N/A	Area code of the cellular number for SMS notification. Use digits, '-' or '.'	N	N/A
number	N/A	Cellular number for SMS notification. Use digits, '-' or '.'	N	N/A
smsgws	Object name	SMS gateways to be used for this destination.	N	ALL (all gateways).
user	Object name	User name, where the user's email or phone are used.	N	N/A

Name	Type	Description	Mandatory	Default
heartbeat_test_hour	N/A	The hour for periodic heartbeat testing in the format HH:MM	N	No heartbeat
heartbeat_test_days	N/A	List of days for heartbeat testing: a comma-separated list of 3-letter day names (such as "mon", "mon,fri", etc.).	N	No heartbeat
domain	N/A	Attach the destination to the specified domains. To define more than one domain, separated them with a comma. To specify all existing domains, use "*".	N	none
internal	Boolean	Defines the destination as internal to XIV.	N	no

This command defines a destination for event notifications. There are four types of destinations: email, SMS, HTTPS and SNMP.

- *Email* destinations are used for sending notifications via email. When defining a new destination of type Email, either the email address of the recipient must be specified in **email_address** or the user name must be specified in **user** (in this case the email address of that user is used).
- *SMS* destinations are used for sending notifications via SMS to cellular phones. When defining a new destination of type SMS, either the cellular phone number of the destination must be specified in **number** or the user name must be specified in **user** (in this case the cellular phone number of that user is used). To allow correct formatting, the area code must be separated from the local number.
- *SNMP* destinations are used for sending notifications by SNMP traps to SNMP managers. When defining a new destination of type SNMP, the IP address of the SNMP manager must be specified.
- *HTTPS* destinations are used for sending notifications to HTTPS servers. When defining a new destination of type HTTPS, the IP address of the HTTPS server must be specified.

By default, when sending an email notification, all SMTP gateways specified in the **smtpgw_prioritize** command (see Prioritizing SMTP gateways) are used, according to the order specified in that command. It is possible to define that sending emails to a specific destination will use specific SMTP gateway or gateways. This is done by specifying the **smtpgws** parameter.

The same logic applies to sending SMS messages. By default, SMS gateways specified in the **smtpgw_prioritize** command are used, according to the order specified in this command. It is possible to define that messages to a specific SMS destination will be sent through a specific SMS gateway or gateways.

Example:

```
dest_define dest=adminemail type=EMAIL
email_address=storageadmin@yourcompany.com
```

Output:

```
Command executed successfully.
```

Example:

```
dest_define dest=monitoringserver type=SNMP
snmp_manager=10.170.68.111
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DEST_MAX_REACHED**
  Maximum number of destinations already defined
- **DEST_NAME_ALREADY_EXISTS**
  Destination name already exists
- **DEST_NAME_IS_DESTGROUP_NAME**
  Destination name already exists as a destination group name
- **EMAIL_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have an email address
- **GATEWAY_NAME_APPEARS_TWICE**
  Gateway name appears twice in the list
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **SMSGWS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have SMS gateways
- **SMTPGWS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have SMTP gateways
- **SNMP_MANAGER_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have an SNMP manager
- **SNMP_MANAGER_NOT_ALLOWED_FOR_DEST_TYPE**

Destination cannot have an SNMP manager

- **NO_SMS_GATEWAYS_ARE_DEFINED**
  An SMS Destination cannot be defined if no SMS gateways are defined
- **HTTPS_ADDRESS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have an https address
- **PROXY_ADDRESS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have a proxy address
- **SNMP_DESTS_CANNOT_REFER_TO_USERS**
  SNMP destinations cannot refer to users
- **HTTPS_DESTS_CANNOT_REFER_TO_USERS**
  HTTPS destinations cannot refer to users
- **NO_SMTP_GATEWAYS_ARE_DEFINED**
  An email destination cannot be defined if no SMTP gateways are defined
- **USER_EMAIL_ADDRESS_IS_NOT_DEFINED**
  User's email address is not defined
- **USER_PHONE_NUMBER_IS_NOT_DEFINED**
  User's phone number is not defined
- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **INTERNAL_DESTS_CANNOT_REFER_TO_USERS**
  Internal destinations cannot refer to users
- **DAY_APPEARS_TWICE**
  The day '*Day*' appears twice on the list.
  Troubleshooting: Each day must appear at most once.
- **HTTPS_ADDRESS_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have an https address
- **DEST_TYPE_NOT_SUPPORTED**
  This type of destination is not supported
  Troubleshooting: Contact support
- **USER_IS_NOT_IN_DESTINATION_DOMAINS**
  User must by included in the destination domains.
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **INTERNAL_EVENT_OBJECTS_CANNOT_USE_SPECIFIC_DOMAINS**
  Internal event objects cannot be defined on specific domains.

Deleting a destination

Use the **dest_delete** command to delete an event notification destination.

```
dest_delete dest=DestName
```

Parameters

Name	Type	Description	Mandatory
dest	Object name	Name of the destination to be deleted.	Y

Name	Type	Description	Mandatory
internal	Boolean	Specify YES for internal XIV destinations.	N

Destinations that are part of a destination group or used by a rule cannot be deleted.

Destinations cannot be deleted while there are uncleared alerting events.

Example:

```
dest_delete dest=itmanager
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_DESTINATION**
  Are you sure you want to delete destination *Destination*?

Return codes

- **DEST_NAME_DOES_NOT_EXIST**
  Destination name does not exist
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **DEST_IS_PART_OF_DESTGROUP**
  Destination is part of a destination group and hence cannot be deleted
- **DEST_APPEARS_IN_RULE**
  Destination appears in a rule
  Troubleshooting: To delete the destination, first delete the rule.

Listing event notification destinations

Use the **dest_list** command to list event notification destinations.

```
dest_list [ dest=DestName ] [ type=<SNMP|EMAIL|SMS|HTTPS> ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
dest	Object name	Destinations to be listed.	N	All destinations.
type	Enumeration	Filter only destinations of the specified type.	N	All types.
internal	Enumeration	Filter destinations by their internal XIV attribute.	N	no
domain	Object name	The domain name.	N	All Domains

This command lists the configuration of all defined destinations, or of a specific destination.

Field ID	Field output	Default position
name	Name	1
type	Type	2
email_address	Email Address	3
area_code	Area Code	4
number	Phone Number	5
snmp_manager	SNMP Manager	6
uri	HTTPS Address	7
gateways	Gateways	N/A
user	User	8
heartbeat_test_days	Heartbeat Days	N/A
heartbeat_test_hour	Heartbeat Time	N/A
creator	Creator	N/A
proxy	proxy server address	N/A
proxy_port	proxy port number	N/A

Example:

```
dest_list
```

Output:

```
Name              Type  Email Address                 Phone Number  Gateways
storagemanager    EMAIL storageadmin@yourcompany.com                all
monitoringserver  SNMP
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Disallowed	N/A

User Category	Permission	Condition
Read-only users	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Renaming a destination

Use the **dest_rename** command to rename an event notification destination.

```
dest_rename dest=DestName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
dest	Object name	The destination to be renamed.	Y
new_name	Object name	New name of the destination.	Y
internal	Boolean	Specify YES for internal XIV destinations.	N

Example:

```
dest_rename dest=adminemail new_name=storagemanager
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **DEST_NAME_DOES_NOT_EXIST**
  Destination name does not exist
- **DEST_NAME_IS_DESTGROUP_NAME**
  Destination name already exists as a destination group name
- **DEST_NAME_ALREADY_EXISTS**

Destination name already exists

Testing a destination

Use the **dest_test** command to send a test message to an event notification destination.

```
dest_test dest=DestName management_ip=IPaddress [ smtpgw=SMTPGatewayName ]
[ smsgw=SMSGatewayName ] [ internal=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
dest	Object name	Name of the destination to be tested.	Y	N/A
management_ip	N/A	Management IP used for sending the event notification.	Y	N/A
smtpgw	Object name	SMTP gateway to be tested.	N	Default system choice.
smsgw	Object name	SMS gateway to be tested.	N	Default system choice.
internal	Boolean	Must be specified for XIV-internal destinations.	N	no

This command tests a destination by sending a test message, SMS or SNMP trap. Note that a successful return code from this command does not ensure notification delivery.

Some problems with SNMP, email, and SMS delivery may fail to be detected.

For email messages, the SMTP gateway must be specified (the destination is only tested through that gateway). The same applies to the SMS gateway.

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **DEST_NAME_DOES_NOT_EXIST**

  Destination name does not exist
- **DEST_TEST_NOT_PERFORMED_SYSTEM_BUSY**

Test of destination '*Destination Name*' not performed because the system is busy
Troubleshooting: Please wait a few seconds and try again

- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **SMSGWS_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have SMS gateways
- **SMSGWS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have SMS gateways
- **SMTPGWS_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have SMTP gateways
- **SMTPGWS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have SMTP gateways
- **DEST_TEST_FAILED**
  Test of destination '*Destination Name*' failed
- **SYSTEM_HAS_NO_SUCH_EXTERNAL_IP**
  The system has no such external IP address
- **MODULE_CANNOT_SEND_MESSAGES**
  Selected module cannot send messages
  Troubleshooting: Contact support

Updating an event notification destination

Use the **dest_update** command to update a destination.

```
dest_update dest=DestName
[ snmp_manager=SNMPManager ] [ uri=HTTPSaddress ]
[ proxy=ProxyAddress ] [ proxy_port=ProxyPortNum ]
[ email_address=email ]
[ smtpgws=<SMTPGW1[,SMTPGW2]...|ALL> ] [ area_code=AreaCode ]
[ number=PhoneNumber ]
[ smsgws=<SMSGW1[,SMSGW2]...|ALL> ]
[ user=UserName ] [ heartbeat_test_hour=HH:MM ]
[ heartbeat_test_days=Day ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
dest	Object name	Destination name.	Y	N/A
snmp_manager	N/A	IP address or DNS name of the SNMP manager.	N	Keep unchanged.
uri	N/A	IP address or DNS name of HTTPS server.	N	Keep unchanged.
proxy	N/A	IP address or DNS name of proxy server to send HTTPS over.	N	Keep unchanged.
proxy_port	Integer	Proxy port number to send HTTPS through (1080 by default).	N	Keep unchanged.

Name	Type	Description	Mandatory	Default
domain	N/A	Attach the destination to the specified domains. To define more than one domain, separated them with a comma. To specify all existing domains, use "*".	N	Keep unchanged
email_address	N/A	Email address.	N	Keep unchanged.
smtpgws	Object name	List of SMTP gateways to be used.	N	Keep unchanged.
area_code	N/A	Area code of the cellular number for SMS notification.	N	Keep unchanged.
number	N/A	Cellular number for SMS notification.	N	Keep unchanged.
smsgws	Object name	SMS gateways to be used.	N	Keep unchanged.
user	Object name	User name, where the user's email or phone are used.	N	Keep unchanged.
heartbeat_test_hour	N/A	The hour of periodic heartbeat testing	N	Keep unchanged.
heartbeat_test_days	N/A	List of days for heartbeat testing: a comma-separated list of 3-letter day names (such as "mon", "mon,fri", and so on).	N	Keep unchanged.
internal	Boolean	Specify YES for internal XIV destinations.	N	no

The parameters of this command are identical to the Defining a new event notification destination command, except that the destination type cannot be changed. All relevant fields must be specified (not only the ones that are being changed).

Example:

```
dest_update dest=storagemanager
email_address=admin@yourcompany.com
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DEST_NAME_DOES_NOT_EXIST**
  Destination name does not exist
- **AREA_CODE_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have an area code
- **AREA_CODE_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have an area code
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **EMAIL_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have an email address
- **EMAIL_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have an email address
- **GATEWAY_NAME_APPEARS_TWICE**
  Gateway name appears twice in the list
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **NUMBER_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have a number
- **NUMBER_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have a number
- **SMSGWS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have SMS gateways
- **SNMP_MANAGER_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have an SNMP manager
- **NO_SMTP_GATEWAYS_ARE_DEFINED**
  An email destination cannot be defined if no SMTP gateways are defined
- **DEST_CANNOT_HAVE_A_USER_AND_AN_EMAIL_ADDRESS**
  Destination cannot simultaneously have an email address and refer to a user
- **DEST_CANNOT_HAVE_A_USER_AND_A_PHONE_NUMBER**
  Destination cannot simultaneously have a phone number address and refer to a user
- **USER_PHONE_NUMBER_IS_NOT_DEFINED**
  User's phone number is not defined
- **USER_NAME_DOES_NOT_EXIST**

User name does not exist

- **INTERNAL_DESTS_CANNOT_REFER_TO_USERS**
  Internal destinations cannot refer to users
- **DEST_HEARTBEAT_DAYS_BUT_NO_HOUR**
  Destination heartbeat days specified with no heartbeat hour
- **HTTPS_ADDRESS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have an https address
- **PROXY_ADDRESS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have a proxy address
- **SNMP_DESTS_CANNOT_REFER_TO_USERS**
  SNMP destinations cannot refer to users
- **HTTPS_DESTS_CANNOT_REFER_TO_USERS**
  HTTPS destinations cannot refer to users
- **USER_EMAIL_ADDRESS_IS_NOT_DEFINED**
  User's email address is not defined
- **SMTPGWS_NOT_ALLOWED_FOR_DEST_TYPE**
  Destination cannot have SMTP gateways
- **DAY_APPEARS_TWICE**
  The day '*Day*' appears twice on the list.
  Troubleshooting: Each day must appear at most once.
- **SNMP_MANAGER_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have an SNMP manager
- **NO_SMS_GATEWAYS_ARE_DEFINED**
  An SMS Destination cannot be defined if no SMS gateways are defined
- **HTTPS_ADDRESS_MUST_BE_SPECIFIED_FOR_DEST_TYPE**
  Destination must have an https address
- **DEST_TYPE_NOT_SUPPORTED**
  This type of destination is not supported
  Troubleshooting: Contact support
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **USER_IS_NOT_IN_DESTINATION_DOMAINS**
  User must by included in the destination domains.
- **DESTINATION_IS_NOT_IN_RULE_DOMAINS**
  Destination must by included in the rule domains.
- **DESTINATION_IS_NOT_IN_DESTGROUP_DOMAINS**
  Destinations must by included in the destination group domains.

Adding a destination to a destination group

Use the **destgroup_add_dest** command to add an event notification destination to a destination group.

```
destgroup_add_dest destgroup=GroupName dest=DestName
```

Parameters

Name	Type	Description	Mandatory
destgroup	Object name	Destination group name to which to add the destination.	Y
dest	Object name	Destination to be added to the group.	Y
internal	Boolean	Specify YES for internal XIV destination groups.	N

The command fails if the destination group already contains the destination.

The command cannot be executed while there are uncleared alerting events.

Example:

```
destgroup_add_dest destgroup=alladmins dest=john
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DESTGROUP_NAME_DOES_NOT_EXIST**
  Destination group name does not exist
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **DEST_NAME_DOES_NOT_EXIST**
  Destination name does not exist
- **DESTGROUP_MAX_DESTS_REACHED**
  Maximum number of destinations already defined in destination groups
- **DESTGROUP_ALREADY_INCLUDES_DEST**
  Destination group already includes destination name
- **DESTINATION_IS_NOT_IN_DESTGROUP_DOMAINS**
  Destinations must by included in the destination group domains.

Creating a destination group

Use the **destgroup_create** command to create an event notification destinations group.

```
destgroup_create destgroup=GroupName [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
destgroup	Object name	Destination group name.	Y	N/A
domain	N/A	Attach the destination group to the specified domains. To define more than one domain, separate them with a comma. To specify all existing domains, use "*".	N	none
internal	Boolean	Specify YES for internal XIV destination groups.	N	no

This command creates a destination group, which is used by rules to send notifications to the entire group without specifying all the destinations for each rule. You can also add or remove destinations from the group, which eliminates the need to change the configuration of each rule separately.

Upon creation, the destination group is empty. To add a destination to a destination group, use the Adding a destination to a destination group command.

Example:

```
destgroup_create destgroup=alladmins
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DESTGROUP_MAX_REACHED**
  Maximum number of destination groups already defined
- **DESTGROUP_NAME_ALREADY_EXISTS**
  Destination group name already exists
- **DESTGROUP_NAME_IS_DEST_NAME**
  Destination group name already exists as a destination name
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **INTERNAL_EVENT_OBJECTS_CANNOT_USE_SPECIFIC_DOMAINS**
  Internal event objects cannot be defined on specific domains.

Updating an event notification destination group

Use the **destgroup_update** command to update a destination group.

```
destgroup_update destgroup=GroupName domain=DomainList
```

Parameters

Name	Type	Description	Mandatory
destgroup	Object name	Destination group name.	Y
domain	N/A	Attach the destination group to the specified domains. To define more than one domain, separated them with a comma. To specify all existing domains, use "*".	Y
internal	Boolean	Specify YES for internal XIV destination groups.	N

Example:

```
destgroup_update destgroup=alladmins domain=D1,D2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DESTINATION_IS_NOT_IN_DESTGROUP_DOMAINS**
  Destinations must by included in the destination group domains.
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **DESTGROUP_IS_NOT_IN_RULE_DOMAINS**
  Destination groups must by included in the rule domains.
- **DESTGROUP_NAME_DOES_NOT_EXIST**
  Destination group name does not exist
- **INTERNAL_EVENT_OBJECTS_CANNOT_USE_SPECIFIC_DOMAINS**
  Internal event objects cannot be defined on specific domains.

Deleting a destination group

Use the **destgroup_delete** command to delete an event notification destination group.

```
destgroup_delete destgroup=GroupName
```

Parameters

Name	Type	Description	Mandatory
destgroup	Object name	The name of the destination group to be deleted.	Y
internal	Boolean	Specify YES for internal XIV destination groups.	N

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_DESTINATION_GROUP**
  Are you sure you want to delete destination group *Destination Group*?

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **DESTGROUP_APPEARS_IN_RULE**
  Destination Group appears in a Rule
  Troubleshooting: To delete the destination group, first delete the rule.

- **DESTGROUP_NAME_DOES_NOT_EXIST**
  Destination group name does not exist

Listing destination groups

Use the **destgroup_list** command to list destination groups.

```
destgroup_list [ destgroup=GroupName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
destgroup	Object name	Destination group to be listed.	N	All groups.
internal	Enumeration	Limits the list to XIV internal destination groups.	N	no
domain	Object name	The domain name.	N	All Domains

This command lists all destination groups or a specific one. All the destinations are listed for each destination group.

Field ID	Field output	Default position
name	Name	1
dests	Destinations	2
creator	Creator	N/A

Example:

```
destgroup_list
```

Output:

```
Name     Destinations
itstaff  john,michael,linda,monitoringserver
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Removing a destination from a destination group

Use the **destgroup_remove_dest** command to remove an event notification destination from a destination group.

```
destgroup_remove_dest destgroup=GroupName dest=DestName
```

Parameters

Name	Type	Description	Mandatory
destgroup	Object name	Group name.	Y
dest	Object name	Destination to be removed from the group.	Y
internal	Boolean	Specify YES for an XIV internal destination or group.	N

This command cannot be executed while there are uncleared alerting events.

Example:

```
destgroup_remove_dest destgroup=alladmins dest=john
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DESTGROUP_NAME_DOES_NOT_EXIST**
  Destination group name does not exist
- **DEST_NAME_DOES_NOT_EXIST**
  Destination name does not exist
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **DESTGROUP_DOES_NOT_INCLUDE_DEST**
  Destination group does not include destination name

Renaming a destination group

Use the **destgroup_rename** command to rename an event notification destination group.

```
destgroup_rename destgroup=GroupName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
destgroup	Object name	Destination group to be renamed.	Y
new_name	Object name	New name of the destination group.	Y
internal	Boolean	Specify YES for internal XIV destination groups.	N

This command cannot be executed while there are uncleared alerting events.

Example:

```
destgroup_rename destgroup=alladmins new_name=itstaff
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DESTGROUP_NAME_DOES_NOT_EXIST**
  Destination group name does not exist
- **DESTGROUP_NAME_ALREADY_EXISTS**
  Destination group name already exists
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **DESTGROUP_NAME_IS_DEST_NAME**
  Destination group name already exists as a destination name

Clearing alerting events

Use the **event_clear** command to clear alerting events.

```
event_clear event_id=EventId [ all_preceding=<yes|no> ] [ internal=<yes|no|all> ]
```

Parameters

Name	Type	Description	Mandatory	Default
event_id	Positive integer	The ID number of the event to be cleared.	Y	N/A
all_preceding	Boolean	Clears all events preceding the specified event.	N	no
internal	Boolean	Clears XIV-internal events.	N	no

In order to ensure that an event was indeed received, an event notification may be sent repeatedly until it is cleared with a CLI command or from the GUI. Such events are called *alerting* events. An event is defined as *alerting* if at the time of the event's generation it was matched by an *alerting* rule, meaning a rule that has either snooze or escalation definitions.

Notifications for the alerting event are sent until it is cleared by this command. The clearing operation does not imply that the problem has been solved. It only implies that the event has been noted by the relevant person who takes responsibility for fixing the problem.

The user may clear either a specific event or all alerting events.

Example:

```
event_clear event_id=87
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **ONLY_TECHNICIAN_CAN_REFER_TO_INTERNAL_EVENT_OBJECTS**
  Only technician can refer to internal event objects

Listing events

Use the **event_list** command to list system events.

```
event_list [ max_events=MaxEventsToList ] [ after=TimeStamp ]
[ before=TimeStamp ] [ min_severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL> ]
[ alerting=<yes|no|all> ] [ cleared=<yes|no|all> ] [ code=EventCode ]
[ object_type=<cons_group|destgroup|dest|dm|host|map| mirror|pool|rule|smsgw|smtpgw|
target|volume|cluster|ip_interface|ldap_conf|meta_data_object| sync_schedule|user|
user_group|ldap_server|modules_status|elicense|ipsec_connection|ipsec_tunnel|
cross_cons_group,...> ] [ internal=<yes|no|all> ] [ beg=BeginIndex ] [ end=EndIndex ]
[ count_all=<yes|no> ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
max_events	Positive integer	Maximum number of events to list.	N	300
after	N/A	Earliest time/date.	N	no filter
before	N/A	Latest time/date.	N	no filter
min_severity	Enumeration	Minimum severity.	N	no filter
alerting	Boolean	Filter alerting events.	N	no filter
cleared	Boolean	Filter cleared events.	N	no filter
code	N/A	Filter by a specific event code.	N	no filter
object_type	Enumeration	Filter events by the type of the related system object.	N	no filter
internal	Boolean	Filter XIV internal events.	N	no filter
beg	Integer	Index of the first event to list. If negative, then counts from the end.	N	1
end	Integer	Index of the last event to list (not inclusive). If negative, then counts from the end.	N	last event + 1
count_all	Boolean	If yes, it scans all the events between beginning and end for computing the number of events meeting the criteria.	N	no
domain	Object name	The domain name.	N	All Domains

This command lists system events according to specified criteria, such as minimum severity, event type, and so on. The event list displays the following information for each event: timestamp, severity, code, user and description.

Events are listed and sorted by time of creation, where the latest events are listed last. Events are listed by default in the user-readable textual form. Alternatively, the CLI option for comma-separated values can be used to generate output that can serve as input for other applications.

The syntax for the `before` and `after` fields is as follows: `Y-M-D[.[h[:m[:s]]]]`, where the ranges are as follows:

- Y - year (four digit)
- M - month (1-12)
- D - day (1-31)
- h - hour (0-23, with 0 as default)
- m - minute (0-59, with 0 as default)
- s - second (0-59, with 0 as default)

The year, month and day are separated by dashes, while the optional hour, minute and second are separated by colons.

Field ID	Field output	Default position
timestamp	Timestamp	1
severity	Severity	2
code	Code	3
user_name	User	4
description	Description	5
index	Index	N/A
alerting	Alerting	N/A
cleared	Cleared	N/A
tshooting	Trouble Shooting	N/A

Example:

```
event_list max_events=10
```

Output:

```
Timestamp             Severity        Code
2009-05-12 15:10:16   Informational   START_WORK
2009-05-12 15:16:11   Informational   POOL_CREATE
2009-05-12 15:16:22   Critical        WOULD_BE_EMERGENCY_SHUTDOWN
2009-05-12 15:16:23   Informational   VOLUME_CREATE

Additional output fields
(lines are broken to fit the page width of this Guide):

User              Description
                  System has entered ON state.
xiv_development   Storage Pool of size 171GB was created with name
                  'p1_m'.
                  An emergency shutdown has been detected, but UPS control
                  is disabled.
xiv_development   Volume was created with name 'master' and size 17GB in
                  Storage Pool with name 'p1_m'.
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Read-only users	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **UNRECOGNIZED_EVENT_CODE**

  '*String*' is not a recognized event code

  Troubleshooting: Consult the manual for the list of event codes
- **CANNOT_READ_EVENTS**

  Cannot read events.

  Troubleshooting: Contact support
- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.

Listing uncleared alerting events

Use the **event_list_uncleared** command to list uncleared alerting events.

```
event_list_uncleared [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	The domain name.	N	All Domains

Example:

```
event_list_uncleared
```

Output:

```
Index   Code            Severity
------- --------------- ---------------
318     VOLUME_CREATE   Informational
666     VOLUME_DELETE   Informational
```

Field ID	Field output	Default position
index	Index	1
code	Code	2
severity	Severity	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Setting the threshold for event notification

Use the **event_redefine_threshold** command to redefine the threshold of a parameterized event.

```
event_redefine_threshold code=EventCode
severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL|NONE>
threshold=<ThresholdValue|NONE>
```

Parameters

Name	Type	Description	Mandatory
code	N/A	Event code.	Y
severity	Enumeration	Severity.	Y
threshold	Integer	Threshold value, or NONE to indicate that an event with this severity is not created.	Y

This command can be applied to parameterized events, that is events that are triggered when a certain parameter crosses a certain threshold. Using this command the user can change the threshold for event notification. Furthermore, multiple thresholds can be defined using multiple invocations of this command, one for each event severity. When the relevant parameter crosses a threshold, an event with the matching severity is created.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **EVENT_DOES_NOT_HAVE_THRESHOLDS**
  Event does not have thresholds
- **EVENT_THRESHOLD_IS_ILLEGAL**
  Illegal value for event threshold

Troubleshooting: Event threshold values must be monotonic

- **UNRECOGNIZED_EVENT_CODE**
  '*String*' is not a recognized event code
  Troubleshooting: Consult the manual for the list of event codes
- **LAST_EVENT_THRESHOLD_CANNOT_BE_DELETED**
  Events must have at least one threshold value

Listing thresholds

Use the **event_threshold_list** to list event thresholds.

```
event_threshold_list [ code=EventCode ]
```

Parameters

Name	Type	Description	Mandatory	Default
code	Enumeration	Filter by a specific event code.	N	no filter

Field ID	Field output	Default position
code	Code	1
has_thresholds	Has Thresholds?	N/A
not_in_use	Not In Use	N/A
replaced_by	Replaced By	N/A
default_thresholds.0	INFORMATIONAL(def)	7
default_thresholds.1	WARNING(def)	8
default_thresholds.2	MINOR(def)	9
default_thresholds.3	MAJOR(def)	10
default_thresholds.4	CRITICAL(def)	11
thresholds.0	INFORMATIONAL	2
thresholds.1	WARNING	3
thresholds.2	MINOR	4
thresholds.3	MAJOR	5
thresholds.4	CRITICAL	6

Example:

```
event_threshold_list
```

Output:

```
Code                                    INFORMATIONAL   WARNING   MINOR
--------------------------------------- --------------- --------- -------
STORAGE_POOL_SNAPSHOT_USAGE_INCREASED   none            80        90
STORAGE_POOL_VOLUME_USAGE_INCREASED     none            80        90

MAJOR   CRITICAL   INFORMATIONAL(def)   WARNING(def)   MINOR(def)   MAJOR(def)
------- ---------- ------------------- -------------- ------------ ------------
95      none       none                80             90           95
95      none       none                80             90           95

CRITICAL(def)
---------------
none
none
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Disallowed	N/A
Read-only users	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Generating a custom event

Use the **mm_event** command to generate a maintenance module event.

```
mm_event description=Description
[ severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL> ]
category=Category mm_data=AdditionalData
```

Parameters

Name	Type	Description	Mandatory	Default
description	String	Description of the event.	Y	N/A
severity	N/A	Severity of the event.	N	Informational
category	String	Category of the event.	Y	N/A
mm_data	String	Additional data for the event.	Y	N/A

This command can be used either to generate an event from a user application or host side software, or to test the event notifications procedures.

Example:

```
mm_event description="Description" category=Disk mm_data="Additional Data"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Retrieving a maintenance module's heartbeat

Use the **mm_heartbeat** command to retrieve the heartbeat of a maintenance module.

```
mm_heartbeat data=HeartbeatData mm=ComponentId serial=SN part_number=PartNumber
total_memory=2048 free_memory=100 temperature=20 version=4.6 free_disk_tmp=200
free_disk_root=1000 free_disk_opt=900 free_disk_var=900
```

Parameters

Name	Type	Description	Mandatory
data	String	Heartbeat data.	Y
mm	N/A	Component ID of the maintenance module.	Y
serial	String	Serial number of the maintenance module.	Y
part_number	String	Part number of the maintenance module.	Y
version	String	Version of SW running on the maintenance module.	Y
total_memory	Integer	Total RAM of the maintenance module.	Y
free_memory	Integer	Free RAM on the maintenance module.	Y
temperature	Integer	Temperature of the maintenance module.	Y
free_disk_root	Integer	Free disk space on root partition of the maintenance module.	Y
free_disk_var	Integer	Free disk space on var partition of the maintenance module.	Y
free_disk_opt	Integer	Free disk space on opt partition of the maintenance module.	Y
free_disk_tmp	Integer	Free disk space on tmp partition of the maintenance module.	Y

Example:

```
mm_heartbeat data="" mm=1:MaintenanceModule:16 serial=serial part_number=pn
total_memory=2048 free_memory=100 temperature=20 version=4.6 free_disk_tmp=200
free_disk_root=1000 free_disk_opt=900 free_disk_var=900
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Activating a rule

Use the **rule_activate** command to activate an event notification rule.

```
rule_activate rule=RuleName
```

Parameters

Name	Type	Description	Mandatory
rule	Object name	The name of the rule to be activated.	Y
internal	Boolean	Must be specified for XIV internal rules.	N

This command activates the specified rule. An active rule is matched against events and generates notifications. If the rule is already active, this command has no effect.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **EVENT_RULE_NAME_DOES_NOT_EXIST**

  Event rule name does not exist

Creating event notification rules

Use the **rule_create** command to create an event notification rule.

```
rule_create rule=RuleName [ min_severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL|NONE> ]
 [ codes=Codes | except_codes=EventCodes ] [ escalation_only=<yes|no> ]
 dests=dest1,dest2,... [ snooze_time=SnoozeTime ]
 [ escalation_time=EscalationTime escalation_rule=EscalationRule ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
rule	Object name	The name of the new rule.	Y	N/A
min_severity	Enumeration	Minimal event severity for rule filtering.	N	All severities.
codes	N/A	Filter only events with these codes.	N	All events.
except_codes	N/A	Filter only events with other codes.	N	All events.
escalation_only	Boolean	Specifies that this rule can only be used for escalation.	N	no
dests	Object name	Comma-separated list of destinations and destination groups for event notification.	Y	N/A
snooze_time	Integer	Snooze time in minutes.	N	No snoozing.
escalation_rule	Object name	Escalation rule.	N	N/A
escalation_time	Integer	Escalation time in minutes. Escalation time should not be smaller than snooze time. Refer to escalation_rule above for more information.	N	No escalation.
domain	N/A	The rule will be attached to the specified domains. To define more than one domain, separate them with a comma. To specify all existing domains, use "*".	N	none
internal	Boolean	Specifies that this rule is an XIV internal rule.	N	no

This command defines a new event notification rule. An event notification rule determines which events should generate which notifications. When an event occurs, it is checked by all currently defined rules, based on which notifications are generated.

Each rule has a filtering and notification configuration.

The filtering configuration controls which events match this rule. The filtering can be based on the event's code, by specifying a minimum severity. When using this configuration, each event with a severity higher or equal to the rule's **min_severity** parameter matches this rule. Alternatively, the rule may match only a specific event code. Two filters can be combined for events whose severity depends on a run-time parameter.

The second part of a rule configuration is a list of destinations and destination groups that receive the notification when an event matches the filtering criteria. If a destination is included both in the rule and in one of the rule's destination groups, it still gets only one notification. The same applies if a destination is included in two destination groups, or if the event matches the filtering criteria of several rules, all using the same destination.

A rule can be defined as *alerting*, which means that notifications are sent repeatedly until the matching events are cleared using the **event_clear** command (see Clearing alerting events).

Clearing the event does not mean that the problem has been solved. It only means that it was noticed and there is no need to continue sending notifications.

The repeated sending of notifications can be defined by two ways:

- The **snooze** parameter causes the notifications to be sent again and again to the same destinations. The time in minutes between the repeated transmissions is determined by the **snooze** parameter.
- The **escalation_time** and **escalation_rule** parameters cause the notifications to be sent to the destination list of the **escalation_rule** if it is not cleared within **escalation_time** minutes.

Rules can escalate only to alerting rules (that is, to rules that have snooze or escalation definitions) in order to prevent a situation where notifications are stopped from being sent.

A rule cannot escalate to itself, nor can it be defined in a cyclic escalation of rules.

The **escalation_only** parameter defines a rule without filters, which can only be used as an escalation for other rules.

The snooze time cannot be greater than the escalation time.

It is not permitted to define new rules while there are uncleared alerting events.

The following example sends alerts upon critical events to John's cellular number and to the emails of all the IT staff. The alerts will be resent every 20 minutes until the events are cleared.

Example:

```
xcli -u  -c Nextra1 rule_create rule=critical_alerts min_severity=critical destinations=joh
n-cell,itstaff snooze_time=20
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **EVENT_RULE_MAX_REACHED**
  Maximum number of event rules already defined
- **EVENT_RULE_CANNOT_ESCALATE_TO_NON_ALERTING_RULES**
  Event rule cannot escalate to non-alerting rule
  Troubleshooting: Alerting rule can only escalate to another escalating rule
- **DEST_APPEARS_TWICE**
  Destination or destination group appears twice
- **EVENT_RULE_NAME_ALREADY_EXISTS**
  Event rule name already exists
- **EVENT_RULE_NAME_DOES_NOT_EXIST**
  Event rule name does not exist
- **NAME_IS_NEITHER_DEST_NOR_GROUP**
  Name is neither the name of a destination group nor the name of a destination
- **ESCALATION_TIME_MUST_BE_LARGER_THAN_SNOOZE_TIME**
  Escalation time must be larger than snooze time
- **RULE_MAX_DESTS_REACHED**
  Maximum number of destinations and destination groups in a rule already defined
- **EVENT_RULE_MUST_HAVE_FILTER**
  An alerting event rule must have a filter, either event code or severity
- **EVENT_RULE_CANNOT_REFER_TO_INTERNAL_EVENT_CODES**
  A user event rule cannot refer to internal event codes
- **ESCALATION_EVENT_RULE_CANNOT_HAVE_FILTER**
  An escalation-only event rule cannot have code or min_severity specification
- **ESCALATION_EVENT_RULE_MUST_BE_ALERTING**
  Escalation-only event rules must be alerting rules
- **TOO_MANY_EVENT_CODES**
  A maximum of *Maximum* event codes can be specified
- **EVENT_CODE_APPEARS_TWICE**
  Event code '*Code*' appears twice in the list
  Troubleshooting: Each event code must appear at most once.
- **UNRECOGNIZED_EVENT_CODE**

'*String*' is not a recognized event code

Troubleshooting: Consult the manual for the list of event codes

- **EVENT_RULE_CANNOT_HAVE_A_CATEGORY**
  A user event rule cannot have a category definition
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **INTERNAL_EVENT_OBJECTS_CANNOT_USE_SPECIFIC_DOMAINS**
  Internal event objects cannot be defined on specific domains.
- **DESTINATION_IS_NOT_IN_RULE_DOMAINS**
  Destination must by included in the rule domains.
- **DESTGROUP_IS_NOT_IN_RULE_DOMAINS**
  Destination groups must by included in the rule domains.
- **ESCALATION_RULE_NOT_IN_RULE_DOMAINS**
  Escalation rule must belong to rule domains.

Deactivating a rule

Use the **rule_deactivate** command to deactivate an event notification rule.

```
rule_deactivate rule=RuleName
```

Parameters

Name	Type	Description	Mandatory
rule	Object name	The name of the rule to be deactivated.	Y
internal	Boolean	Must be specified for XIV internal rules.	N

A deactivated rule is not matched against events and does not generate notifications. If the rule is already inactive, then this command has no effect.

Inactive rules cannot be used as escalation rules.

The rules of type `escalation_only` cannot be deactivated.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **EVENT_RULE_NAME_DOES_NOT_EXIST**
  Event rule name does not exist

- **ESCALATION_ONLY_RULES_ARE_ALWAYS_ACTIVE**
  Escalation-only event rules cannot be deactivated or activated

Deleting event notification rules

Use the **rule_delete** command to delete an event notification rule.

```
rule_delete rule=RuleName
```

Parameters

Name	Type	Description	Mandatory
rule	Object name	The rule to be deleted.	Y
internal	Boolean	Must be specified for XIV internal rules.	N

Rules that are defined as the escalation of other rules cannot be deleted.

It is not permitted to delete a rule while there are uncleared alerting events.

Example:

```
rule_delete rule=emergency_alerts
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_RULE**
  Are you sure you want to delete Rule *Rule*?

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **EVENT_RULE_NAME_DOES_NOT_EXIST**
  Event rule name does not exist
- **EVENT_RULE_USED_FOR_ESCALATION_CAN_NOT_BE_DELETED**

Event rule is an escalation rule of another event rule and thus cannot be deleted

Troubleshooting: Delete all escalation rules that refer to this rule as their escalation rule

Listing event notification rules

Use the **rule_list** command to list event notification rules.

```
rule_list [ rule=RuleName ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
rule	Object name	The rule to be listed.	N	All rules.
internal	Enumeration	Filters XIV internal rules.	N	no
domain	Object name	The domain name.	N	All Domains

Field ID	Field output	Default position
name	Name	1
min_severity	Minimum Severity	2
codes	Event Codes	3
except_codes	Except Codes	4
dests	Destinations	5
active	Active	6
escalation_time	Escalation Time	N/A
snooze_time	Snooze Time	N/A
escalation_rule	Escalation Rule	N/A
escalation_only	Escalation Only	7
category	Category	N/A
creator	Creator	N/A

Example:

```
rule_list
```

Output:

```
Name             Minimum Severity  Event Code  Destinations
---------------  ----------------  ----------  -----------------
emergency_alerts  critical          all         john-cell,itstaff
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed

User Category	Permission
Operations administrator	Allowed
Host side accelerator client	Disallowed

Renaming event notification rules

Use the **rule_rename** command to rename an event notification rule.

```
rule_rename rule=RuleName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
rule	Object name	The rule to be renamed.	Y
new_name	Object name	The new name of the rule.	Y
internal	Boolean	Must be specified for XIV internal rules.	N

Example:

```
rule_rename rule=critical_alerts new_name=emergency_alerts
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **EVENT_RULE_NAME_ALREADY_EXISTS**
  Event rule name already exists
- **EVENT_RULE_NAME_DOES_NOT_EXIST**
  Event rule name does not exist

Updating an event notification rule

Use the **rule_update** command to update an event notification rule.

```
rule_update rule=RuleName [ min_severity=<INFORMATIONAL|WARNING|MINOR|MAJOR|CRITICAL|NONE> ]
 [ codes=Codes ] [ except_codes=EventCodes ] [ escalation_only=<yes|no> ]
 [ dests=dest1,dest2,... ] [ snooze_time=SnoozeTime ] [ escalation_time=EscalationTime ]
 [ escalation_rule=EscalationRule ] [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
rule	Object name	The name of the rule.	Y	N/A
min_severity	Enumeration	Minimum event severity for rule filtering.	N	Leave unchanged.
codes	N/A	Filter only events with this code.	N	Leave unchanged.
except_codes	N/A	Filter only events with other codes.	N	Leave unchanged.
escalation_only	Boolean	Specifies that this rule can only be used for escalation.	N	no
dests	Object name	Comma-separated list of destinations and destination groups for event notification.	N	Leave unchanged.
snooze_time	Integer	Snooze time in minutes.	N	Leave unchanged.
escalation_time	Integer	Escalation time in minutes.	N	Leave unchanged.
escalation_rule	Object name	Escalation rule.	N	Leave unchanged.
domain	N/A	The rule will be attached to the specified domains. To specify more than one domain, separate them with a comma. To specify all existing domains, use "*".	N	Leave unchanged.
internal	Boolean	Specifies that this rule is an `xiv_internal` rule.	N	no
category	Enumeration	Event category.	N	all

This command updates the configuration of an event notification rule. All parameters and their descriptions are identical to the Creating event notification rules command.

Parameters which are not specified are not changed.

Example:

```
rule_update rule=critical_alerts min_severity=critical destinations=john-cell,itstaff
snooze_time=30
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **EVENT_RULE_NAME_DOES_NOT_EXIST**
  Event rule name does not exist
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **EVENT_RULE_CANNOT_ESCALATE_TO_ITSELF**
  An event rule cannot be its own escalation rule
- **EVENT_RULE_CANNOT_ESCALATE_TO_NON_ALERTING_RULES**
  Event rule cannot escalate to non-alerting rule
  Troubleshooting: Alerting rule can only escalate to another escalating rule
- **DEST_APPEARS_TWICE**
  Destination or destination group appears twice
- **EVENT_RULE_MISSING_ESCALATION_RULE**
  An alerting event rule must have an escalation rule
  Troubleshooting: If escalation time is specified, then an escalation rule must be specified also.
- **EVENT_RULE_MISSING_ESCALATION_TIME**
  An alerting event rule must have escalation time
  Troubleshooting: If an escalation rule is specified, then escalation time must be specified also.
- **NAME_IS_NEITHER_DEST_NOR_GROUP**
  Name is neither the name of a destination group nor the name of a destination
- **ESCALATION_TIME_MUST_BE_LARGER_THAN_SNOOZE_TIME**
  Escalation time must be larger than snooze time
- **RULE_MAX_DESTS_REACHED**
  Maximum number of destinations and destination groups in a rule already defined
- **EVENT_RULE_MUST_HAVE_FILTER**

An alerting event rule must have a filter, either event code or severity

- **CYCLIC_ESCALATION_RULES_DEFINITION**
  Event rule escalation cannot be cyclic
- **EVENT_RULE_USED_FOR_ESCALATION_MUST_BE_ALERTING**
  Event rule is an escalation rule of another event rule and thus must be an alerting rule
- **EVENT_RULE_CANNOT_REFER_TO_INTERNAL_EVENT_CODES**
  A user event rule cannot refer to internal event codes
- **ESCALATION_EVENT_RULE_CANNOT_HAVE_FILTER**
  An escalation-only event rule cannot have code or min_severity specification
- **EVENT_RULE_CANNOT_HAVE_A_CATEGORY**
  A user event rule cannot have a category definition
- **EVENT_RULE_CANNOT_HAVE_BOTH_CODES_AND_EXCEPTION_CODES**
  An event rule cannot have both codes and exception codes
- **ESCALATION_EVENT_RULE_MUST_BE_ALERTING**
  Escalation-only event rules must be alerting rules
- **TOO_MANY_EVENT_CODES**
  A maximum of *Maximum* event codes can be specified
- **EVENT_CODE_APPEARS_TWICE**
  Event code '*Code*' appears twice in the list
  Troubleshooting: Each event code must appear at most once.
- **UNRECOGNIZED_EVENT_CODE**
  '*String*' is not a recognized event code
  Troubleshooting: Consult the manual for the list of event codes
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **INTERNAL_EVENT_OBJECTS_CANNOT_USE_SPECIFIC_DOMAINS**
  Internal event objects cannot be defined on specific domains.
- **DESTINATION_IS_NOT_IN_RULE_DOMAINS**
  Destination must by included in the rule domains.
- **DESTGROUP_IS_NOT_IN_RULE_DOMAINS**
  Destination groups must by included in the rule domains.
- **ESCALATION_RULE_NOT_IN_RULE_DOMAINS**
  Escalation rule must belong to rule domains.

Defining an SMS gateway

Use the **smsgw_define** command to define an SMS gateway.

```
smsgw_define smsgw=SMSGatewayName email_address=email
subject_line=SubjectLineScheme email_body=EmailBodyScheme
[ smtpgw=<SMTPGW1[,SMTPGW2]...|ALL> ]
```

Parameters

Name	Type	Description	Mandatory	Default
smsgw	Object name	SMS gateway name.	Y	N/A

Name	Type	Description	Mandatory	Default
email_address	Token String	Format for the email address.	Y	N/A
subject_line	Token String	Format for the subject line.	Y	N/A
email_body	Token String	Format for the email body.	Y	N/A
smtpgw	Object name	List of SMTP gateways to be used.	N	The SMTP gateways defined in the **smtpgw_prioritize** command.
internal	Boolean	Specifies the SMSGW as XIV internal.	N	no

SMS gateways are used to send event notifications via SMS messages. SMS messages are sent via SMS-to-email servers.To define a new SMS gateway, it is necessary to know how SMS messages are encapsulated in the email message.

When the system sends an SMS message, it uses the actual message text that describes the event and the destination number. The destination number is comprised of an area code and the local number. Both are specified when the destination is defined as described in the Defining a new event notification destination command.

The message text and destination numbers can be embedded into various parts of the email message: destination address, subject line, or email body. This command defines how email messages are formatted, and how the information of the specific SMS is arranged.

When defining an SMS gateway, three parameters must be specified in order to define the formatting:

- **email_address**: This is the email address used for sending the SMS via the email-to-SMS gateway.
- **subject_line**: This is the subject line of the outgoing email that will be converted to an SMS.
- **email_body**: This is the body of the outgoing email that will be converted to an SMS.

For each of these parameters, the value can be either fixed text, or an event text, or the destination phone number. The information must be embedded into the following escape sequences:

- `{areacode}`. This escape sequence is replaced by the destination's cellular number area code.
- `{number}`. This escape sequence is replaced by the destination's cellular local number.
- `{message}`. This escape sequence is replaced by the text to be shown to the user.
- `\{, \}, \\`. These are replaced by the {, } or \ respectively.

By default, the email to the email-to-SMS server is sent through the defined SMTP servers, prioritized by the **smtpgw_prioritize** command (see Prioritizing SMTP gateways). If needed, the user may define a specific SMTP gateway or gateways for sending email to this email-to-SMS gateway.

The system will try each SMS gateway, in the order specified in the **smtpgw_prioritize** command, until it successfully connects to one of them. The specific SMS destination can be associated with the specific SMS gateway (see Defining a new event notification destination).

Example:

```
smsgw_define smsgw=SMSGW1
email_address={areacode}{number}@sms2emailserver.yourcompany.com
subject_line=SMS email_body={message}
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **GATEWAY_MAX_REACHED**
  Maximum number of gateways already defined
- **SMSGW_CANNOT_BE_DEFINED_WITHOUT_SMTPGW**
  SMS gateways cannot be defined if no SMTP gateways are defined
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **GATEWAY_NAME_APPEARS_TWICE**
  Gateway name appears twice in the list
- **GATEWAY_NAME_ALREADY_EXISTS**
  Gateway name already exists

Deleting an SMS gateway

Use the **smsgw_delete** command to delete an SMS gateway.

```
smsgw_delete smsgw=SMSGatewayName
```

Parameters

Name	Type	Description	Mandatory
smsgw	Object name	SMS gateway to be deleted.	Y
internal	Boolean	Specifies that the gateway is an XIV internal gateway.	N

A gateway cannot be deleted if it is part of a notification rule or if it is being used by a destination.

Before deleting an SMS gateway, make sure that all alerting events are cleared.

Example:

```
smsgw_delete smsgw=external-SMSGW
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_SMS_GATEWAY**
  Are you sure you want to delete SMS gateway *Gateway*?

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **GATEWAY_USED_BY_DESTINATION**
  Gateway is used by a destination

Listing SMS gateways

Use the **smsgw_list** command to list SMS gateways.

```
smsgw_list [ smsgw=SMSGatewayName ]
```

Parameters

Name	Type	Description	Mandatory	Default
smsgw	Object name	Name of SMS gateway to list.	N	All gateways.

Name	Type	Description	Mandatory	Default
internal	Enumeration	Filters gateways by their XIV-internal attribute.	N	no

The command lists all SMS gateways, or a specific one. For each SMS gateway, all of its configuration information is listed.

Field ID	Field output	Default position
name	Name	1
email_address	Email Address	2
gateways	SMTP Gateways	3
subject_line	Subject Line	N/A
email_body	Email Body	N/A
priority	Priority	N/A

Example:

```
smsgw_list
```

Output:

```
Name    Email Address                                      SMTP Gateways
SMSGW1  {areacode}{number}@sms2emailserver.yourcompany.com  all
SMSGW2  {areacode}{number}@sms2emailservice.com             all
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Prioritizing SMS gateways

Use the **smsgw_prioritize** command to set the priorities of the SMS gateways for sending SMS messages.

```
smsgw_prioritize order=<gw1[,gw2]...>
```

Parameters

Name	Type	Description	Mandatory
order	Object name	List of all SMS gateways ordered by priority.	Y

Name	Type	Description	Mandatory
internal	Boolean	Specified for the prioritization of XIV internal gateways.	N

SMS messages can be sent to cell phones through one of the email-to-SMS gateways in this list. This command determines the order in which the storage system attempts to use these SMS gateways.

Only one gateway is used and subsequent gateways are only tried if the preceding ones in this priority list return an error.

Specific SMS destinations may define their own SMS gateways to be used when sending SMS to these destinations, regardless of this list.

Example:

```
smsgw_prioritize order=SMSGW1,SMSGW2
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **GATEWAY_NAME_APPEARS_TWICE**
  Gateway name appears twice in the list
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **GATEWAY_NAME_MISSING_FROM_LIST**
  Gateway name is missing from the list

Renaming an SMS gateway

Use the **smsgw_rename** command to rename an SMS gateway.

```
smsgw_rename smsgw=SMSGatewayName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
smsgw	Object name	SMS gateway to be renamed.	Y
new_name	Object name	New name for the SMS gateway.	Y
internal	Boolean	Should be specified as YES for XIV internal gateways.	N

Before renaming an SMS gateway, make sure that all alerting events are cleared.

Example:

```
smsgw_rename smsgw=SMSGW2 new_name=external-SMSGW
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **GATEWAY_NAME_ALREADY_EXISTS**
  Gateway name already exists
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist

Updating an SMS gateway

Use the **smsgw_update** command to update an SMS gateway.

```
smsgw_update smsgw=SMSGatewayName [ email_address=email ]
[ subject_line=SubjectLineScheme ] [ email_body=EmailBodyScheme ]
[ smtpgw=<SMTPGW1[,SMTPGW2]...|ALL> ]
```

Parameters

Name	Type	Description	Mandatory	Default
smsgw	Object name	SMS gateway name.	Y	N/A
email_address	Token String	Format for email address.	N	Leave unchanged.
subject_line	Token String	Format for subject line.	N	Leave unchanged.
email_body	Token String	Format for the email's body.	N	Leave unchanged.
smtpgw	Object name	List of SMTP gateways to be used.	N	The SMTP gateways defined in the **smtpgw_prioritize** command.
internal	Boolean	Must match the `xiv_internal` value of the SMS gateway.	N	no

This command updates the configuration information of an existing SMS gateway. For the exact description and documentation of each parameter, see the documentation of Defining an SMS gateway.

This command cannot be executed while there are uncleared alerting events.

Parameters that are not specified will not be changed.

Example:

```
smsgw_update smsgw=SMSGW1
email_address={areacode}{number}@sms2emailserver.yourcompany.com

    subject_line=NextraSMS
    email_body={message}
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events

Troubleshooting: Clear all alerting events before changing event configuration

- **GATEWAY_NAME_APPEARS_TWICE**
  Gateway name appears twice in the list
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist

Defining a new SMTP gateway

Use the **smtpgw_define** command to define an SMTP gateway.

```
smtpgw_define smtpgw=SMTPGatewayName address=Address
[ from_address=<email|DEFAULT> ]
[ reply_to_address=<email|DEFAULT> ]
```

Parameters

Name	Type	Description	Mandatory	Default
smtpgw	Object name	SMTP gateway name.	Y	N/A
address	N/A	SMTP gateway address (IP or DNS name).	Y	N/A
internal	Boolean	Defines the gateway as XIV internal.	N	no
from_address	N/A	Sender's email address used for outgoing emails sent through this SMTP server.	N	DEFAULT (system-wide sender's address that applies to all servers).
reply_to_address	N/A	The reply to address used for outgoing emails sent through this SMTP server.	N	DEFAULT (system-wide reply-to address that applies to all servers).
port	Integer	TCP port used in the gateway instead of the default port 25.	N	no

Several email gateways can be defined to enable notification of events by email or sending SMS messages via email-to-SMS gateways. By default, the system attempts to send each email notification through the first gateway according to the order that you specify. Subsequent gateways are only tried if the first in line returns an error. A specific email destination, or a specific SMS gateway may be defined to use only specific SMTP gateways.

The SMTP protocol dictates that every email message must specify the email address of the sender. This sender address must be a valid address for two reasons:

- Many SMTP gateways require a valid sender address, otherwise they will not forward the email, as a security measure in order to prevent unauthorized usage of the SMTP server. Often this sender address must be limited to a specific domain.

- The sender's address is used as the destination for error messages generated by the SMTP gateways, such as: incorrect email address, full email mailbox and so on.

If the sender's address is not specified for a specific SMTP gateway, a global system-wide sender's address specified in Setting configuration parameters is used.

The user can also configure a reply-to address which is different from the sender's address, if it is required that the return emails be sent to another destination.

Example:

```
smtpgw_define smtpgw=mailserver1 address=smtp.yourcompany.com
from_address=nextra@yourcompany.com
reply_to_address=nextraerrors@yourcompany.com
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **FROM_ADDRESS_NOT_DEFINED**

  Neither the gateway's From Address nor the default From Address is defined
- **GATEWAY_MAX_REACHED**

  Maximum number of gateways already defined
- **GATEWAY_NAME_ALREADY_EXISTS**

  Gateway name already exists

Deleting an SMTP gateway

Use the **smtpgw_delete** command to delete the specified SMTP gateway.

```
smtpgw_delete smtpgw=SMTPGatewayName
```

Parameters

Name	Type	Description	Mandatory
smtpgw	Object name	SMTP gateway to be deleted.	Y
internal	Boolean	Specifies that the gateway is an XIV internal gateway.	N

A gateway cannot be deleted if it is part of a notification rule, is being used as an SMS gateway, or if it belongs to a destination.

Before deleting an SMTP gateway, make sure that all alerting events are cleared.

Example:

```
smtpgw_delete smtpgw=mailserverbackup
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_SMTP_GATEWAY**
  Are you sure you want to delete SMTP gateway *Gateway*?

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **GATEWAY_USED_BY_DESTINATION**
  Gateway is used by a destination
- **GATEWAY_USED_BY_SMS_GATEWAY**
  Gateway is used by an SMS Gateway

Listing SMTP gateways

Use the **smtpgw_list** command to list SMTP gateways.

```
smtpgw_list [ smtpgw=SMTPGatewayName ]
```

Parameters

Name	Type	Description	Mandatory	Default
smtpgw	Object name	Name of SMTP gateway to list.	N	no.
internal	Enumeration	Filters gateways by their XIV-internal attribute.	N	no

This command lists defined SMTP gateways and their configuration information.

Field ID	Field output	Default position
name	Name	1
address	Address	2
priority	Priority	3
from_address	From Address	N/A
reply_to_address	Reply-to Address	N/A
failed	Failed	N/A
port	Port	N/A
creator	Creator	N/A

Example:

```
smtpgw_list
```

Output:

```
Name         Email Address         Port  Priority
-----------  --------------------  ----  --------
mailserver1  smtp.yourcompany.com  25    1
mailserver2  smtp.yourcompany.com  25    2
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Disallowed	N/A
Read-only users	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Prioritizing SMTP gateways

Use the **smtpgw_prioritize** command to prioritize SMTP gateways.

```
smtpgw_prioritize order=<gw1[,gw2]...>
```

Parameters

Name	Type	Description	Mandatory
order	Object name	List of all the SMTP gateways in the order of their priority.	Y
internal	Boolean	Specified for the prioritization of XIV internal gateways.	N

Several email gateways can be defined to enable notification of events or the sending of SMS by email. By default, XIV attempts to send each email through the first gateway according to the order that is specified in this command. Only one gateway is used and subsequent gateways are only tried if the preceding ones in this priority list return an error.

These priorities are used only for email destinations and SMS gateways that did not specify their own SMTP gateways.

Example:

```
smtpgw_prioritize order=mailserver2,mailserver1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **GATEWAY_NAME_APPEARS_TWICE**
  Gateway name appears twice in the list
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **GATEWAY_NAME_MISSING_FROM_LIST**
  Gateway name is missing from the list

Renaming an SMTP gateway

Use the **smtpgw_rename** command to rename an SMTP gateway.

```
smtpgw_rename smtpgw=SMTPGatewayName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
smtpgw	Object name	SMTP gateway to be renamed.	Y
new_name	Object name	New name for the SMTP gateway.	Y
internal	Boolean	Should be specified as YES for XIV internal gateways.	N

Example:

```
smtpgw_rename smtpgw=mailserver2 new_name=mailserverbackup
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **GATEWAY_NAME_ALREADY_EXISTS**
  Gateway name already exists
- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist

Updating an SMTP gateway

Use the **smtpgw_update** command to update the configuration of an SMTP gateway.

```
smtpgw_update smtpgw=SMTPGatewayName [ address=Address ]
[ from_address=<email|DEFAULT> ]
[ reply_to_address=<email|DEFAULT> ] [ internal=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
smtpgw	Object name	SMTP gateway name.	Y	N/A
address	N/A	SMTP gateway address (IP or DNS name).	N	Leave unchanged.
internal	Boolean	For an XIV internal gateway, set to Yes.	N	NO
from_address	N/A	Sender's email address used for out-going emails sent through this SMTP server, or DEFAULT for the system-wide default.	N	Leave unchanged.
reply_to_address	N/A	The reply-to address used for outgoing emails sent through this SMTP server, or DEFAULT for the system-wide default.	N	Leave unchanged.
port	Integer	TCP port used in the gateway instead of the default port 25.	N	Leave unchanged.

This command updates the configuration of an existing SMTP gateway. Fields which are not specified are not changed.

Example:

```
smtpgw_update smtpgw=mailserver1 address=smtp2.yourcompany.com
from_address=nextra@yurcompany.com
reply_to_address=nextraerrors@yourcompany.com
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Application administrator	Conditionally Allowed	Allowed, unless the internal parameter is specified.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Allowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **GATEWAY_NAME_DOES_NOT_EXIST**
  Gateway name does not exist
- **CANNOT_CHANGE_EVENT_CONF_WITH_ALERTING_EVENTS**
  Cannot change event configuration while there are alerting events
  Troubleshooting: Clear all alerting events before changing event configuration
- **FROM_ADDRESS_NOT_DEFINED**
  Neither the gateway's From Address nor the default From Address is defined

Generating an XMPNS user control event

Use **xmpns_user_config_set** command to generate an **XMPNS_USER_CONTROL** event.

```
xmpns_user_config_set action=Action
```

Parameters

Name	Type	Description	Mandatory
action	String	Action code text.	Y

This command generates an **XMPNS_USER_CONTROL** event which includes the `action_code` text in the event's description field. The current logged-in username is also added to the action string sent in the description field after validating that the user exists in the given system.

Example:

```
xmpns_user_config_set action="registration;device_token=aa23d1234;pns=gcm"
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed

User Category	Permission
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Generating an XMPNS admin control event

Use the **xmpns_admin_config_set** command to generate an **XMPNS_ADMIN_CONTROL** event.

```
xmpns_admin_config_set action=Action user=User
```

Parameters

Name	Type	Description	Mandatory
action	String	Action code text.	Y
user	String	User name.	Y

This command generates an **XMPNS_ADMIN_CONTROL** event which includes the `action_code` text in the event's description field. The username is also added to the action string sent in the description field.

Example:

```
xmpns_admin_config_set action user
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Chapter 15. IP configuration commands

This section describes the command-line interface (CLI) for IP configuration.

Adding Ethernet ports to IP interfaces

Use the **ipinterface_add_port** command to add an Ethernet port to the link aggregation group of an IP interface.

```
ipinterface_add_port ipinterface=IPInterfaceName port=P
```

Parameters

Name	Type	Description	Mandatory
ipinterface	Object name	IP interface to which the port is to be added.	Y
port	Integer	Number of the port to be added to the group.	Y

The specified port is added to the link aggregation group of the specified IP interface.

Ports defined as a link aggregation group must be connected to the same Ethernet switch, and a parallel link aggregation group must be defined on that Ethernet switch.

The module is not provided, as it must be the module of the other ports of the interface.

This command cannot be applied to management or VPN interfaces.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPINTERFACE_DOES_NOT_EXIST**

  IP Interface name does not exist.
- **ILLEGAL_PORT_NUMBER**

  Port number is out of range.
- **PORT_ALREADY_IN_INTERFACE**

  Port is already part of the specified IP interface.

- **PORT_IS_USED_IN_ANOTHER_IP_INTERFACE**
  One of the physical ports specified is already assigned to an IP interface.
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**
  Operation is not allowed on management or VPN IP interface.
- **IPINTERFACE_NOT_AGGREGATED**
  Ports cannot be added to a non-aggregated IP interface.

Creating a new IP interface

Use the **ipinterface_create** command to create a new IP interface for iSCSI.

```
ipinterface_create ipinterface=IPInterfaceName address=Address netmask=NetworkMask
[ gateway=DefaultGateway ] [ mtu=MTU ] module=ModuleNumber port=PortNumber
[ speed=<auto|10mb|100mb|1000mb|1gb|2500mb|2.5gb|10000mb|10gb> ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipinterface	Object name	The name of the IP interface to be created. Do not use the names Management or VPN.	Y	N/A
address	N/A	IP address of the interface.	Y	N/A
netmask	N/A	Network mask of the interface.	Y	N/A
gateway	N/A	IP address of the default gateway for this interface. This parameter is optional.	N	None
mtu	Integer	Maximum Transmission Unit: The supported packet size by the connecting Ethernet switch. This is optional when the default equals 1536. MTU of up to 4500 is supported.	N	4500 for iSCSI and 1536 for Management and VPN.
module	N/A	Component identifier (rack and module) of the module containing Ethernet ports.	Y	N/A
port	Integer	Port Number	Y	N/A
speed	Enumeration	Interface's speed, either automatic or explicit. An explicit speed turns off auto-negotiation.	N	auto

This command defines a new IP interface for iSCSI traffic. Gateway, MTU, network mask and IP are the standard IP definitions.

Each iSCSI Ethernet port can be defined as an IP interface.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPINTERFACE_EXISTS**
  IP Interface name already used
- **ILLEGAL_PORT_NUMBER**
  Port number is out of range
- **PORT_IS_USED_IN_ANOTHER_IP_INTERFACE**
  One of the physical ports specified is already assigned to an IP Interface
- **PORT_REPEATS_TWICE**
  Port list contains the same value more than once
- **FORCE_NO_AGGREGATION_ALLOWED_FOR_SINGLE_PORT_ONLY**
  More than one port specified for non-aggregated IP Interface
- **IP_ADDRESS_ALREADY_USED_IN_ANOTHER_INTERFACE**
  IP address is already assigned to another interface
- **IPADDRESS_AND_GATEWAY_ARE_NOT_ON_SAME_SUBNET**
  IP address specified for the default gateway is not in the subnet of the IP Interface
- **MTU_TOO_LARGE**
  Specified MTU value is too large
- **MTU_TOO_SMALL**
  Specified MTU value is too small
- **BAD_PORTS_FORMAT**
  Port list should be a comma separated list of positive integers
- **ILLEGAL_COMPONENT_ID**
  Component ID is illegal
- **TOO_MANY_PORTS_IN_AGGREGATION_GROUP**
  Too many physical ports for one IP interface
- **ILLEGAL_IPADDRESS**
  Illegal IP address was entered
- **DUPLICATE_IPADDRESSES**
  Duplicate IP addresses were specified
- **ILLEGAL_GATEWAY_IPADDRESS**
  Illegal IP address was specified for default gateway

Deleting IP interfaces

Use the **ipinterface_delete** command to delete an IP interface.

```
ipinterface_delete ipinterface=IPInterfaceName
```

Parameters

Name	Type	Description	Mandatory
ipinterface	Object name	The IP interface to be deleted.	Y

Only the interfaces defined for iSCSI traffic can be deleted. Management and VPN interfaces cannot be deleted.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPINTERFACE_DOES_NOT_EXIST**

  IP Interface name does not exist
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**

  Operation is not allowed on Management or VPN IP Interface
- **IPINTERFACE_HAS_CONNECTIVITY**

  IP interface has connectivity defined to another machine

Listing IP interface configuration

Use the **ipinterface_list** command to list the configuration of a specific IP interface or all IP interfaces.

```
ipinterface_list [ ipinterface=IPInterfaceName | address=Address | address6=IPv6address ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipinterface	Object name	The IP interface to be listed.	N	All interfaces
address	N/A	IP address of the interface to be listed.	N	All interfaces
address6	N/A	IPv6 address of the interface to be listed.	N	All interfaces

This command lists configuration information for the specified IP interface, or for all IP interfaces (including management). The management or VPN name can only be used to view the configuration of the management of VPN interfaces.

The following information is listed:

- Name
- Type (iSCSI/management)
- IP address (or comma separated addresses for management and VPN)
- Network mask
- Default gateway
- CIDR address (or comma separated addresses for management and VPN)
- Default IPv6 gateway
- MTU
- Module (for iSCSI only)
- Comma separated list of ports (for iSCSI only)
- Interface desired speed information

Example:

```
ipinterface_list
```

Output:

```
Name         Type         IP Address      Network Mask    Default Gateway   IPv6 Address
------------ ------------ --------------- --------------- ----------------- --------------
management   Management   9.151.154.239   255.255.248.0   9.151.159.254

Cont.:

IPv6 Gateway   MTU    Module        Port   IP access group name
-------------- ------ ------------- ------ ----------------------
               1500   1:Module:12
```

Field ID	Field output	Default position
name	Name	1
type	Type	2
address	IP Address	3
netmask	Network Mask	4
gateway	Default Gateway	5
address6	IPv6 Address	6
gateway6	IPv6 Gateway	7
mtu	MTU	8
module	Module	9
port	Port	10
speed	Speed	N/A
access_group	IP access group name	11

Access control

User Category	Permission
Storage administrator	Allowed

User Category	Permission
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing IP interface addresses

Use the **ipinterface_list_ips** command to list the IP addresses configured on a specific IP interface or all IP interfaces.

```
ipinterface_list_ips [ ipinterface=IPInterfaceName |
address=Address | address6=IPv6address | module=ModuleNumber ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipinterface	Object name	The IP interface to be listed.	N	All interfaces
address	N/A	IP address of the interface to be listed.	N	All addresses
address6	N/A	IPv6 address of the interface to be listed.	N	All addresses
module	N/A	Limits the listing to a specific module.	N	All modules

This command lists IP addresses for the specified interface, or for the specified module, or for both (including Management). The Management or VPN name can only be used to view IP addresses configured for the management of VPN interfaces.

The following information is listed:

- IP Interface
- Interface Type (iSCSI/Management/VPN)
- Address (in CIDR format)
- Address type (Static IPv4/Static IPv6/Link Local IPv6/Site Local IPv6/Global IPv6)
- Module

Example:

```
ipinterface_list_ips
```

Output:

```
IP Interface   Interface Type   Address
-------------- ---------------- ----------------------------------------
management     Management       2001:bf8:2000:5159:42f2:e9ff:feaf:ccb2/64
management     Management       9.151.154.239/21
management     Management       fe80::42f2:e9ff:feaf:ccb2/64

Cont.:

Address Type      Module        IP access group name
----------------- ------------- ---------------------
Global IPv6       1:Module:12
Static IPv4       1:Module:12
Link Local IPv6   1:Module:12
```

Field ID	Field output	Default position
ipinterface	IP Interface	1
ipinterface_type	Interface Type	2
address	Address	3
address_type	Address Type	4
module	Module	5
access_group	IP access group name	6

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Showing the status and configuration of Ethernet ports

Use the **ipinterface_list_ports** command to list all Ethernet ports together with their configuration and status.

```
ipinterface_list_ports
```

All physical Ethernet ports used to connect to the user's network are listed. The list includes the following information:

- Component ID (Module number for iSCSI or switch number for management/field technician port)
- Port number on module/switch
- For management/VPN/field technician: "management"/"VPN"/"field technician"
- IP interface containing the ports (or none, if port is not configured as part of IP interface)
- Status up/down
- Auto-negotiation: Half-full duplex, 1000/100/10

Example:

```
ipinterface_list_ports
```

Output:

```
Index   Role         IP Interface   Connected Component    Link Up?
------- ------------ -------------- ---------------------- ----------
1       Component                   1:Flash_Canister:4:1   yes
1       Component                   1:Flash_Canister:4:2   yes
1       IPMI                        1:Module:13            yes
1       IPMI                        1:Module:14            yes
1       IPMI                        1:Module:9             yes
1       Internal                    1:IB_Switch:1:12       yes
1       Internal                    1:IB_Switch:1:13       yes
1       Internal                    1:IB_Switch:1:8        yes
1       Management                                         yes
1       iSCSI                                              unknown
1       iSCSI                                              unknown
1       iSCSI                                              unknown
2       IPMI                        1:Module:11            yes
2       IPMI                        1:Module:12            yes
2       IPMI                        1:Module:7             yes
2       iSCSI                                              unknown
2       iSCSI                                              unknown
2       iSCSI                                              unknown

Cont.:

Negotiated Speed (Mb/s)   Full Duplex?   Module        RX Flow Control?   TX Flow Control?
------------------------- -------------- ------------- ------------------ ------------------
1000                      yes            1:Module:12   yes                yes
1000                      yes            1:Module:13   yes                yes
1000                      yes            1:Module:12   yes                yes
1000                      yes            1:Module:13   yes                yes
1000                      yes            1:Module:8    yes                yes
10000                     yes            1:Module:12   yes                yes
10000                     yes            1:Module:13   yes                yes
10000                     yes            1:Module:8    yes                yes
1000                      yes            1:Module:12   yes                yes
N/A                       unknown        1:Module:12   yes                yes
N/A                       unknown        1:Module:13   yes                yes
N/A                       unknown        1:Module:8    yes                yes
1000                      yes            1:Module:12   yes                yes
1000                      yes            1:Module:13   yes                yes
1000                      yes            1:Module:8    yes                yes
N/A                       unknown        1:Module:12   yes                yes
N/A                       unknown        1:Module:13   yes                yes
N/A                       unknown        1:Module:8    yes                yes
```

Field ID	Field output	Default position
index	Index	1
role	Role	2
ip_interface_name	IP Interface	3
connected_component	Connected Component	4
is_link_up	Link Up?	5
negotiated_speed_Mbs	Negotiated Speed (Mb/s)	6
is_full_duplex	Full Duplex?	7
module_id	Module	8
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
pause_autonegotiate	Flow control auto-negotiate?	N/A
pause_rx	RX Flow Control?	9
pause_tx	TX Flow Control?	10

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Removing Ethernet ports from IP interfaces

Use the **ipinterface_remove_port** command to remove an Ethernet port from the link aggregation group of an IP interface.

```
ipinterface_remove_port ipinterface=IPInterfaceName port=P
```

Parameters

Name	Type	Description	Mandatory
ipinterface	Object name	IP interface from which the port is to be removed.	Y
port	Integer	Number of the port to be removed from the group.	Y

This command removes the specified port from the link aggregation group of the specified IP interface. The module does not need to be specified, because it is the same module as the other ports of the IP interface.

The last port of the IP interface cannot be removed.

If the IP interface must be moved to a different module, first delete the interface and then recreate it. This command cannot be applied to management or VPN interfaces.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPINTERFACE_DOES_NOT_EXIST**

  IP interface name does not exist.

- **ILLEGAL_PORT_NUMBER**
  Port number is out of range.
- **PORT_NOT_IN_INTERFACE**
  Port is not part of the specified IP interface.
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**
  Operation is not allowed on management or VPN IP interface.
- **IPINTERFACE_LAST_PORT**
  Last port in IP interface cannot be removed.

Renaming an IP interface

Use the **ipinterface_rename** command to rename an IP interface.

```
ipinterface_rename ipinterface=IPInterfaceName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
ipinterface	Object name	Original name of the IP interface.	Y
new_name	Object name	The new name of the IP interface.	Y

This command renames an IP interface. The IP interface must be unique in the system. This command cannot be applied to Management or VPN interfaces.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPINTERFACE_DOES_NOT_EXIST**
  IP Interface name does not exist
- **IPINTERFACE_EXISTS**
  IP Interface name already used
- **COMMAND_NOT_ALLOWED_ON_MANAGEMENT_OR_VPN_INTERFACE**
  Operation is not allowed on Management or VPN IP Interface

Printing the ARP database of an IP interface

Use the **ipinterface_run_arp** command to print the ARP database of the specified IP interface.

```
ipinterface_run_arp localipaddress=IPaddress | localipaddress6=IPv6address
```

Parameters

Name	Description	Mandatory
localipaddress	IP address of the IP interface for which the ARP database should be printed.	N
localipaddress6	IPv6 address of the IP interface for which the ARP database should be printed.	N

This command prints a list of the ARP database of an IP interface with its IP addresses and their associated Ethernet MAC addresses. The IP address must be one of the IP addresses defined for iSCSI IP interfaces, or the management or VPN name.

Field ID	Field output	Default position
arp_output	arp Output	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **NO_IP_INTERFACE_MATCHES_CRITERIA**
  No IP Interface matches given criteria
- **MORE_THAN_ONE_IP_INTERFACE_MATCHES**
  More than one IP Interface matches given criteria

Testing the traceroute to a remote IP

Use the **ipinterface_run_traceroute** to test connectivity to a remote IP node using the ICMP trace-route mechanism.

```
ipinterface_run_traceroute localipaddress=IPaddress remote=remoteHost
```

Parameters

Name	Description	Mandatory
localipaddress	IP address of the IP interface for which the traceroute command is run.	Y
remote	IP address or DNS for the traceroute test.	Y

This command runs a route trace to the specified remote host through the specified IP interface. The IP address must be one of the IP addresses defined for iSCSI IP interfaces or the Management or VPN name.

Field ID	Field output	Default position
traceroute_output	traceroute Output	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **NO_IP_INTERFACE_MATCHES_CRITERIA**
  No IP Interface matches given criteria
- **MORE_THAN_ONE_IP_INTERFACE_MATCHES**
  More than one IP Interface matches given criteria

Testing the traceroute to a remote IP

Use the **ipinterface_run_traceroute6** command to test connectivity to a remote IP node using the ICMP trace-route mechanism.

```
ipinterface_run_traceroute6 localipaddress6=IPv6address remote6=remoteHost
```

Parameters

Name	Description	Mandatory
localipaddress6	IPv6 address of the IP interface for which the traceroute6 command is run.	Y
remote6	IPv6 address or DNS for the traceroute test.	Y

This command runs a route trace to the specified remote host through the specified IP interface. The IP address must be one of the IP addresses defined for iSCSI IP interfaces or the Management or VPN name.

Field ID	Field output	Default position
traceroute_output	traceroute Output	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **NO_IP_INTERFACE_MATCHES_CRITERIA**
  No IP Interface matches given criteria
- **MORE_THAN_ONE_IP_INTERFACE_MATCHES**
  More than one IP Interface matches given criteria

Updating an IP interface

Use the **ipinterface_update** command to update the configuration of an IP interface.

```
ipinterface_update ipinterface=IPInterfaceName [ address=Address ] [ netmask=NetworkMask ]
 [ gateway=DefaultGateway ] [ address6=IPv6address ] [ gateway6=DefaultIPv6Gateway ]
 [ mtu=MTU ] [ access_group=IPAccessGroupName ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipinterface	Object name	The name of the IP interface to be updated.	Y	N/A
address	N/A	IP address of the interface or a list of addresses for the Management and VPN interfaces.	N	Leaves the address unchanged.
netmask	N/A	Network mask of the interface.	N	Leaves the network mask unchanged.
gateway	N/A	IP address of the default gateway for this interface.	N	Leaves unchanged.
address6	N/A	IPv6 address of the interface or a list of addresses for the Management and VPN interfaces.	N	Leaves the address unchanged.

Name	Type	Description	Mandatory	Default
gateway6	N/A	IPv6 address of the default gateway for this interface.	N	Leaves unchanged.
mtu	Integer	Maximum Transmission Unit: The packet size that is supported by the connecting Ethernet switch.	N	Keep unchanged.
access_group	Object name	The name of the IP access group used for IP filtering.	N	Keep unchanged.

This command updates the configuration of an existing IP interface.

Fields that are not specified do not change their values.

The name of the interface may either be one of the previously defined IP interfaces for iSCSI, or Management for the management IP interface, or VPN for the VPN interface.

Management ports are dedicated for CLI and GUI communications, as well as for outgoing SNMP and SMTP connections. For management interfaces, the user must specify three IP addresses (equal to the number of potential managers, minus the number of management ports).

For VPN interfaces, the user must specify two IP addresses (equal to the number of VPN ports). All VPN addresses must reside on the same subnet.

Example:

```
ipinterface_update ipinterface=management
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPINTERFACE_DOES_NOT_EXIST**

  IP Interface name does not exist
- **IP_ADDRESS_ALREADY_USED_IN_ANOTHER_INTERFACE**

IP address is already assigned to another interface

- **IPADDRESS_AND_GATEWAY_ARE_NOT_ON_SAME_SUBNET**

  IP address specified for the default gateway is not in the subnet of the IP Interface
- **IPINTERFACE_MANAGEMENT_DIFFERENT_SUBNET**

  IP addresses management modules must all be in the same subnet
- **IPINTERFACE_MANAGEMENT_MISSING_IPS**

  Number of IP addresses specified is less than the number of management modules
- **IPINTERFACE_MANAGEMENT_TOO_MANY_IPS**

  Number of IP addresses specified is larger than the number of management modules
- **MTU_TOO_LARGE**

  Specified MTU value is too large
- **ILLEGAL_IPADDRESS**

  Illegal IP address was entered
- **DUPLICATE_IPADDRESSES**

  Duplicate IP addresses were specified
- **ILLEGAL_GATEWAY_IPADDRESS**

  Illegal IP address was specified for default gateway
- **ILLEGAL_IPV6ADDRESS**

  Illegal IPv6 address was entered
- **DUPLICATE_IPV6ADDRESSES**

  Duplicate IPv6 addresses were specified
- **ILLEGAL_GATEWAY_IPV6_ADDRESS**

  Illegal IPv6 address was specified for default gateway
- **IPV6ADDRESS_AND_GATEWAY_ARE_NOT_ON_SAME_SUBNET**

  IPv6 address specified for the default gateway is not in the subnet of the IP Interface
- **IPV6_ADDRESS_ALREADY_USED_IN_ANOTHER_INTERFACE**

  IPv6 address is already assigned to another interface
- **IPINTERFACE_MANAGEMENT_MISSING_IPV6S**

  Number of IPv6 addresses specified is less than the number of management modules
- **IPINTERFACE_MANAGEMENT_TOO_MANY_IPV6S**

  Number of IPv6 addresses specified is larger than the number of management modules
- **IPINTERFACE_MANAGEMENT_DIFFERENT_IPV6_SUBNET**

  IPv6 addresses management modules must all be in the same subnet
- **IP_ACCESS_GROUP_DOES_NOT_EXIST**

  IP access group with such name doesn't exist
- **IP_ACCESS_INVALID_INTERFACE_TYPE**

  IP filtering is applied to an invalid interface (should be management or VPN)
- **COMMAND_NOT_ALLOWED_ON_INTERCONNECT_INTERFACE**

  Operation is not allowed on interconnect Interface

Defining a new IPSec connection

Use the **ipsec_connection_add** command to add a new IPSec connection.

```
ipsec_connection_add ipsec_connection=ConnectionName left=IPInterfaceName
[ right_ip=RightIpAddress ] < passkey=PassKey | certificate=PemCertificate >
```

Parameters

Name	Type	Description	Mandatory	Default
ipsec_connection	N/A	The name of the IPSec connection to be added.	Y	N/A
left	Object name	The name of the IP interface to be used as the left side: `management` or `VPN`.	Y	N/A
right_ip	N/A	IP address of the right side.	N	Any
passkey	N/A	Secret password.	N	N/A
certificate	N/A	The content of a `.pem` file, with asterisks (`*`) instead of newlines. In Windows, drag-and-drop the `.pem` file from the Windows Explorer to the appropriate location in the XCLI session window; the content will be added automatically.	N	N/A

This command defines a new IPSec connection between an IP interface and the right side.

IP interface can be either `management` or `VPN`. If specified:

- the address of the right side is IPv4 or IPv6; otherwise the right side can be any
- the secret password must be shared between the left and the right sides
- the certificate must contain a public key of the right side

Example:

```
ipsec_connection_add ipsec_connection=MySec left=management passkey="MyPass123"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPSEC_CONNECTION_EXISTS**
  The IPSec connection already exists
- **IPSEC_CONNECTION_BETWEEN_ENDPOINTS_EXISTS**
  A connection between these endpoints already exists
- **LEFT_INTERFACE_NOT_FOUND**
  The specified left side interface was not found
- **MAX_IPSEC_CONNECTIONS_REACHED**
  The maximum allowed number of IPSec connections is already configured
- **IPSEC_UNSUPPORTED_FOR_ISCSI**
  IPSec is unsupported for iSCSI ports
- **SSL_CERTIFICATE_CHAIN_EMPTY**
  No certificates found in input.
- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.

Updating an existing IPSec connection

Use the **ipsec_connection_update** command to update an existing IPSec connection.

```
ipsec_connection_update ipsec_connection=ConnectionName [ left=IPInterfaceName ]
[ right_ip=RightIpAddress ] [ passkey=PassKey | certificate=PemCertificate ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipsec_connection	Object name	The name of the IPSec connection to be updated.	Y	N/A

Name	Type	Description	Mandatory	Default
left	Object name	The name of the IP interface to be used as left side: management or VPN.	N	None
right_ip	N/A	The IP address of the right side.	N	None
passkey	N/A	Pre-shared key.	N	None
certificate	N/A	The content of a .pem file, with asterisks (*) instead of newlines. In Windows, drag-and-drop the .pem file from the Windows Explorer to the appropriate location in the XCLI session window; the content will be added automatically.	N	None

This command updates an existing IPSec connection between an IP interface and the right side.

IP interface can be either management or VPN. If specified:

- the address of the right side is IPv4 or IPv6; otherwise the right side can be any
- the pre-shared key must be shared between the left and the right sides
- the certificate must contain a public key of the right side.

Example:

```
ipsec_connection_update ipsec_connection=MySec passkey="MyNewPass!@#"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPSEC_CONNECTION_DOES_NOT_EXIST**
  The specified IPSec connection does not exist
- **IPSEC_CONNECTION_EXISTS**
  The IPSec connection already exists
- **LEFT_INTERFACE_NOT_FOUND**

The specified left side interface was not found

- **IPSEC_UNSUPPORTED_FOR_ISCSI**
  IPSec is unsupported for iSCSI ports
- **SSL_CERTIFICATE_CHAIN_EMPTY**
  No certificates found in input.
- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.

Removing an existing IPSec connection

Use the **ipsec_connection_remove** command to remove an existing IPSec connection.

```
ipsec_connection_remove ipsec_connection=ConnectionName
```

Parameters

Name	Type	Description	Mandatory
ipsec_connection	Object name	The name of the IPSec connection to be updated.	Y

Example:

```
xcli.py ipsec_connection_remove ipsec_connection=connect1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **IPSEC_CONNECTION_DOES_NOT_EXIST**
  The specified IPSec connection does not exist

Listing IPSec connections

Use the **ipsec_connection_list** command to list all or specific IPSec connections.

```
ipsec_connection_list [ ipsec_connection=ConnectionName ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipsec_connection	Object name	The IPSec connection(s) to be listed.	N	All IPsec connections

Field ID	Field output	Default position
name	IPSec Connection	1
type	Type	2
left	Left Interface	3
right_ip	Right Address	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing IPSec tunnels

Use the **ipsec_list_tunnels** command to list all or specific IPSec tunnels.

```
ipsec_list_tunnels [ ipsec_connection=ConnectionName ] [ left=IPInterfaceName ]
[ left_ip=InterfaceIpAddress ] [ right_ip=RightIpAddress ] [ module=ComponentId ]
```

Parameters

Name	Type	Description	Mandatory	Default
ipsec_connection	Object name	Lists all IPSec tunnels of this IPSec connection.	N	IPSec tunnels of all IPsec connections
left	Object name	Lists all IPSec tunnels from this interface.	N	IPsec tunnels from any interface

Name	Type	Description	Mandatory	Default
left_ip	N/A	Lists all IPSec tunnels from this left IP.	N	IPsec tunnels from any left IP
right_ip	N/A	Lists all IPSec tunnels from this right IP.	N	IPsec tunnels to any right IP
module	N/A	Limits the listing to a specific module.	N	All modules

Field ID	Field output	Default position
name	IPSec Connection	1
type	Type	2
status	Status	3
left	Left Interface	4
left_ip	Left Address	5
right_ip	Right Address	6
module	Module	7

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Connecting to a support center

Use the **support_center_connect** command to connect to a support center.

```
support_center_connect
[ < timeout=Timeout [ idle_timeout=IdleTimeout ] > | always_on=<yes|no> ]
[ module=ModuleNumber ] [ password=Password ]
```

Parameters

Name	Type	Description	Mandatory	Default
timeout	N/A	Specifies the duration of the session. After the duration elapses, the session will be disconnected. Time is specified in hh:mm format.	N	none

Name	Type	Description	Mandatory	Default
idle_timeout	N/A	Specifies the idle time for the session after which it will be disconnected. Time is specified in hh:mm format.	N	[timeout]
module	N/A	The module from which the connection to the support center should be initiated	N	[the module that handled the CLI request]
password	String	A password set by the customer, that needs to be submitted by support services, in order to start a remote support session Format: string, must be 6-12 alpha-numeric characters, and is case-insensitive.	N	none
always_on	Boolean	Enables a constant connection to the support center (rather than an on-demand connection).	N	none

If the support center is not defined, the command will fail.

To control the duration of the session, use the parameters **timeout** and **idle_disconnect**.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **NO_SUPPORT_CENTERS_ARE_DEFINED**

  No support centers are defined
- **IDLE_TIMEOUT_MUST_BE_LOWER_THAN_TIMEOUT**

  The idle timeout, if specified, must be lower than the regular timeout
- **MODULE_HAS_NO_SUPPORT_CENTER_PORT**

  The specified module does not have a port from which Support Center can connect
- **NO_MODULE_WITH_SUPPORT_CENTER_PORT**

No module has a port from which Support Center can connect

- **REMOTE_SUPPORT_CLIENT_ALREADY_RUNNING**
  The Remote Support Client is already running

Defining a support center

Use the **support_center_define** command to define a support center.

```
support_center_define support_center=SupportCenterName address=Address [ port=port ]
 [ priority=priority ]
```

Parameters

Name	Type	Description	Mandatory	Default
support_center	Object name	The name of the support center server	Y	N/A
address	N/A	The IP address of the support center server	Y	N/A
port	Positive integer	The TCP port to connect to on the support center	N	22
priority	N/A	The priority of the support center (support centers with a higher priority will be connected first)	N	0

Example:

```
xcli.py support_center_define support_center=somewhere address=1.1.1.1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **MAX_SUPPORT_CENTERS_DEFINED**
  Maximum number of support centers is already defined.

Deleting a support center

Use the **support_center_delete** command to delete a support center.

```
support_center_delete support_center=SupportCenterName
```

Parameters

Name	Type	Description	Mandatory
support_center	Object name	The name of the support center to delete.	Y

Sessions that belong to this support center are disconnected, even if they are open at the time of deletion.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_TO_DELETE_THE_SUPPORT_CENTER**
  Are you sure you want to delete Support Center?.

Return codes

- **SUPPORT_CENTER_NOT_DEFINED**
  Support Center is not defined.
- **CANNOT_DELETE_WHILE_SUPPORT_CENTER_IS_RUNNING**
  Support Center is running. Disconnect before deleting.

Disconnecting from a support center

Use the **support_center_disconnect** command to disconnect the storage system from a support center.

```
support_center_disconnect
```

Example:

```
support_center_disconnect
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DISCONNECT_BUSY_REMOTE_SUPPORT**
  Are you sure you want to disconnect the busy Remote Support connection?

Return codes

- **REMOTE_SUPPORT_CLIENT_NOT_RUNNING**
  The Remote Support Client is not running

Listing support centers

Use the **support_center_list** command to list support centers.

```
support_center_list
```

This command displays the following information about all defined support centers:

- Name
- IP Address
- Port
- Priority

Field ID	Field output	Default position
name	Name	1
address	Address	2
port	Port	3
priority	Priority	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing the status of all support centers

Use the **support_center_status** command to list information about all defined support centers.

```
support_center_status
```

Example:

```
support_center_status
```

Output:

```
State           Connected sessions   Timeout (min)   Module   Connected since
--------------- -------------------- --------------- -------- -----------------
no connection   0                    no timeout

Cont.:

Destination   Connect-on-restart active
------------- --------------------------
              no
```

Field ID	Field output	Default position
state	State	1
connected_support_sessions	Connected sessions	2
minutes_to_timeout	Timeout (min)	3
running_from_module	Module	4
start_time	Connected since	5
destination	Destination	6

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Creating a new IP access group

Use the **ip_access_group_create** command to create a new IP access group.

```
ip_access_group_create access_group=IPAccessGroupName
```

Parameters

Name	Type	Description	Mandatory
access_group	Object name	The name of the IP access group to be created.	Y

The group may contain up to 20 addresses and can be used to limit network access to a management/VPN interface.

Example:

```
ip_access_group_create access_group=IPAccessGroup1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **IP_ACCESS_GROUP_ALREADY_EXISTS**
  IP access group with such name already exists
- **IP_ACCESS_MAXIMUM_NUMBER_OF_GROUPS_IS_REACHED**
  Reached maximum number of IP access groups

Removing an address from an IP access group

Use the **ip_access_group_remove_address** command to delete the IP address of an access group.

```
ip_access_group_remove_address access_group=IPAccessGroupName address=Address
```

Parameters

Name	Type	Description	Mandatory
access_group	Object name	The name of the IP access group.	Y
address	N/A	The address that should be deleted from the IP access group.	Y

As a prerequisite for completing this command, the IP address must be defined for the group.

Example:

```
ip_access_group_remove_address access_group=IPAccessGroup1 address=172.30.214.202
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **IP_ACCESS_GROUP_DOES_NOT_EXIST**
  IP access group with such name doesn't exist
- **IP_ACCESS_ADDRESS_IS_NOT_VALID**
  The given address is not valid
- **IP_ACCESS_ADDRESS_IS_NOT_IN_GROUP**
  The given address isn't in the group

Adding a new address to an IP access group

Use the **ip_access_group_add_address** command to add a new IP to an access group.

```
ip_access_group_add_address access_group=IPAccessGroupName
address=Address [ netmask=NetworkMask ]
```

Parameters

Name	Type	Description	Mandatory	Default
access_group	Object name	The name of an IP access group.	Y	N/A
address	N/A	A valid IP4 address or FQDN to be added to the IP access group.	Y	N/A
netmask	N/A	The network mask for a network address range.	N	Single IP address range (255.255.255.255).

The address can be an IP4 address with or without a netmask, or a valid host name (FQDN).

Example:

```
ip_access_group_add_address access_group=IPAccessGroup1 address=172.30.214.202
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **IP_ACCESS_GROUP_DOES_NOT_EXIST**
  IP access group with such name doesn't exist
- **IP_ACCESS_REMOTE_RESOLVE_ADDRESS_CALL_HAS_FAILED**
  The remote call to resolve an address has failed
- **IP_ACCESS_MAXIMUM_NUMBER_OF_ADDRESSES_IN_GROUP_IS_REACHED**
  Reached the maximum number of addresses in the IP access group

Deleting an existing IP access group

Use the **ip_access_group_delete** command to delete an IP access group.

```
ip_access_group_delete access_group=IPAccessGroupName
```

Parameters

Name	Type	Description	Mandatory
access_group	Object name	The name of the IP access group to be deleted.	Y

Example:

```
ip_access_group_delete access_group=DBGroupNew
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **IP_ACCESS_GROUP_DOES_NOT_EXIST**
  IP access group with such name doesn't exist
- **IP_ACCESS_GROUP_IN_USE**
  The group is used for IP filtering

Renaming an existing IP access group

Use the **ip_access_group_rename** command to rename an existing IP access group.

```
ip_access_group_rename access_group=IPAccessGroupName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
access_group	Object name	Name of the IP access group to be renamed.	Y
new_name	Object name	A new name of the IP access group.	Y

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **IP_ACCESS_GROUP_DOES_NOT_EXIST**
  IP access group with such name doesn't exist
- **IP_ACCESS_GROUP_ALREADY_EXISTS**
  IP access group with such name already exists

Listing IP access groups

Use the **ip_access_group_list** command to list IP access groups.

```
ip_access_group_list
```

Field ID	Field output	Default position
name	Group Name	1
addresses.0	Address 1	N/A
addresses.1	Address 2	N/A
addresses.2	Address 3	N/A
addresses.3	Address 4	N/A
addresses.4	Address 5	N/A
addresses.5	Address 6	N/A
addresses.6	Address 7	N/A
addresses.7	Address 8	N/A
addresses.8	Address 9	N/A
addresses.9	Address 10	N/A
addresses.10	Address 11	N/A
addresses.11	Address 12	N/A
addresses.12	Address 13	N/A
addresses.13	Address 14	N/A
addresses.14	Address 15	N/A
addresses.15	Address 16	N/A
addresses.16	Address 17	N/A
addresses.17	Address 18	N/A
addresses.18	Address 19	N/A
addresses.19	Address 20	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Listing IP access groups

Use the **ip_access_group_address_list** command to list IP access group addresses.

```
ip_access_group_address_list
```

This command lists IP access groups and address lists for these groups.

Example:

```
ip_access_group_address_list
```

Output:

```
Group Name       Address
---------------- ----------------
DBGroup          192.168.1.10
IPAccessGroup1   172.30.214.202
```

Field ID	Field output	Default position
access_group	Group Name	1
address	Address	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Chapter 16. PKI configuration commands

This section describes the command-line interface (CLI) for PKI configuration.

Listing PKI items

Use the **pki_list** command to list PKI items.

```
pki_list
```

The storage system allows you to install certificates generated by your own certificate authority (CA) for the different services that use digital certificates (SSL authentication, IPSec, and so on). When you install a certificate, it is associated with a name that you provide, which is used for managing it.

Certificates can be installed in one of two ways, depending on your site PKI policy:

- System generated: This method does not expose the system private key
  - The system generates a public-private keypair
  - The public key is exported in a certificate signing request (CSR) file using the **pki_generate_private_key_and_csr** command.
  - CA generated: The CA signs this file, returning a .PEM file that is then imported into the storage system using the **pki_set_pem** command.
- The CA generates both the key pair and associated certificate. Both are provided in a password-protected PKCS#12 file.
  - This file is imported into the system using the **pki_set_pkcs12** command.

The **pki_list** command lists the following information:

- Name
- Fingerprint
- Has signed certificate
- Services

Field ID	Field output	Default position
name	Name	1
fingerprint	Fingerprint	2
authenticated	Has signed certificate	3
services	Services	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed

User Category	Permission
Host side accelerator client	Disallowed

Generating a certificate signing request

Use the **pki_generate_csr** command to generate a certificate signing request.

```
pki_generate_csr name=Name subject=Subject
```

Parameters

Name	Type	Description	Mandatory
name	String	The certificate's symbolic name.	Y
subject	N/A	The subject name for the generated certificate request. The argument must be formatted as /type0=value0/ type1=value1/type2=... .	Y

Example:

```
pki_generate_csr name subject
```

Field ID	Field output	Default position
csr	CSR	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **FAILED_CREATING_CERTIFICATE_SIGNING_REQUEST**

  Failed to generate the certificate signing request

  Troubleshooting: Generate a certificate signing request specifying a correct subject (e.g., '/C=US/CN=IBM')
- **CERTIFICATE_NAME_DOES_NOT_EXIST**

  Certificate name was not found

  Troubleshooting: Choose a different name

Generating a private key and CSR

Use the **pki_generate_private_key_and_csr** command to generate a private key and CSR.

```
pki_generate_private_key_and_csr name=Name subject=Subject [ bits=Bits ]
```

Parameters

Name	Type	Description	Mandatory	Default
bits	Integer	The private key size in bits. It can be between 1024 to 4096.	N	2048
name	String	The certificate's symbolic name.	Y	N/A
subject	N/A	The subject name for the generated certificate request. The argument must be formatted as /type0=value0/ type1=value1/ type2=... .	Y	N/A

Example:

```
pki_generate_private_key_and_csr name="my_cert"
subject="/C=US/CN=IBM" bits=1024
```

Field ID	Field output	Default position
csr	CSR	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **FAILED_CREATING_CERTIFICATE_SIGNING_REQUEST**

  Failed to generate the certificate signing request

  Troubleshooting: Generate a certificate signing request specifying a correct subject (e.g., '/C=US/CN=IBM')
- **FAILED_CREATING_PRIVATE_KEY**

  Failed creating private key
- **CERTIFICATE_NAME_ALREADY_EXIST**

Certificate with same name already exist

Troubleshooting: Choose a different name

- **CERTIFICATE_CONTAINER_FULL**

  Can't add more ceritifactes, the maximum already defined

  Troubleshooting: Delete certificate

Deleting the PKI content

Use the **pki_remove** command to delete the PKI content.

```
pki_remove name=Name
```

Parameters

Name	Type	Description	Mandatory
name	String	The certificate's symbolic name.	Y

Example:

```
pki_remove name="my_cert"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_CERTIFICATE**

  Are you sure you want to delete certificate?

Return codes

- **CERTIFICATE_NAME_DOES_NOT_EXIST**

  Certificate name was not found

  Troubleshooting: Choose a different name

- **DEFAULT_CERTIFICATE_CANNOT_BE_DELETED**

  Default certificate cannot be deleted.

Changing a PKI symbolic name

Use the **pki_rename** command to change a PKI symbolic name.

```
pki_rename name=Name new_name=Name
```

Parameters

Name	Type	Description	Mandatory
name	String	The current symbolic name.	Y
new_name	String	The new symbolic name.	Y

Example:

```
pki_rename name="current_name" new_name="my_new_name"
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **CERTIFICATE_NAME_ALREADY_EXIST**
  Certificate with same name already exist
  Troubleshooting: Choose a different name
- **CERTIFICATE_NAME_DOES_NOT_EXIST**
  Certificate name was not found
  Troubleshooting: Choose a different name

Importing a signed certificate

Use the **pki_set_pem** command to import a signed certificate in PEM format.

```
pki_set_pem certificate=SignedCertificate  [ services=<xcli [ ,cim ]
[ ,ipsec ] ... | ALL | NONE> ]
```

Parameters

Name	Description	Mandatory	Default
services	A comma-separated list of services that use this certificate.	N	none

Name	Description	Mandatory	Default
certificate	The content of signed certificate in .pem file format. Asterisks (*) can be used instead of newlines. In Windows, drag-and-drop the `.pem` file from the Windows Explorer to the appropriate location in the XCLI session window; the content will be added automatically.	Y	N/A

As a security precaution, use the **pki_show_security** command to view the certificate in plain text, and make sure that the certificate text under *Signature Algorithm* does not include the string *MD5*. This will help you avoid a "transcript collision" attack, that can force a hash-construction downgrade to MD5 and reduce expected security. For the vulnerability summary, see the National Vulnerability Database.

Example:

```
pki_set_pem certificate=validCertificateChain
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SERVICE_IS_USING_OTHER_CERTIFICATE**

  Service '*services*' is using other certificate.

  Troubleshooting: Edit the certificate used by service before
- **PRIVATE_KEY_ALREADY_HAS_OTHER_CERTIFICATE**

  The private key matching this certificate already has other certificate

  Troubleshooting: Use the pki_update command if you want to replace the certificate
- **CERTIFICATE_KEY_WAS_NOT_FOUND**

  Failed to set certificate

  Troubleshooting: Check the parameters
- **SSL_CERTIFICATE_CHAIN_EMPTY**

No certificates found in input.

- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.

Importing a PKCS#12 certificate

Use the **pki_set_pkcs12** command to import a PKCS#12 certificate.

```
pki_set_pkcs12 name=Name password=Password certificate=Base64Data
[ services=<xcli [ ,cim ] [ ,ipsec ] ... | ALL | NONE> ]
```

Parameters

Name	Type	Description	Mandatory	Default
services	N/A	A comma-separated list of services that use this certificate.	N	none
password	String	The PKCS#12 file password.	Y	N/A
name	String	The certificate's symbolic name.	Y	N/A
certificate	N/A	The PKCS#12 content in one-line base64 format. Such input can be created, for example, by a base64 utility: base64 -w0 myCert.pfx	Y	N/A

As a security precaution, use the **pki_show_security** command to view the certificate in plain text, and make sure that the certificate text under *Signature Algorithm* does not include the string *MD5*. This will help you avoid a "transcript collision" attack, that can force a hash-construction downgrade to MD5 and reduce expected security. For the vulnerability summary, see the National Vulnerability Database.

Example:

```
pki_set_pkcs12 name=myPki password=pkiPassword certificate=pkiCertificateBase64
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SERVICE_IS_USING_OTHER_CERTIFICATE**
  Service '*services*' is using other certificate.
  Troubleshooting: Edit the certificate used by service before
- **CANNOT_VALIDATE_PKCS12_FILE**
  Failed validating PKCS#12 file.
  Troubleshooting: Check PKCS#12 file content is encoded to base64, and the password is OK.
- **DEFAULT_CERTIFICATE_ALREADY_EXIST**
  Other default certificate already exist.
  Troubleshooting: Remove the default certificate, or make it not default.
- **CERTIFICATE_NAME_ALREADY_EXIST**
  Certificate with same name already exist
  Troubleshooting: Choose a different name
- **BAD_BASE64_DATA**
  Data cannot be decoded as base-64 data.
- **FAILED_GETTING_PRIVATE_KEY_FINGERPRINT**
  Failed getting private key fingerprint.
- **FAILED_ENCRYPTING_PRIVATE_KEY**
  Failed encrypting private key.
- **CERTIFICATE_CONTAINER_FULL**
  Can't add more ceritifactes, the maximum already defined
  Troubleshooting: Delete certificate

Displaying the details of a signed certificate

Use the **pki_show_certificate** command to display the details of a signed certificate.

```
pki_show_certificate name=Name
```

Parameters

Name	Type	Description	Mandatory
name	String	The certificate's symbolic name.	Y

As a security precaution, use this command to view the certificate in plain text, and make sure that the certificate text under *Signature Algorithm* does not include the string *MD5*. This will help you avoid a "transcript collision" attack, that can force a hash-construction downgrade to MD5 and reduce expected security. For the vulnerability summary, see the National Vulnerability Database.

Example:

```
pki_show_certificate name=ibm
```

Field ID	Field output	Default position
certificate	Certificate	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **FAILED_PARSING_CERTIFICATE**
  Failed parsing certificate.
- **KEY_HAS_NO_CERTIFICATE**
  The key has no signed certificate defined.
- **CERTIFICATE_NAME_DOES_NOT_EXIST**
  Certificate name was not found
  Troubleshooting: Choose a different name

Updating a PKI certificate or services

Use the **pki_update** command to update a PKI certificate or services.

```
pki_update  name=Name [ services=<xcli [ ,cim ] [ ,ipsec ] ... | ALL | NONE> ]
[ certificate=SigendCertificate ]
```

Parameters

Name	Type	Description	Mandatory	Default
services	N/A	Comma-separated list of services that need to use this certificate.	N	none
name	String	The certificate's symbolic name.	Y	N/A
certificate	N/A	If this parameter is defined, the certificate will be replaced.	N	none

Example:

```
pki_update name=cert services=xcli,cim
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SERVICE_IS_USING_OTHER_CERTIFICATE**
  Service '*services*' is using other certificate.
  Troubleshooting: Edit the certificate used by service before
- **NO_PKI_UPDATE_PARAMETERS_SPECIFIED**
  No parameters were specified for update
- **CERTIFICATE_DOES_NOT_MATCH_PRIVATE_KEY**
  Certificate does not match private key
  Troubleshooting: Use other certificate.
- **CANNOT_SET_SERVICES_BEFORE_SETTING_CERTIFICATE**
  Can't set services before certificate.
  Troubleshooting: Set certificate first.
- **DEFAULT_CERTIFICATE_ALREADY_EXIST**
  Other default certificate already exist.
  Troubleshooting: Remove the default certificate, or make it not default.
- **CERTIFICATE_KEY_WAS_NOT_FOUND**
  Failed to set certificate
  Troubleshooting: Check the parameters
- **CERTIFICATE_NAME_DOES_NOT_EXIST**
  Certificate name was not found
  Troubleshooting: Choose a different name

- **SSL_CERTIFICATE_CHAIN_EMPTY**
  No certificates found in input.
- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.

Chapter 17. InfiniBand commands

This section describes the command-line interface (CLI) for InfiniBand fabric management.

Listing the configured InfiniBand ports

Use the **ib_port_list** command to list the configured InfiniBand ports.

```
ib_port_list [ ib_port=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
ib_port	The InfiniBand port to be listed.	N	All IB ports

Example:

```
ib_port_list
```

Field ID	Field output	Default position
port	Port	1
component_id	Connected Component	2
status	Status	3
skip_miswire	Allow Any GUID	4
saved_info.peer_guid	GUID	5
saved_info.last_state	State	6
saved_info.port_down_reason	Failure Reason	7
currently_functioning	Currently Functioning	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
sm_port_in_test	SM Port in Test	N/A
sm_port_is_master	SM Port is Master	N/A
sm_port_should_have_state	SM Port Target State	N/A
sm_port_status	SM Port Status	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing the configured InfiniBand switches

Use the **switch_list** command to list the configured InfiniBand switches.

```
switch_list [ switch=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
switch	IB switch to list.	N	All IB switches

Example:

```
switch_list
```

Field ID	Field output	Default position
component_id	Switch	1
status	Status	2
sw_mgmt_status	Management Status	3
num_of_down_ports	Down Ports	4
last_succ_monitoring	Last Monitoring Time	5
ps1	Power Supply #1	6
ps2	Power Supply #2	7
prob_fans_num	Problematic Fans	8
prob_temp_num	Problematic Temperatures	9
prob_volt_num	Problematic Voltages	10
currently_functioning	Currently Functioning	N/A
temp_is4	IS4 Temperature	N/A
temp_ps_ambient	PS Ambient Temperature	N/A
temp_is4_ambient	IS4 Ambient Temperature	N/A
temp_board	Board Temperature	N/A
fans_rpm.0	Fan #1 RPM	N/A
fans_rpm.1	Fan #2 RPM	N/A
fans_rpm.2	Fan #3 RPM	N/A
fans_rpm.3	Fan #4 RPM	N/A
voltage.0	Expected Voltage #1	N/A
expected_voltage.0	Expected Voltage #1	N/A
voltage.1	Expected Voltage #2	N/A
expected_voltage.1	Expected Voltage #2	N/A
voltage.2	Expected Voltage #3	N/A
expected_voltage.2	Expected Voltage #3	N/A
voltage.3	Expected Voltage #4	N/A
expected_voltage.3	Expected Voltage #4	N/A
voltage.4	Expected Voltage #5	N/A
expected_voltage.4	Expected Voltage #5	N/A
voltage.5	Expected Voltage #6	N/A
expected_voltage.5	Expected Voltage #6	N/A
voltage.6	Expected Voltage #7	N/A

Field ID	Field output	Default position
expected_voltage.6	Expected Voltage #7	N/A
voltage.7	Expected Voltage #8	N/A
expected_voltage.7	Expected Voltage #8	N/A
mgmt_guid	Managememt GUID	N/A
fabric_guid	Fabric GUID	N/A
curr_vpd.chassis_type	Current VPD - Chassis type	N/A
curr_vpd.mgmt_type	Current VPD - Managemet type	N/A
curr_vpd.cpu_type	Current VPD - CPU type	N/A
curr_vpd.chassis_pn	Current VPD - Chassis P/N	N/A
curr_vpd.mgmt_pn	Current VPD - Management P/N	N/A
curr_vpd.cpu_pn	Current VPD - CPU P/N	N/A
curr_vpd.chassis_sn	Current VPD - Chassis S/N	N/A
curr_vpd.mgmt_sn	Current VPD - Management S/N	N/A
curr_vpd.cpu_sn	Current VPD - CPU S/N	N/A
curr_vpd.asic_fw_version	Current ASIC firmware version	N/A
curr_vpd.mgmt_fw_version	Current Management firmware version	N/A
prev_vpd.chassis_type	Previous VPD - Chassis type	N/A
prev_vpd.mgmt_type	Previous VPD - Managemet type	N/A
prev_vpd.cpu_type	Previous VPD - CPU type	N/A
prev_vpd.chassis_pn	Previous VPD - Chassis P/N	N/A
prev_vpd.mgmt_pn	Previous VPD - Management P/N	N/A
prev_vpd.cpu_pn	Previous VPD - CPU P/N	N/A
prev_vpd.chassis_sn	Previous VPD - Chassis S/N	N/A
prev_vpd.mgmt_sn	Previous VPD - Management S/N	N/A
prev_vpd.cpu_sn	Previous VPD - CPU S/N	N/A
prev_vpd.asic_fw_version	Previous ASIC firmware version	N/A
prev_vpd.mgmt_fw_version	Previous Management firmware version	N/A
initial_vpd.chassis_type	Initial VPD - Chassis type	N/A
initial_vpd.mgmt_type	Initial VPD - Managemet type	N/A
initial_vpd.cpu_type	Initial VPD - CPU type	N/A
initial_vpd.chassis_pn	Initial VPD - Chassis P/N	N/A
initial_vpd.mgmt_pn	Initial VPD - Management P/N	N/A
initial_vpd.cpu_pn	Initial VPD - CPU P/N	N/A
initial_vpd.chassis_sn	Initial VPD - Chassis S/N	N/A
initial_vpd.mgmt_sn	Initial VPD - Management S/N	N/A
initial_vpd.cpu_sn	Initial VPD - CPU S/N	N/A
initial_vpd.asic_fw_version	Initial ASIC firmware version	N/A
initial_vpd.mgmt_fw_version	Initial Management firmware version	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Chapter 18. Access control commands

This section describes the command-line interface (CLI) for user access control.

Adding an access control definition

Use the **access_define** command to define an association between a user group and a host.

```
access_define user_group=UserGroup < host=HostName | cluster=ClusterName >
```

Parameters

Name	Type	Description	Mandatory
user_group	Object name	User group to be associated with the host or cluster.	Y
host	Object name	Host to be associated with the user group.	N
cluster	Object name	Cluster to be associated with the user group.	N

This command associates a user group with a host or a cluster. Hosts and clusters can only be associated with a single user group.

Example:

```
access_define host=host1 user_group=usergroup1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist
- **CLUSTER_BAD_NAME**
  Cluster name does not exist

- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_BELONGS_TO_CLUSTER**
  Host is part of a cluster

Deleting an access control definition

Use the **access_delete** command to delete an access control definition.

```
access_delete user_group=UserGroup < host=HostName | cluster=ClusterName >
```

Parameters

Name	Type	Description	Mandatory
user_group	Object name	The user group specified in the access control definition that should be deleted.	Y
host	Object name	The host specified in the access control definition that should be deleted.	N
cluster	Object name	The cluster specified in the access control definition that should be deleted.	N

This command deletes an association between the user group and host or cluster. The operation fails if no such access definition exists. When a host is removed from a cluster, the host's associations become the cluster's associations. This allows a continued mapping of operations, so that all scripts continue to work.

Example:

```
access_delete user_group=usergroup1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist

- **USER_GROUP_DOES_NOT_HAVE_ACCESS_TO_CLUSTER**
  User Group does not have access to cluster
- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_BELONGS_TO_CLUSTER**
  Host is part of a cluster
- **USER_GROUP_DOES_NOT_HAVE_ACCESS_TO_HOST**
  User Group does not have access to host

Listing access control definitions

Use the **access_list** command to list access control definitions.

```
access_list [ user_group=UserGroup ] [ host=HostName | cluster=ClusterName ]
```

Parameters

Name	Type	Description	Mandatory	Default
user_group	Object name	Filters the access control listing to display only this user group.	N	All user groups.
host	Object name	Filters the access control listing to display only this host.	N	All hosts.
cluster	Object name	Filters the access control listing to display only this cluster.	N	All clusters.

The list can be displayed for all access control definitions, or it can be filtered for a specific user group, host/cluster, or both.

Field ID	Field output	Default position
type	Type	1
name	Name	2
user_group	User Group	3

Example:

```
access_list host=buffyvam
```

Output:

```
Type   Name       User Group
host   buffyvam   testing
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **HOST_BAD_NAME**
  Host name does not exist
- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist

Adding an LDAP server definition

Use the **ldap_add_server** command to add an LDAP server definition.

```
ldap_add_server fqdn=Fqdn [ address=Address ]
base_dn=LdapDn [ certificate=PemCertificate ] [ port=PortNum ] [ secure_port=PortNum ]
```

Parameters

Name	Type	Description	Mandatory	Default
fqdn	N/A	FQDN of the LDAP server.	Y	N/A
address	N/A	IP address of the LDAP server.	N	none
base_dn	N/A	Base_DN of the LDAP server. Serves as the starting reference point for searches.	Y	N/A
certificate	N/A	The content of a `.pem` file, with asterisks (`*`) instead of newlines. In Windows, drag-and-drop the `.pem` file from the Windows Explorer to the appropriate location in the XCLI session window; the content will be added automatically.	N	no certificate
port	Integer	The port number.	N	389

Name	Type	Description	Mandatory	Default
secure_port	Integer	The secure port number.	N	636

Example:

```
ldap_add_server fqdn=ldap.example.com address=1.2.3.4
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **MAX_LDAP_SERVERS_REACHED**
  Maximum number of LDAP servers already defined
- **ADDRESS_CURRENTLY_ASSOCIATED_WITH_ANOTHER_LDAP_SERVER**
  The specified IP address is currently associated with another LDAP server
- **LDAP_SERVER_EXISTS**
  LDAP server with specified FQDN already exists
- **SSL_CERTIFICATE_CHAIN_EMPTY**
  No certificates found in input.
- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.

Testing an LDAP configuration

Use the **ldap_test** command to authenticate the specified user against an LDAP server, based on the existing configuration.

```
ldap_test [ fqdn=Fqdn ] user=UserName password=Password
```

Parameters

Name	Type	Description	Mandatory	Default
fqdn	N/A	FQDN of an LDAP server.	N	All servers
user	String	The username of the tested user.	Y	N/A
password	String	The password of the tested user.	Y	N/A

Example:

```
xcli.py ldap_test user=user1 password=pass1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **NO_LDAP_SERVERS_ARE_DEFINED**
  No LDAP servers are defined in the system
- **LDAP_SERVER_NOT_DEFINED**
  LDAP server *Server FQDN* is not defined in the system.
- **LDAP_IS_NOT_FULLY_CONFIGURED**
  LDAP is not fully configured
  Troubleshooting: Check your settings.
- **NO_LDAP_SERVERS_WITH_CERTIFICATE_ARE_DEFINED**
  No LDAP servers with an LDAP certificate are defined in the system
- **SSL_CERTIFICATE_HAS_EXPIRED_FOR_SERVER**
  SSL certificate of ldap server '*Server FQDN*' has expired on *Expiration Date*.
- **USER_IS_PREDEFINED_IN_THE_SYSTEM**
  User is predefined in the system

- **LOGIN_FAILURE_USER_CANNOT_BE_UNIQUELY_AUTHENTICATED_BY_LDAP_SERVER**
  User *User Name* was not uniquely authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_LDAP_SERVER_UNREACHABLE**
  No LDAP server can be reached.
- **LOGIN_FAILURE_XIV_USER_NOT_AUTHENTICATED_BY_LDAP_SERVER**
  XIV User '*XIV User*' was not authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_LDAP_SERVER_UNREACHABLE_OR_USER_NOT_FOUND**
  User *User Name* was not found in LDAP servers '*Servers FQDN*'.
- **LOGIN_FAILURE_INVALID_BASE_DN**
  The base dn of server '*Server FQDN*' is invalid.
- **LOGIN_FAILURE_USER_NOT_AUTHENTICATED_BY_LDAP_SERVER**
  User *User Name* was not authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_USER_HAS_NO_RECOGNIZED_ROLE**
  User *User Name* has no recognized LDAP role.
- **LOGIN_FAILURE_USER_HAS_MORE_THAN_ONE_RECOGNIZED_ROLE**
  User *User Name* has more than one recognized LDAP role.
- **LOGIN_FAILURE_USER_MISSING_ID_ATTRIBUTE**
  User *User Name* is missing the LDAP ID attribute '*Attribute*'.
- **LOGIN_FAILURE_USER_MISSING_GROUP_ATTRIBUTE**
  User *User Name* is missing the group attribute '*Attribute*'.
- **LOGIN_FAILURE_USER_NOT_FOUND_IN_LDAP_SERVERS**
  User *User Name* was not found in LDAP servers.
- **LDAP_ROLE_UNRECOGNIZED**
  LDAP role for user is not recognized in the system
- **LDAP_SERVER_NOT_FOUND**
  LDAP server with specified FQDN is not defined in the system
- **LDAP_AUTHENTICATION_IS_NOT_ACTIVE**
  LDAP authentication is not active

Listing LDAP configuration parameters

Use the **ldap_config_get** command to display system parameters that control user authentication against a specified LDAP server.

```
ldap_config_get
```

A successful execution of this command depends on connecting to a valid LDAP server.

The output of the command does not list LDAP servers. For the list of LDAP servers, use the **ldap_list_servers** command.

The **xiv_password** parameter is not listed.

Example:

```
ldap_config_get
```

Output:

```
Name                    Value
current_server
base_dn
version                 3
xiv_group_attrib
storage_admin_role
read_only_role
session_cache_period    20
bind_time_limit         20
user_id_attrib          objectSiD
first_expiration_event  30
second_expiration_event 14
third_expiration_event  7
use_ssl                 no
xiv_user
```

Field ID	Field output	Default position
name	Name	1
value	Value	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Configuring LDAP in the system

Use the **ldap_config_set** command to configure general system parameters that control user authentication against LDAP servers.

```
ldap_config_set [ user_name_attrib=LdapAttrib ] [ xiv_group_attrib=LdapAttrib ]
 [ storage_admin_role=LdapRole ] [ read_only_role=LdapRole ]
 [ security_admin_role=LdapRole ] [ storage_integration_admin_role=LdapRole ]
 [ use_ssl=<yes|no> ] [ user_id_attrib=LdapAttrib ] [ session_cache_period=Minutes ]
 [ bind_time_limit=Seconds ] [ first_expiration_event=Days ]
 [ second_expiration_event=Days ] [ third_expiration_event=Days ] [ version=LdapVersion ]
 [ xiv_user=LdapAttrib ] [ xiv_password=LdapAttrib ]
 [ server_type=<SUN DIRECTORY|MICROSOFT ACTIVE DIRECTORY|OPEN LDAP> ]
 [ group_search_depth=Depth ] [ group_search_max_queries=Number ]
 [ group_search_stop_when_found=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
user_name_attrib	String	User name attribute for queries. If not specified, it is set to `uid` for SUN Directory servers and `userPrincipalName` for Microsoft Active Directory servers.	N	According to server type
xiv_group_attrib	String	LDAP attribute designated to hold system-mapped roles.	N	none
storage_admin_role	String	LDAP value mapped to the Storage Administrator role. Multiple (up to 8) values are supported and must be separated with a semicolon (;). Multiple roles are not available for SUN Directory LDAP Servers.	N	none
read_only_role	String	LDAP value mapped to the Read Only role. Multiple (up to 8) values are supported and must be separated with a semicolon (;).	N	none
security_admin_role	String	LDAP value mapped to the Security Administrator role. Multiple (up to 8) values are supported and must be separated with a semicolon (;).	N	none
storage_integration_admin_role	String	LDAP value mapped to the Storage Integration Administrator role. Multiple (up to 8) values are supported and must be separated with a semicolon (;).	N	none

Name	Type	Description	Mandatory	Default
ops_admin_role	String	LDAP value mapped to the XIV operations administrator role. Multiple (up to 8) values are supported and must be separated using a semicolon (;)	N	none
xiv_host_ profiler_role	String	LDAP value mapped to the XIV host profiler role. Multiple (up to 8) values are supported and must be separated using a semicolon (;)	N	none
hsa_client_role	String	LDAP value mapped to the XIV host profiler role. Multiple (up to 8) values are supported and must be separated using a semicolon (;)	N	none
use_ssl	Boolean	Indicates whether secure LDAP is mandatory.	N	no
user_id_attrib	String	The LDAP attribute set to identify the user (in addition to user DN) when recording user operations in the event log.	N	objectSiD
session_cache_ period	Positive integer	Duration of keeping user credentials before attempting to re-login the user.	N	20
bind_time_limit	Positive integer	The duration after which the next LDAP server on the LDAP server list will be called.	N	0. If set to the default, the LDAP server is contacted for every command. Performance issues depend on its availability.
first_ expiration_ event	Positive integer	The number of days before the expiration of certificate, when the first alert is issued (severity: warning).	N	30/14/7 (third is smallest)

Name	Type	Description	Mandatory	Default
second_ expiration_ event	Positive integer	The number of days before the expiration of certificate, when the second alert is issued (severity: warning).	N	30/14/7 (third is smallest)
third_ expiration_ event	Positive integer	The number of days before the expiration of certificate, when the third alert is issued (severity: warning).	N	30/14/7 (third is smallest)
version	Positive integer	Version of LDAP used (only version 3 is supported).	N	3
xiv_user	String	The user for LDAP queries.	N	none
xiv_password	String	The password of user for LDAP queries.	N	none
server_type	Enumeration	Type of the LDAP server.	N	none
group_search_ depth	Positive integer	The depth of group hierarchy to search in.	N	0
group_search_ max_queries	Positive integer	Maximum number of group queries to perform per server.	N	39
group_search_ stop_when_found	Boolean	Stop the group search when a group match is found.	N	yes

LDAP access permissions are not enforced for predefined users. These predefined users are authenticated by the IBM storage system and not by LDAP even if LDAP authentication is enabled.

Predefined user names are:

- admin
- technician
- xiv_development
- xiv_maintenance
- xiv_hostprofiler
- hsa_client

When an LDAP user, whose user name is identical with a predefined name, attempts to log into the system with LDAP authentication enabled, access will normally be denied, because:

- the user is not authenticated against LDAP, but rather against the storage system
- the user's (LDAP) password most likely does not match the storage system password.

However, if the user attempts to log into the system using the password of the corresponding predefined user, he or she will be granted the rights of the corresponding predefined user regardless of LDAP settings (for example, the user's association with the Application Administrator role), because LDAP authentication for predefined users is not required.

Example:

```
ldap_config_set
base_dn version xiv_group_attrib
storage_admin_role read_only_role
session_cache_period bind_time_limit
use_ssl user_id_attrib first_expiration_event
second_expiration_event
third_expiration_event
xiv_user
xiv_password
server_type="SUN DIRECTORY"
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **LDAP_IS_NOT_FULLY_CONFIGURED**

  LDAP is not fully configured

  Troubleshooting: Check your settings.
- **LDAP_CONFIG_CHANGE_IS_ILLEGAL_WHEN_AUTHENTICATION_IS_ACTIVE**

  This LDAP configuration change is invalid when LDAP configuration is active

  Troubleshooting: Disable LDAP-based authentication and then change LDAP configuration.
- **LDAP_ROLE_ALREADY_USED**

  LDAP role is already in use in LDAP configuration or in a user group
- **NO_LDAP_SERVERS_WITH_CERTIFICATE_ARE_DEFINED**

  No LDAP servers with an LDAP certificate are defined in the system
- **INVALID_EXPIRATION_EVENT_DATES**

  Dates for expiration events must be in ascending order
- **LDAP_READ_ONLY_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP read only role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8

- **LDAP_ROLE_HAS_DUPLICATED_PARTS**

  LDAP role contains duplicated parts
- **LDAP_STORAGE_ADMIN_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP storage admin role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8
- **LDAP_SECURITY_ADMIN_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP security admin role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8
- **LDAP_STORAGE_INTEGRATION_ADMIN_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP storage integration admin role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8
- **LDAP_OPS_ADMIN_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP ops admin role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8
- **LDAP_XIV_HOST_PROFILER_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP xiv host_profiler role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8
- **LDAP_HSA_CLIENT_ROLE_HAS_WRONG_NUMBER_OF_PARTS**

  LDAP hsa_client role contains too many parts

  Troubleshooting: The role is divided to parts by ';' the number of parts should be between 0 and 8

Listing LDAP servers defined in the system

Use the **ldap_list_servers** command to list LDAP servers defined in the system.

```
ldap_list_servers  [ fqdn=Fqdn ]
```

Parameters

Name	Description	Mandatory	Default
fqdn	FQDN of a specific server to list.	N	All servers.

This command lists the LDAP servers defined in the system along with their type description and the indication whether they are mandatory.

Example:

```
ldap_list_servers fqdn
```

Output:

```
<code value="SUCCESS"/>
        <empty_table_message value="No LDAP servers are defined in the system"/>
        <last_change_index value="367896"/>
        <status value="0"/>
        <status_str value="Command completed successfully"/>
```

Field ID	Field output	Default position
fqdn	FQDN	1
address	Address	2
base_dn	Base DN	3
has_certificate	Has Certificate	4
expiration_date	Expiration Date	5
valid_certificate	Valid Certificate	N/A
accessible	Accessible	N/A
port	Port	6
secure_port	Secure Port	7

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Listing LDAP server users

Use the **ldap_user_list** command to list LDAP server users.

```
ldap_user_list role=Category [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
role	Enumeration	The role of the users to be retrieved from the LDAP server. The available roles are: storageadmin and readonly.	Y	N/A
domain	Object name	The domain name.	N	All Domains

This command retrieves a list of users from the LDAP server by a specific role.

Field ID	Field output	Default position
user_name	User Name	1
user_role	Role	2

Example:

```
ldap_user_list role=storageadmin
```

Output:

```
User Name       Role
--------------- -----------
readonly_user   Read Only
restldapread    Read Only
test_readonly   Read Only
xivreadonly     Read Only
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **LDAP_AUTHENTICATION_IS_NOT_ACTIVE**
  LDAP authentication is not active
- **LDAP_IS_NOT_FULLY_CONFIGURED**
  LDAP is not fully configured
  Troubleshooting: Check your settings.
- **NO_LDAP_SERVERS_ARE_DEFINED**
  No LDAP servers are defined in the system
- **NO_LDAP_SERVERS_WITH_CERTIFICATE_ARE_DEFINED**
  No LDAP servers with an LDAP certificate are defined in the system
- **LOGIN_FAILURE_XIV_USER_NOT_AUTHENTICATED_BY_LDAP_SERVER**
  XIV User '*XIV User*' was not authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_LDAP_SERVER_UNREACHABLE**
  No LDAP server can be reached.
- **LOGIN_FAILURE_INVALID_BASE_DN**
  The base dn of server '*Server FQDN*' is invalid.

Listing LDAP-based authentication mode

Use the **ldap_mode_get** command to list LDAP-based authentication mode.

```
ldap_mode_get
```

The command succeeds regardless of whether the LDAP server is accessible.

Example:

```
ldap_mode_get
```

Output:

```
Mode
Inactive
```

Field ID	Field output	Default position
mode	Mode	1

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Enabling or disabling LDAP-based authentication mode

Use the **ldap_mode_set** command to enable or disable LDAP-based authentication mode.

```
ldap_mode_set  mode=Mode
```

Parameters

Name	Type	Description	Mandatory
mode	Boolean	The required state of LDAP authentication. Available values: Active, Inactive.	Y

Example:

```
ldap_mode_set mode=active
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_ENABLE_LDAP_AUTHENTICATION**
  Are you sure you want to enable LDAP authentication?
- **ARE_YOU_SURE_YOU_WANT_TO_DISABLE_LDAP_AUTHENTICATION**
  Are you sure you want to disable LDAP authentication?

Return codes

- **LDAP_IS_NOT_FULLY_CONFIGURED**
  LDAP is not fully configured
  Troubleshooting: Check your settings.
- **NO_LDAP_SERVERS_WITH_CERTIFICATE_ARE_DEFINED**
  No LDAP servers with an LDAP certificate are defined in the system
- **NO_LDAP_SERVERS_ARE_DEFINED**
  No LDAP servers are defined in the system

Updating an LDAP server definition

Use the **ldap_update_server** command to update an existing server configuration.

```
ldap_update_server  fqdn=Fqdn [ address=Address ] [ base_dn=LdapDn ]  [ port=PortNum ]
[ secure_port=PortNum ] [ certificate=PemCertificate | remove_certificate=<no|yes> ]
```

Parameters

Name	Type	Description	Mandatory	Default
fqdn	N/A	FQDN of the LDAP server.	Y	N/A
address	N/A	IP address of the LDAP server.	N	none
certificate	N/A	The content of a `.pem` file, with asterisks (`*`) instead of newlines. In Windows, drag-and-drop the `.pem` file from the Windows Explorer to the appropriate location in the XCLI session window; the content will be added automatically.	N	no certificate
remove_ certificate	Boolean	Defines whether to remove the certificate.	N	no

Name	Type	Description	Mandatory	Default
base_dn	N/A	Base_DN of the LDAP directory.	N	none
port	Integer	The port number.	N	none
secure_port	Integer	The secure port number.	N	none

Example:

```
ldap_update_server fqdn=ldap.example.com address=1.2.3.4
remove_certificate=yes
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_UPDATE_LDAP_SERVER**
  Are you sure you want to update the LDAP server configuration?

Return codes

- **LDAP_SERVER_NOT_FOUND**
  LDAP server with specified FQDN is not defined in the system
- **ADDRESS_CURRENTLY_ASSOCIATED_WITH_ANOTHER_LDAP_SERVER**
  The specified IP address is currently associated with another LDAP server
- **NO_UPDATE_PARAMETERS_SPECIFIED**
  No LDAP server parameters were specified for update
- **SSL_CERTIFICATE_CHAIN_EMPTY**
  No certificates found in input.
- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.

- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.

Removing an LDAP server definition

Use the **ldap_remove_server** command to remove an LDAP server definition.

```
ldap_remove_server  fqdn=Fqdn
```

Parameters

Name	Description	Mandatory
fqdn	FQDN of the server to remove.	Y

Example:

```
ldap_remove_server fqdn=cloud.xivldap2.com
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_REMOVE_LDAP_SERVER**
  Are you sure you want to remove LDAP server?

Return codes

- **LDAP_SERVER_NOT_FOUND**
  LDAP server with specified FQDN is not defined in the system
- **LDAP_IS_ACTIVE_BUT_THIS_IS_THE_LAST_SERVER**
  Deleting the last LDAP server is illegal when LDAP authentication is active
- **LDAP_USES_SSL_BUT_THIS_IS_THE_LAST_SERVER_WITH_CERTIFICATE**
  Deleting the last LDAP server which has a valid SSL certificate is illegal when LDAP authentication is active and uses SSL

Launching the ldapsearch utility

Use the **ldap_search** command to launch the ldapsearch utility.

```
ldap_search  user=UserName fqdn=Fqdn [ second_cmd=<yes|no> password=Password ]
```

Parameters

Name	Type	Description	Mandatory	Default
user	Object name	The username to search for.	Y	N/A
password	N/A	The user password to search for.	N	empty
second_cmd	Boolean	Defines whether to invoke the second lsearch command.	N	no
fqdn	N/A	FQDN of LDAP server to query.	Y	N/A

There are 2 LDAP search commands executed in the authentication process. The second one can be issued by setting the **second_cmd** parameter to yes.

Example:

```
ldap_search fqdn user password
```

Output:

```
Name           Index   Value
-------------- ------- -----------------------------------------------------
command_line   0       ldapsearch -H ldap://ldapwin2003.xivldap2.com:389...
returncode     0       0
stderr         0
stdout         0       dn: CN=employee,CN=Users,DC=xivldap2,DC=com
stdout         1       description: Group One
stdout         2       objectSid:: AQUAAAAAAAUVAAAAYcKhSnhmt01IPSuAbQQAAA==
stdout         3
stdout         4
```

Field ID	Field output	Default position
name	Name	1
index	Index	2
value	Value	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **LOGIN_FAILURE_USER_NOT_AUTHENTICATED_BY_LDAP_SERVER**
  User *User Name* was not authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_USER_MISSING_GROUP_ATTRIBUTE**
  User *User Name* is missing the group attribute '*Attribute*'.
- **LDAP_SERVER_NOT_FOUND**
  LDAP server with specified FQDN is not defined in the system
- **LOGIN_FAILURE_LDAP_SERVER_UNREACHABLE**
  No LDAP server can be reached.
- **LDAP_SERVER_NOT_DEFINED**
  LDAP server *Server FQDN* is not defined in the system.
- **LDAP_ROLE_UNRECOGNIZED**
  LDAP role for user is not recognized in the system
- **LOGIN_FAILURE_USER_HAS_NO_RECOGNIZED_ROLE**
  User *User Name* has no recognized LDAP role.
- **LOGIN_FAILURE_USER_CANNOT_BE_UNIQUELY_AUTHENTICATED_BY_LDAP_SERVER**
  User *User Name* was not uniquely authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_XIV_USER_NOT_AUTHENTICATED_BY_LDAP_SERVER**
  XIV User '*XIV User*' was not authenticated by LDAP server '*Server FQDN*'.
- **LOGIN_FAILURE_USER_HAS_MORE_THAN_ONE_RECOGNIZED_ROLE**
  User *User Name* has more than one recognized LDAP role.
- **LOGIN_FAILURE_USER_MISSING_ID_ATTRIBUTE**
  User *User Name* is missing the LDAP ID attribute '*Attribute*'.
- **USER_IS_PREDEFINED_IN_THE_SYSTEM**
  User is predefined in the system
- **LOGIN_FAILURE_INVALID_BASE_DN**
  The base dn of server '*Server FQDN*' is invalid.
- **LDAP_AUTHENTICATION_IS_NOT_ACTIVE**
  LDAP authentication is not active

Revoking an authorized SSH key

Use the **ssh_revoke_key** command to revoke an (optionally given) authorized SSH key for an (optionally given) Unix account.

```
ssh_revoke_key [ user=AccountName ] [ key_tail=EndOfTheKey ]
```

Parameters

Name	Type	Description	Mandatory	Default
user	String	Unix account for which the key will be revoked.	N	root
key_tail	String	The end of the key to be revoked.	N	none

Example:

```
ssh_revoke_key
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SYSTEM_DOES_NOT_HAVE_FREE_MEM**

  The system does not have enough free memory to execute the command.

Defining a new user

Use the **user_define** command to define a new user.

```
user_define user=UserName password=Password password_verify=Password
 category=Category
[ email_address=email ]
[ area_code=AreaCode number=PhoneNumber ]
[ domain=DomainList [ exclusive=<yes|no> ] ]
```

Parameters

Name	Type	Description	Mandatory	Default
user	Object name	User name. User names are lower case.	Y	N/A
password	N/A	Password of the user to be created. The password must have between 6 and 12 characters consisting of: a-z. A-Z or 0-9. Password is case sensitive.	Y	N/A
password_verify	N/A	Password verification, which must be equal to the value of password.	Y	N/A

Name	Type	Description	Mandatory	Default
category	Enumeration	The role of the user to be created. Available roles: storageadmin, applicationadmin, operationsadmin, securityadmin, readonly and opsadmin.	Y	N/A
email_address	N/A	Email address of this user. The email address specified here can be used for event notification. Entering this address is optional. The email address format is any legal email address.	N	N/A
number	N/A	Cellular phone number of the user for event notification via SMS, excluding the area code. Phone numbers and area codes can be a maximum of 63 digits, dashes (-) and periods (.)	N	N/A
area_code	N/A	Area code of the cellular phone number of the user. Phone numbers and area codes can be a maximum of 63 digits, dashes (-) and periods (.)	N	N/A
domain	N/A	The cluster will be attached to the specified domains. To specify more than one domain, separate them with a comma. To specify all existing domains, use "*".	N	none
exclusive	Boolean	Use yes to restrict the user to domain's objects.	N	yes

Email address and phone number are optional and can be used for event notification. The category (user role) may be only one of those specified above (other categories contain only a single predefined user).

The maximum number of users is 128.

Two predefined users are set system-wide: Admin and Technician.

Example:

```
user_define user=xiv_user1 password=s0mePassw0rd password_verify=s0mePassw0rd
category=applicationadmin
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_NAME_ALREADY_EXISTS**
  User name already exists
- **MAX_USERS_REACHED**
  Maximum number of users already defined
- **PASSWORDS_DO_NOT_MATCH**
  Passwords must be identical
- **USER_PHONE_NUMBER_MUST_ACCOMPANY_AREA_CODE**
  Phone numbers and area code must be defined together
- **LDAP_AUTHENTICATION_IS_ACTIVE**
  Command is not available while LDAP authentication is active
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **NON_EXCLUSIVE_USER_NOT_SECURITY_ADMIN**
  Only a security admin can add a user to a domain non-exclusively.
- **USER_CANNOT_BE_ADDED_TO_A_DOMAIN**
  Specified user cannot be associated with a domain.
- **SIA_MUST_BE_ASSOCIATED_WITH_A_DOMAIN**
  The Storage Integration Administrator must be associated with a domain.

Deleting a user

Use the **user_delete** command to delete a user.

```
user_delete user=UserName
```

Parameters

Name	Type	Description	Mandatory
user	Object name	User to be deleted.	Y

Existing objects created by this user will retain an empty user reference after the user has been deleted.

Two predefined users are set system-wide: Admin and Technician. Predefined users cannot be deleted or renamed.

Example:

```
user_delete user=user1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **LDAP_AUTHENTICATION_IS_ACTIVE**
  Command is not available while LDAP authentication is active
- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **USER_CANNOT_BE_DELETED**
  User cannot be deleted
- **USER_IS_REFERRED_TO_BY_DEST**
  User is referred to by an event destination and therefore cannot be deleted
- **USER_OWNS_RECOVERY_KEY**
  User owns recovery key and therefore cannot be deleted or renamed
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_USER_AND_USERGROUP**
  The operation would result in a user referring to user group that's not in its domain. First remove the reference explicitly.

Adding users to user groups

Use the **user_group_add_user** command to add a user to a user group.

```
user_group_add_user user_group=UserGroup user=UserName
```

Parameters

Name	Type	Description	Mandatory
user_group	Object name	User group into which the user is to be added.	Y
user	Object name	User to be added to the user group.	Y

A user group can contain up to eight users.

A user may belong to only one user group.

Only users defined as Application Administrators can be assigned to a group.

This command fails when the user already belongs to the user group.

Example:

```
user_group_add_user user_group=ug1 user=user1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist
- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **USER_ALREADY_INCLUDED_IN_ANOTHER_GROUP**
  User is included in another user group
- **USER_GROUP_ALREADY_INCLUDES_USER**
  User group already includes user
- **ONLY_APPLICATION_ADMIN_USERS_CAN_BE_GROUPED**
  User groups can only contain application administrators
- **USER_GROUP_HAS_MAXIMUM_NUMBER_OF_USERS**
  User group already has the maximum number of users
- **LDAP_AUTHENTICATION_IS_ACTIVE**
  Command is not available while LDAP authentication is active

Creating user groups

Use the **user_group_create** command to create a user group.

```
user_group_create user_group=UserGroup [ access_all=<yes|no> ]   [ ldap_role=LdapRole ]
 [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
user_group	Object name	Name of the user group to be created.	Y	N/A
access_all	Boolean	Allows application administrators to perform their specified operations on all volumes and not just on a subset of the specific volumes.	N	no
ldap_role	String	The value representing the user group in LDAP.	N	[none]
domain	N/A	The user_group will be attached to the specified domains. To specify more than one domain, separate them with a comma. To specify all the existing domains, use "*".	N	none

A user group is a group of application administrators who share the same set of snapshot creation limitations. After user groups are created, the limitations of all the users in a user group can be updated with a single command. These limitations are enforced by associating the user groups with hosts or clusters.

Storage administrators create user groups and control the various application administrator's permissions. Hosts and clusters can be associated with only a single user group. When a user belongs to a user group that is associated with a host, it is possible to manage snapshots of the volumes mapped to that host.

User groups have the following limitations:

- Only users who are defined as application administrators can be assigned to a group.
- A user can belong to only a single user group.
- A user group can contain up to eight users.

User and host associations have the following properties:

- User groups can be associated with both hosts and clusters. This allows limiting application administrator access to specific volumes.

- A host that is part of a cluster cannot also be associated with a user group.
- When a host is added to a cluster the host's associations are broken. Limitations on the management of volumes mapped to the host is controlled by the cluster's association.
- When a host is removed from a cluster, the host's associations become the cluster 's associations, this allows continued mapping of operations so that all scripts continue to work.

Application administrator access level:

- The **access_all** parameter can be specified for application administrators only. When it is specified, it means that the user has an application administrator access level to all volumes, and can perform operations on all volumes and not just on a subset of the specific volume.

Example:

```
user_group_create user_group=ug1 ldap_role="App Admin 1" access_all=yes
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_GROUP_NAME_ALREADY_EXISTS**
  User group name already exists
- **MAX_USER_GROUPS_REACHED**
  Maximum number of user groups already defined
- **LDAP_ROLE_ALREADY_USED**
  LDAP role is already in use in LDAP configuration or in a user group
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Deleting a user group

Use the **user_group_delete** command to delete a user group.

```
user_group_delete user_group=UserGroup
```

Parameters

Name	Type	Description	Mandatory
user_group	Object name	User group to be deleted.	Y

A user group can be deleted, even when it is associated with hosts or clusters. It can be deleted while in LDAP Authentication mode.

A user group can be deleted, even when it contains users. Deleting the user group does not delete the users contained in this group.

Example:

```
user_group_delete user_group=ug1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_LDAP_USER_GROUP**

  One or more LDAP users might be associated to user group. Are you sure you want to delete this user group?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_USER_GROUP**

  Are you sure you want to delete user group?
- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_POPULATED_USER_GROUP**

  One or more internal users are associated to user group. Are you sure you want to delete this user group?

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**

  User group name does not exist

Listing user groups

Use the **user_group_list** command to list all user groups or a specific one.

```
user_group_list [ user_group=UserGroup ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
user_group	Object name	The user group to be listed.	N	All user groups.
domain	Object name	The domain name.	N	All Domains

All the users included in the user group are listed.

Field ID	Field output	Default position
name	Name	1
access_all	Access All	2
ldap_role	LDAP Role	3
users	Users	4
creator	Creator	N/A

Example:

```
user_group_list
```

Output:

```
Name        Access All   LDAP Role   Users
myug1       yes          Group1
myOtherUG   yes          OtherGroup
ug1         yes          App Admin 1
ug2         yes          App Admin 2
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Removing a user from a user group

Use the **user_group_remove_user** command to remove a user from a user group.

```
user_group_remove_user user_group=UserGroup user=UserName
```

Parameters

Name	Type	Description	Mandatory
user_group	Object name	User group.	Y
user	Object name	User to be removed.	Y

This command fails when the user does not belong to the user group.

Deleting the user group's mapping is done by removing the role association. The user group itself is not deleted.

Example:

```
user_group_remove_user user_group=ug1 user=user1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_REMOVE_USER**
  Are you sure you want to remove user from user group?

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist
- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **USER_GROUP_DOES_NOT_INCLUDE_USER**
  User group does not include user
- **LDAP_AUTHENTICATION_IS_ACTIVE**
  Command is not available while LDAP authentication is active

Renaming user groups

Use the **user_group_rename** command to rename a user group.

```
user_group_rename user_group=UserGroup new_name=Name
```

Parameters

Name	Type	Description	Mandatory
user_group	Object name	User group to be renamed.	Y
new_name	Object name	New name of the user group.	Y

Example:

```
user_group_rename user_group=ug1 new_name=ug2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist
- **USER_GROUP_NAME_ALREADY_EXISTS**
  User group name already exists

Updating a user group

Use the **user_group_update** command to update a user group.

```
user_group_update  user_group=UserGroup [ ldap_role=LdapRole ] [ access_all=<yes|no> ]
 [ domain=DomainList ]
```

Parameters

Name	Type	Description	Mandatory	Default
user_group	Object name	The name of the user group to be updated.	Y	N/A
ldap_role	String	The value representing the user group in LDAP.	N	Keep current LDAP role.
access_all	Boolean	Assigns application administration access level for all volumes.	N	no

Name	Type	Description	Mandatory	Default
domain	N/A	The user_group will be attached to the specified domains. To specify more than one domain, separate them with a comma. To specify all the existing domains, use "*".	N	none

Example:

```
user_group_update user_group=ug1 ldap_role="App Admin 1" access_all=yes
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_GROUP_NAME_DOES_NOT_EXIST**

  User group name does not exist
- **LDAP_ROLE_ALREADY_USED**

  LDAP role is already in use in LDAP configuration or in a user group
- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_HOST_AND_USERGROUP**

  The operation would result in a host referring to user group that's not in its domain. First remove the reference explicitly.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_CLUSTER_AND_USERGROUP**

  The operation would result in a cluster referring to user group that's not in its domain. First remove the reference explicitly.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_USER_AND_USERGROUP**

  The operation would result in a user referring to user group that's not in its domain. First remove the reference explicitly.

Listing users

Use the **user_list** command to list all users or a specific user.

```
user_list [ user=UserName | show_users=<all|active> ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
user	Object name	The user to be listed.	N	All users.
show_users	Enumeration	Indicates whether all internal users will be listed, or only internal users that are active.	N	active
domain	Object name	The domain name.	N	All Domains

The following information is listed:

- User name: Lower case
- Category
- Email address
- Phone number
- Phone area code
- Containing user group

Passwords are not shown in the list.

Field ID	Field output	Default position
name	Name	1
category	Category	2
group	Group	3
active	Active	4
email_address	Email Address	5
area_code	Area Code	6
number	Phone Number	7
access_all	Access All	8
id	ID	N/A
creator	Creator	N/A
creator_category	Creator Category	N/A

Example:

```
user_list
```

Output:

```
Name              Category          Group
xiv_development   xiv_development           yes
xiv_maintenance   xiv_maintenance           yes
admin             storageadmin              yes
technician        technician                yes
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Renaming users

Use the **user_rename** command to rename a user.

```
user_rename user=UserName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
user	Object name	The user to be renamed. User names are lowercase.	Y
new_name	Object name	New name of the user.	Y

This command renames a user.

Example:

```
user_rename user=admin new_name=storage_admin
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **USER_NAME_ALREADY_EXISTS**
  User name already exists
- **USER_CANNOT_BE_RENAMED**
  User cannot be renamed
- **LDAP_AUTHENTICATION_IS_ACTIVE**
  Command is not available while LDAP authentication is active
- **USER_OWNS_RECOVERY_KEY**
  User owns recovery key and therefore cannot be deleted or renamed
- **OPERATION_NOT_ALLOWED_ON_DESIGNATED_MSM_USER**
  Designtated MSM user cannot be renamed and cannot be exclusively associated with a domain.

Updating a user definition

Use the**user_update** command to update a user definition.

```
user_update user=UserName [ password=Password password_verify=Password ]

 [ email_address=email ] [ area_code=AreaCode ]
 [ number=PhoneNumber ]
 [ exclusive=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
user	Object name	The name of the user to be updated. User names are lower case.	Y	N/A
password	N/A	New password. Users can only change their own passwords. The password consists of 6-12 characters, comprised of a-z, A-Z and 0-9, and is case sensitive.	N	Retains the current password.
password_verify	N/A	Verification of the password: Must be equal to the password.	N	Retains the current password.
email_address	N/A	Email address of this user (for event notification).	N	Leaves the current email address.
number	N/A	Cellular phone number of the user (for event notification via SMS) excluding the area code.	N	Leaves the current number.

Name	Type	Description	Mandatory	Default
area_code	N/A	Area code of the cellular phone number of the user.	N	Leaves the current area code.
exclusive	Boolean	This parameter can be set only by security administrator. If set to "yes", the user will be removed from the global domain. If set to "no", the user will get permissions on the global domain.	N	Leaves the current value.

A user with the predefined password `admin` can change the passwords of other users. The category (role) of a user cannot be changed. The user Technician does not require a phone number or email address. Limitations on password changes are as follows:

- Any user can change his/her own password.
- The predefined admin user can change all passwords, excluding the user Technician.
- Passwords are case sensitive.

Example:

```
user_update user=admin password=Passw0rd password_verify=Passw0rd
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Conditionally Allowed	A user other than admin may only change its own configuration.
Application administrator	Conditionally Allowed	A user of this category may only change its own configuration.
Security administrator	Conditionally Allowed	A user of this category may only change its own configuration.
Read-only users	Conditionally Allowed	A user other than admin may only change its own configuration.
Operations administrator	Conditionally Allowed	A user of this category may only change its own configuration.
Host side accelerator client	Disallowed	N/A

Return codes

- **USER_NAME_DOES_NOT_EXIST**

  User name does not exist
- **PASSWORDS_DO_NOT_MATCH**

  Passwords must be identical
- **USER_PHONE_NUMBER_MUST_ACCOMPANY_AREA_CODE**

  Phone numbers and area code must be defined together
- **ADMIN_CAN_NOT_CHANGE_TECHNICIAN_USER**

  Administrators cannot change the details of the technician user
- **SMS_DESTINATION_REFERS_TO_USER**

  An SMS destination refers to the user and therefore it must have a phone number and an area code
- **EMAIL_DESTINATION_REFERS_TO_USER**

  An email destination refers to the user and therefore it must have an email address
- **USER_NOT_ALLOWED_TO_CHANGE_OTHER_USERS**

  This user is not allowed to change the details of other users
- **USER_NOT_ALLOWED_TO_HAVE_PHONE_NUMBER**

  User not allowed to have phone number
- **USER_NOT_ALLOWED_TO_HAVE_EMAIL_ADDRESS**

  User not allowed to have email address
- **USER_NOT_ALLOWED_TO_CHANGE_PASSWORDS**

  This user cannot change passwords of other users
- **USER_CANNOT_BE_UPDATED_WHILE_LDAP_AUTHENTICATION_IS_ACTIVE**

  User cannot be updated while LDAP authentication is active
- **NON_EXCLUSIVE_USER_NOT_SECURITY_ADMIN**

  Only a security admin can add a user to a domain non-exclusively.
- **PREDEFINED_USER_CANNOT_BE_RESTRICTED_TO_DOMAIN**

  Specified user cannot be exclusively associated with a domain.
- **SIA_MUST_BE_ASSOCIATED_WITH_A_DOMAIN**

  The Storage Integration Administrator must be associated with a domain.
- **USER_IS_REFERRED_TO_BY_DEST**

  User is referred to by an event destination and therefore cannot be deleted
- **OPERATION_NOT_ALLOWED_ON_DESIGNATED_MSM_USER**

  Designtated MSM user cannot be renamed and cannot be exclusively associated with a domain.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_USER_AND_USERGROUP**

  The operation would result in a user referring to user group that's not in its domain. First remove the reference explicitly.

Creating a new domain

Use the **domain_create** command to create a domain.

```
domain_create domain=DomainName [ size=GB ] [ max_pools=MaxPools ]
 [ max_volumes=MaxVolumes ] [ max_cgs=MaxCGs ] [ max_mirrors=MaxMirrors ]
 [ max_dms=MaxDataMigrations ] [ perf_class=perfClassName ] [ ldap_id=LdapRole ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	The name of the domain to be created.	Y	N/A
hard_capacity	Integer	Defines the sum of the hard sizes of all the pools associated with the domain, in gigabytes.	N	0
soft_capacity	Integer	Defines the sum of the soft sizes of all the pools associated with the domain, in gigabytes.	N	0
max_pools	Positive integer	The maximum number of pools that can be associated with this domain.	N	0
max_volumes	Positive integer	The maximum number of volumes that can be associated with all the pools in this domain.	N	0
max_cgs	Integer	The maximum number of consistency groups that can be associated with this domain.	N	512
max_mirrors	Positive integer	The maximum number of mirrors that can be associated with this domain.	N	0
max_dms	Positive integer	The maximum number of data migrations that can be associated with this domain.	N	0
perf_class	Object name	Name of a performance class.	N	none
ldap_id	String	The name to be associated with this domain in LDAP.	N	The domain name
allow_ssd_caching	Boolean	States whether SSD caching for the domain volumes is allowed.	N	yes

Example:

```
domain_create domain=d1 size=1000
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **DO_YOU_WANT_TO_SHARE_LDAP_ID**
  The specified ldap_id is already in use, Are you sure you want to share the same ldap_id?

Return codes

- **SOFT_SIZE_SMALLER_THAN_HARD_SIZE**
  Soft size must be equal or larger than hard size
- **DOMAIN_ALREADY_EXISTS**
  A domain with this name already exists.
- **DOMAIN_MAX_REACHED**
  The maximum number of domain objects was reached.
- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist
- **DOMAIN_INVALID_CAPACITY**
  Only soft or hard capacity were defined.
- **DOMAIN_INSUFFICIENT_HARD_CAPACITY**
  There is not enough hard capacity available for the domain.
- **DOMAIN_INSUFFICIENT_SOFT_CAPACITY**
  There is not enough soft capacity available for the domain.
- **DOMAIN_INSUFFICIENT_VOLUMES**
  There are not enough volumes available for the domain.
- **DOMAIN_INSUFFICIENT_POOLS**
  There are not enough pools available for the domain.
- **DOMAIN_INSUFFICIENT_CGS**
  There are not enough cons groups available for the domain.
- **DOMAIN_INSUFFICIENT_MIRRORS**
  There are not enough mirrors available for the domain.
- **DOMAIN_INSUFFICIENT_DMS**
  There are not enough data migration available for the domain.
- **PERF_CLASS_ASSOCIATED_WITH_HOSTS**
  Performance Class *Performance Class* is already in use by host.

Updating a domain definition

Use the **domain_update** command to update a domain definition.

```
domain_update domain=DomainName [ size=GB ] [ max_pools=MaxPools ]
 [ max_volumes=MaxVolumes ] [ max_cgs=MaxCGs ] [ max_mirrors=MaxMirrors ]
 [ max_dms=MaxDataMigrations ] [ perf_class=perfClassName ] [ ldap_id=LdapRole ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	The name of the domain to be updated.	Y	N/A
hard_capacity	Integer	Defines the sum of the hard sizes of all the pools associated with the domain, in gigabytes.	N	Current value.
soft_capacity	Integer	Defines the sum of the soft sizes of all the pools associated with the domain, in gigabytes.	N	Current value.
max_pools	Positive integer	The maximum number of pools that can be associated with this domain.	N	Current value.
max_volumes	Positive integer	The maximum number of volumes that can be associated with all the pools in this domain.	N	Current value.
max_cgs	Integer	The maximum number of consistency groups that can be associated with this domain.	N	Current value.
max_mirrors	Positive integer	The maximum number of mirrors that can be associated with this domain.	N	Current value.
max_dms	Positive integer	The maximum number of data migrations that can be associated with this domain.	N	Current value.
perf_class	Object name	Name of a performance class.	N	Current value.
ldap_id	String	The name to be associated with this domain in LDAP.	N	Current value.

Name	Type	Description	Mandatory	Default
allow_ssd_caching	Boolean	Do we allow SSD caching for domain volumes?	N	Current value.

Example:

```
domain_update domain=d1 size=10000 max_pools=5 max_volumes=100
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **DO_YOU_WANT_TO_SHARE_LDAP_ID**

  The specified ldap_id is already in use, Are you sure you want to share the same ldap_id?

Return codes

- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.
- **PERF_CLASS_BAD_NAME**

  Performance Class does not exist
- **DOMAIN_MAX_HARD_CAPACITY_TOO_SMALL**

  The domain already has more than the specified number of hard capacity.
- **DOMAIN_MAX_SOFT_CAPACITY_TOO_SMALL**

  Domain already has more than the specified number of soft capacity.
- **SOFT_SIZE_SMALLER_THAN_HARD_SIZE**

  Soft size must be equal or larger than hard size
- **DOMAIN_MAX_VOLUMES_TOO_SMALL**

  Domain already has more than the specified number of volumes.
- **DOMAIN_MAX_MIRRORS_TOO_SMALL**

  Domain already has more than the specified number of mirrors.
- **DOMAIN_MAX_DMS_TOO_SMALL**

  Domain already has more than the specified number of data migrations.
- **DOMAIN_MAX_CGS_TOO_SMALL**

  Domain already has more than the specified number of consistency groups.

- **DOMAIN_MAX_POOLS_TOO_SMALL**
  Domain already has more than the specified number of pools.
- **DOMAIN_INVALID_CAPACITY**
  Only soft or hard capacity were defined.
- **DOMAIN_INSUFFICIENT_HARD_CAPACITY**
  There is not enough hard capacity available for the domain.
- **DOMAIN_INSUFFICIENT_SOFT_CAPACITY**
  There is not enough soft capacity available for the domain.
- **DOMAIN_INSUFFICIENT_VOLUMES**
  There are not enough volumes available for the domain.
- **DOMAIN_INSUFFICIENT_POOLS**
  There are not enough pools available for the domain.
- **DOMAIN_INSUFFICIENT_MIRRORS**
  There are not enough mirrors available for the domain.
- **DOMAIN_INSUFFICIENT_CGS**
  There are not enough cons groups available for the domain.
- **DOMAIN_INSUFFICIENT_DMS**
  There are not enough data migration available for the domain.
- PERF_CLASS_ASSOCIATED_WITH_HOSTS
  Performance Class *Performance Class* is already in use by host.

Renaming a domain

Use the **domain_rename** command to rename a domain.

```
domain_rename domain=DomainName new_name=Name
```

Parameters

Name	Type	Description	Mandatory
new_name	Object name	Name of the domain.	Y
domain	Object name	New name of the domain.	Y

Example:

```
domain_rename domain=domain1 new_name=domain2
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_ALREADY_EXISTS**
  A domain with this name already exists.
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Deleting a domain

Use the **domain_delete** command to delete a domain.

```
domain_delete domain=DomainName
```

Parameters

Name	Type	Description	Mandatory
domain	Object name	The name of the domain to delete.	Y

Example:

```
domain_delete domain=domain1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DELETE_DOMAIN**
  Are you sure you want to delete the domain *Domain*?

Return codes

- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

- **DOMAIN_HAS_POOL**
  One or more pools are still in the domain.
- **DOMAIN_HAS_USER_GROUP**
  One or more user groups are associated with this domain.
- **DOMAIN_HAS_USER**
  One or more users are associated with this domain.
- **DOMAIN_HAS_SCHEDULE**
  One or more schedules are associated with this domain.
- **DOMAIN_HAS_DEST**
  One or more destinations are associated with this domain.
- **DOMAIN_HAS_DESTGROUP**
  One or more destination groups are associated with this domain.

Listing domains

Use the **domain_list** command to list all domains or the specified one.

```
domain_list [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	Name of a domain.	N	All domains.

When the **domain** parameter is provided, only the specified domain is listed.

Example:

```
domain_list domain=d1
```

Output:

```
Tabular output

Name       DN         Soft   Free Soft   Hard   Free Hard
Domain1    Domain1    1703   0           1703   0
Domain2    Domain2    1703   1703        1703   1703
Domain3    Domain3    1703   1600        1703   1600
Domain4    Domain4    1703   1703        1703   1703
Domain5    Domain5    1703   1703        1703   1703

XML output
<domain id="4e414e00000">
 <id value="4e414e00000"/>
 <name value="Domain1"/>
 <hard_capacity value="1703"/>
 <soft_capacity value="1703"/>
 <free_soft_capacity value="0"/>
 <free_hard_capacity value="0"/>
 <max_pools value="25"/>
 <used_pools value="1"/>
 <max_volumes value="100"/>
 <used_volumes value="2"/>
 <max_cgs value="100"/>
 <used_cgs value="1"/>
 <max_sync_mirrors value="70"/>
 <used_sync_mirrors value="0"/>
 <ax_async_mirrors value="70"/>
 <used_async_mirrors value="0"/>
 <perf_class_uid value="50713d00000"/>
 <perf_class value="QoS1"/>>
 <dn value="Domain1"/>
</domain>
```

Field ID	Field output	Default position
name	Name	1
ldap_id	LDAP ID	2
soft_capacity	Soft	3
soft_capacity_MiB	Soft (MiB)	N/A
free_soft_capacity	Free Soft	4
free_soft_capacity_MiB	Free Soft (MiB)	N/A
used_soft_capacity	Used Soft	5
used_soft_capacity_MiB	Used Soft (MiB)	N/A
hard_capacity	Hard	6
hard_capacity_MiB	Hard (MiB)	N/A
free_hard_capacity	Free Hard	7
free_hard_capacity_MiB	Free Hard (MiB)	N/A
used_hard_capacity	Used Hard	8
used_hard_capacity_MiB	Used Hard (MiB)	N/A
max_pools	Max Pools	9
used_pools	Pools	10
max_volumes	Max Volumes	11
used_volumes	Volumes	12
max_mirrors	Max Mirrors	13
used_mirrors	Mirrors	14
max_dms	Max Data Migrations	15
used_dms	Data Migrations	16
max_cgs	Max CGs	17
used_cgs	CGs	18

Field ID	Field output	Default position
perf_class	Performance Class	19
allow_ssd_caching	Allow SSD Caching	20
managed	Managed	21
max_gps	Max Grouped Pools	N/A
used_gps	Grouped Pools	N/A
id	ID	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Listing users per domain

Use the **domain_list_users** command to list users associated with domain(s).

```
domain_list_users  [ domain=DomainName ] [ user=UserName ] [ category=Category ]
[ show_users=<all|active> ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	Name of a domain.	N	All domains.
user	Object name	Name of a user.	N	All users.
category	Enumeration	The roles of the users to be listed. Available options are: storageadmin, readonly, applicationadmin and storageintegrationadmin.	N	All categories.
show_users	Enumeration	Indicates whether to list all internal users, or only active internal users.	N	active

Example:

```
domain_list_users domain=d1
```

Output:

```
Domain   User        Category
-------- ----------- --------------
d1       d1_domain   storageadmin
```

Field ID	Field output	Default position
domain_name	Domain	1
user_name	User	2
category	Category	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Listing objects in domains

Use the **domain_list_objects** command to list objects attached to domain(s).

```
domain_list_objects  [ domain=DomainName ] [ type=ObjectType [ name=ObjectName ] ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	Name of a domain.	N	All domains.
type	Enumeration	The object type to list: target, host, cluster, schedule, usergroup, dest, destgroup or rule.	N	All object types.
name	Object name	Name of an object.	N	All object names.

This command is used for listing objects in the system per domain.

Example:

```
domain_list_objects domain=d1
```

Output:

```
Domain   Type       Object
-------- ---------- --------------
d1       cluster    c1
d1       host       MyHost
d1       schedule   min_interval
d1       schedule   never
```

Field ID	Field output	Default position
domain_name	Domain	1
object_type	Type	2
object_name	Object	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.
- **TOO_MANY_OBJECTS**

  There are too many objects to output. Run the command again, this time use the command's parameters to filter the output by domain or object type.

Listing the global domain

Use the **domain_global_list** to list the global domain.

```
domain_global_list
```

Example:

```
domain_global_list
```

Field ID	Field output	Default position
name	Name	1
ldap_id	LDAP ID	2
soft_capacity	Soft	3
soft_capacity_MiB	Soft (MiB)	N/A
free_soft_capacity	Free Soft	4
free_soft_capacity_MiB	Free Soft (MiB)	N/A
used_soft_capacity	Used Soft	5
used_soft_capacity_MiB	Used Soft (MiB)	N/A
hard_capacity	Hard	6

Field ID	Field output	Default position
hard_capacity_MiB	Hard (MiB)	N/A
free_hard_capacity	Free Hard	7
free_hard_capacity_MiB	Free Hard (MiB)	N/A
used_hard_capacity	Used Hard	8
used_hard_capacity_MiB	Used Hard (MiB)	N/A
max_pools	Max Pools	9
used_pools	Pools	10
max_volumes	Max Volumes	11
used_volumes	Volumes	12
max_mirrors	Max Mirrors	13
used_mirrors	Mirrors	14
max_dms	Max Data Migrations	15
used_dms	Data Migrations	16
max_cgs	Max CGs	17
used_cgs	CGs	18
perf_class	Performance Class	19
allow_ssd_caching	Allow SSD Caching	20
managed	Managed	21
max_gps	Max Grouped Pools	N/A
used_gps	Grouped Pools	N/A
id	ID	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Attaching an object to a domain

Use the **domain_attach_object** command to associate an object with a domain.

```
domain_attach_object domain=DomainName type=ObjectType name=ObjectName
```

Parameters

Name	Type	Description	Mandatory
domain	Object name	The name of the domain.	Y

Name	Type	Description	Mandatory
type	Enumeration	The object type to attach to the domain. It can be: target, host, cluster, schedule, usergroup, dest, destgroup or rule.	Y
name	Object name	The object name.	Y

Example:

```
domain_attach_object domain=d1 type=host name=MyHost
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Storage integration administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Technicians	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **TARGET_BAD_NAME**
  Target name does not exist
- **HOST_BAD_NAME**
  Host name does not exist
- **CLUSTER_BAD_NAME**
  Cluster name does not exist
- **USER_GROUP_NAME_DOES_NOT_EXIST**
  User group name does not exist
- **SCHEDULE_DOES_NOT_EXIST**
  Specified Schedule does not exist
- **DEST_NAME_DOES_NOT_EXIST**
  Destination name does not exist
- **DESTGROUP_NAME_DOES_NOT_EXIST**
  Destination group name does not exist
- **EVENT_RULE_NAME_DOES_NOT_EXIST**
  Event rule name does not exist
- **USER_IS_NOT_IN_DESTINATION_DOMAINS**
  User must by included in the destination domains.

- **DESTINATION_IS_NOT_IN_DESTGROUP_DOMAINS**
  Destinations must by included in the destination group domains.
- **DESTINATION_IS_NOT_IN_RULE_DOMAINS**
  Destination must by included in the rule domains.
- **DESTGROUP_IS_NOT_IN_RULE_DOMAINS**
  Destination groups must by included in the rule domains.
- **ESCALATION_RULE_NOT_IN_RULE_DOMAINS**
  Escalation rule must belong to rule domains.
- **CLUSTER_HAS_HOSTS_UNASSOCIATED_WITH_DOMAIN**
  Cannot attach a cluster with hosts that aren't in the specified domain.
- **RESOURCE_ALREADY_ASSOCIATED_WITH_THIS_DOMAIN**
  The resource is already associated with this domain.

Disassociating object from a domain

Use the **domain_detach_object** command to disassociate object from a domain.

```
domain_detach_object domain=DomainName type=ObjectType name=ObjectName
```

Parameters

Name	Type	Description	Mandatory
domain	Object name	The name of the domain.	Y
type	Enumeration	The object type to disassociate from the domain. It can be: target, host, cluster, schedule, usergroup, dest, destgroup, or rule.	Y
name	Object name	The object name.	Y

The object is disassociated from mapped or bound objects that belong to the domain.

Example:

```
domain_detach_object domain=d1 type=host name=MyHost
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed

User Category	Permission
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.
- **RESOURCE_NOT_ASSOCIATED_WITH_THIS_DOMAIN**

  The resource is not associated with this domain.
- **DOMAIN_VOLUME_MAPPED_TO_HOST**

  Host has a volume in the domain mapped to it.
- **DOMAIN_VOLUME_MAPPED_TO_CLUSTER**

  Cluster has a volume in the domain mapped to it.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_HOST_AND_USERGROUP**

  The operation would result in a host referring to user group that's not in its domain. First remove the reference explicitly.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_CLUSTER_AND_USERGROUP**

  The operation would result in a cluster referring to user group that's not in its domain. First remove the reference explicitly.
- **HOST_PART_OF_ATTACHED_CLUSTER**

  The host is a part of a cluster and cannot be handled individually.
- **DOMAIN_TARGET_IN_USE**

  Attempt to remove a target that is used in a mirror or DM relation with a volume in the domain.
- **DOMAIN_VOLUME_BOUND_TO_HOST**

  Host has a volume in the domain bound to it via an ALU.
- **TARGET_BAD_NAME**

  Target name does not exist
- **HOST_BAD_NAME**

  Host name does not exist
- **CLUSTER_BAD_NAME**

  Cluster name does not exist
- **USER_GROUP_NAME_DOES_NOT_EXIST**

  User group name does not exist
- **SCHEDULE_DOES_NOT_EXIST**

  Specified Schedule does not exist
- **DEST_NAME_DOES_NOT_EXIST**

  Destination name does not exist
- **DESTGROUP_NAME_DOES_NOT_EXIST**

  Destination group name does not exist
- **EVENT_RULE_NAME_DOES_NOT_EXIST**

  Event rule name does not exist
- **DETACH_WOULD_MAKE_OBJECT_INACCESSIBLE**

  Detaching the object would leave it unassociated with any domain, hence inaccessible.

Troubleshooting: If it's no longer needed, please delete it.

- **USER_IS_NOT_IN_DESTINATION_DOMAINS**
  User must by included in the destination domains.
- **DESTINATION_IS_NOT_IN_RULE_DOMAINS**
  Destination must by included in the rule domains.
- **DESTINATION_IS_NOT_IN_DESTGROUP_DOMAINS**
  Destinations must by included in the destination group domains.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_USER_AND_USERGROUP**
  The operation would result in a user referring to user group that's not in its domain. First remove the reference explicitly.
- **DESTGROUP_IS_NOT_IN_RULE_DOMAINS**
  Destination groups must by included in the rule domains.
- **ESCALATION_RULE_NOT_IN_RULE_DOMAINS**
  Escalation rule must belong to rule domains.
- **DOMAIN_SCHEDULE_IN_USE**
  Cannot move the schedule to other domain since it is in use.
- **DOMAIN_PROXY_VOLUME_MAPPED_TO_HOST**
  Host has a proxy volume in the domain mapped to it.
- **DOMAIN_PROXY_VOLUME_MAPPED_TO_CLUSTER**
  Cluster has a proxy volume in the domain mapped to it.

Associating users to a domain

Use the **domain_add_user** command to associate a user to a domain.

```
domain_add_user domain=DomainName user=UserName [ exclusive=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	The name of the domain.	Y	N/A
user	Object name	The name of the user.	Y	N/A
exclusive	Boolean	Set to Yes to restrict the user to domain's objects.	N	yes

Example:

```
domain_add_user domain=d1 user=d1_admin
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **LDAP_AUTHENTICATION_IS_ACTIVE**
  Command is not available while LDAP authentication is active
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **NON_EXCLUSIVE_USER_NOT_SECURITY_ADMIN**
  Only a security admin can add a user to a domain non-exclusively.
- **USER_CANNOT_BE_ADDED_TO_A_DOMAIN**
  Specified user cannot be associated with a domain.
- **PREDEFINED_USER_CANNOT_BE_RESTRICTED_TO_DOMAIN**
  Specified user cannot be exclusively associated with a domain.
- **DOMAIN_USER_EXIST**
  This user is already added to the domain.
- **USER_IS_REFERRED_TO_BY_DEST**
  User is referred to by an event destination and therefore cannot be deleted
- **OPERATION_NOT_ALLOWED_ON_DESIGNATED_MSM_USER**
  Designtated MSM user cannot be renamed and cannot be exclusively associated with a domain.
- **SIA_MUST_BE_ASSOCIATED_WITH_A_DOMAIN**
  The Storage Integration Administrator must be associated with a domain.
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_USER_AND_USERGROUP**
  The operation would result in a user referring to user group that's not in its domain. First remove the reference explicitly.

Removing a user from a domain

Use the **domain_remove_user** command to remove a user from a domain.

```
domain_remove_user domain=DomainName user=UserName
```

Parameters

Name	Type	Description	Mandatory
domain	Object name	The name of the domain.	Y
user	Object name	The name of the user.	Y

Example:

```
domain_remove_user domain=d1 user=d1_admin
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **USER_WILL_BE_DELETED**

  User is only associated with this domain. This will delete the user from the system. Are you sure?

Return codes

- **USER_NAME_DOES_NOT_EXIST**

  User name does not exist
- **DOMAIN_DOESNT_HAVE_THE_USER**

  User is not attached to this domain.
- **DOMAIN_DOESNT_EXIST**

  Domain does not exist.
- **LDAP_AUTHENTICATION_IS_ACTIVE**

  Command is not available while LDAP authentication is active
- **REMOVAL_WOULD_CREATE_UNRESOLVABLE_REFERENCE_BETWEEN_USER_AND_USERGROUP**

  The operation would result in a user referring to user group that's not in its domain. First remove the reference explicitly.
- **DOMAIN_USER_CANNOT_REMOVE_HIMSELF**

  Users cannot remove themselves from a domain.
- **USER_IS_REFERRED_TO_BY_DEST**

  User is referred to by an event destination and therefore cannot be deleted

Adding a pool to a domain

Use the **domain_add_pool** command to add a pool to a domain.

```
domain_add_pool domain=DomainName pool=PoolName [ adjust=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	The name of the domain.	Y	N/A
pool	Object name	The pool name.	Y	N/A
adjust	Boolean	Adjust domain resources. If 'adjust' is set to true, the resources of the global domain and destination domain are adjusted to accommodate the pool being moved.	N	no

Example:

```
domain_add_pool domain=d1 pool=p1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **NO_FREE_HARD_CAPACITY_IN_DOMAIN**
  There is not enough free hard space in the domain.
- **NO_FREE_SOFT_CAPACITY_IN_DOMAIN**
  There is not enough free soft space in the domain.
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **POOL_ALREADY_ASSOCIATED_WITH_A_DOMAIN**
  The pool is already associated with a domain.
- **DOMAIN_MAX_POOLS_REACHED**
  The maximum number of domain pools was reached.
- **DOMAIN_MAX_MIRRORS_REACHED**
  The domain exceeds the maximum allowed number of mirrors.

- **DOMAIN_MAX_DMS_REACHED**

  The domain exceeds the maximum allowed number of data migrations.
- **DOMAIN_MAX_CONS_GROUPS_REACHED**

  The domain exceeds the maximum allowed number of consistency groups.
- **DOMAIN_MAX_VOLUMES_REACHED**

  The domain exceeds the maximum allowed number of volumes.
- **DOMAIN_USED_TARGET_NOT_IN_DESTINATION**

  A target that is used by mirror in the pool is not associated with the target domain.
- **DOMAIN_USED_SCHEDULE_NOT_IN_DESTINATION**

  A schedule that is used by a mirror in the pool is not associated with the target domain.
- **MAPPED_HOSTS_NOT_IN_DESTINATION**

  A host that is mapped to a volume in the pool is not associated with the target domain.
- **MAPPED_CLUSTERS_NOT_IN_DESTINATION**

  A cluster that is mapped to a volume in the pool is not associated with the target domain.
- **NO_SPACE**

  The system does not have enough free space for the requested Storage Pool size

Removing a pool from a domain

Use the **domain_remove_pool** command to remove a pool from a domain.

```
domain_remove_pool domain=DomainName pool=PoolName [ adjust=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
domain	Object name	The name of the domain.	Y	N/A
pool	Object name	The pool name.	Y	N/A
adjust	Boolean	Adjust domain resources. If set to True, the resources of the global domain and destination domain are adjusted to accommodate the pool being moved.	N	no

Example:

```
domain_remove_pool domain=d1 pool=p1
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **DOMAIN_DOESNT_HAVE_THE_POOL**
  Pool is not attached to this domain.
- **MAX_POOLS_REACHED**
  Maximum number of Storage Pools already defined
- **MAX_CONS_GROUPS_REACHED**
  Maximum number of Consistency Groups already defined.
- **MAX_VOLUMES_REACHED**
  Maximum number of volumes already defined
- **MAX_DMS_REACHED**
  Maximum number of remote volumes (mirror/migration) is already defined
  Troubleshooting: Delete unnecessary Data Migration objects
- **POOL_BELONGS_TO_A_GROUPED_POOL**
  Pool belongs to a Grouped Pool.
- **NO_SOFT_SPACE**
  The system does not have enough free soft space for the requested Storage Pool soft size
- **NO_HARD_SPACE**
  The system does not have enough free hard space for the requested Storage Pool hard size
- **DOMAIN_USED_SCHEDULE_NOT_IN_DESTINATION**
  A schedule that is used by a mirror in the pool is not associated with the target domain.

Moving a pool from one domain to another

Use the **domain_move_pool** command to move a pool from one domain to another.

```
domain_move_pool pool=PoolName src_domain=DomainName dst_domain=DomainName
[ adjust=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
pool	Object name	The name of the pool to be moved.	Y	N/A
src_domain	Object name	The source domain name.	Y	N/A
dst_domain	Object name	The destination domain name.	Y	N/A
adjust	Boolean	Adjust domain resources. If set to Yes, the resources of the domains are adjusted to accommodate the pool being moved.	N	no

Example:

```
domain_move_pool pool=p1 src_domain=d1 dst_domain=d2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SOURCE_DOMAIN_DOES_NOT_EXIST**
  Source domain does not exist.
- **DESTINATION_DOMAIN_DOES_NOT_EXIST**
  Destination domain does not exist.
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **POOL_NOT_ASSOCIATED_WITH_SOURCE_DOMAIN**
  The pool is not associated with the source domain.
- **DOMAIN_MAX_POOLS_REACHED**
  The maximum number of domain pools was reached.
- **MAPPED_HOSTS_NOT_IN_DESTINATION**
  A host that is mapped to a volume in the pool is not associated with the target domain.
- **MAPPED_CLUSTERS_NOT_IN_DESTINATION**

A cluster that is mapped to a volume in the pool is not associated with the target domain.

- **POOL_BELONGS_TO_A_GROUPED_POOL**

  Pool belongs to a Grouped Pool.
- **NO_FREE_HARD_CAPACITY_IN_DOMAIN**

  There is not enough free hard space in the domain.
- **NO_FREE_SOFT_CAPACITY_IN_DOMAIN**

  There is not enough free soft space in the domain.
- **DOMAIN_USED_SCHEDULE_NOT_IN_DESTINATION**

  A schedule that is used by a mirror in the pool is not associated with the target domain.
- **DOMAIN_USED_TARGET_NOT_IN_DESTINATION**

  A target that is used by mirror in the pool is not associated with the target domain.
- **DOMAIN_MAX_DMS_REACHED**

  The domain exceeds the maximum allowed number of data migrations.
- **DOMAIN_MAX_MIRRORS_REACHED**

  The domain exceeds the maximum allowed number of mirrors.
- **DOMAIN_MAX_DMS_REACHED**

  The domain exceeds the maximum allowed number of data migrations.
- **DOMAIN_MAX_CONS_GROUPS_REACHED**

  The domain exceeds the maximum allowed number of consistency groups.
- **DOMAIN_MAX_VOLUMES_REACHED**

  The domain exceeds the maximum allowed number of volumes.
- **BOUND_ALUS_NOT_IN_DESTINATION**

  An ALU that is bound to a volume in the pool is not associated with the target domain.
- **OPERATION_DENIED_OBJECT_MANAGED**

  This is a managed object. Only the managing software and xiv_maintenance / xiv_development may perform this operation on this object.
- **SOURCE_AND_DESTINATION_DOMAINS_MUST_BE_DIFFERENT**

  Source and destination domains must be different.
- **DOMAIN_CONTAINS_OLVM_VOLUME**

  The domain contains a volume in olvm process.

Setting domain-related policies

Use the **domain_policy_set** command to set domain-related policies.

```
domain_policy_set name=Name value=ParamValue
```

Parameters

Name	Type	Description	Mandatory
name	String	Name of the parameter to set.	Y
value	String	Value of the parameter.	Y

This command is used for setting domain related policies.

- **name=access** defines whether non-domain-specific users can access domain-specific resources (*value=open*) or not (*value=closed*).
- **name=host_management** defines whether domain administrators can create their own hosts (*value=extended*), or are restricted to hosts assigned to their domains by NDSO administrators (*value=basic*).

Example:

```
domain_policy_set name=access value=closed
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNRECOGNIZED_CONFIG_PARAMETER**

  Unrecognized configuration parameter: '*name*'.

  Troubleshooting: Use a valid configuration parameter as an input.

Displaying domain-related policies

Use the **domain_policy_get** command to display domain-related policies.

```
domain_policy_get [ name=Name ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Name of the parameter to get.	N	All parameters.

- **name=access** defines whether non-domain-specific users can access domain-specific resources (*value=open*) or not (*value=closed*).
- **name=host_management** defines whether domain administrators can create their own hosts (*value=extended*), or are restricted to hosts assigned to their domains by NDSO administrators (*value=basic*).

Field ID	Field output	Default position
name	Name	1
value	Value	2

Example:

```
domain_policy_get name=access
```

Output:

```
Name     Value
-------- -------
access   OPEN
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNRECOGNIZED_CONFIG_PARAMETER**

  Unrecognized configuration parameter: '*name*'.

  Troubleshooting: Use a valid configuration parameter as an input.
- **CONF_SERVER_UNREACHABLE**

  Configuration server unreachable

Specifying a user associated with IBM Hyper-Scale Manager

Use the **designate_msm_user_set** command to specify the name of the user that is associated with the IBM Hyper-Scale Manager.

```
designate_msm_user_set name=UserName
```

Parameters

Name	Type	Description	Mandatory
name	Object name	The designated user.	Y

This command specifies which XIV user is defined in the IBM Hyper-Scale Manager Server in the activation step. This can be either a local or LDAP user, depending on whether LDAP authentication is used.

Example:

```
designate_msm_user_set name=xiv_msms
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **USER_NAME_DOES_NOT_EXIST**
  User name does not exist
- **USER_IS_ONLY_DOMAIN_ADMIN**
  User is associated with one or more domains, and cannot view the entire system.

Retrieving the user associated with the IBM Hyper-Scale Manager

Use the **designate_msm_user_get** command to retrieve the name of the user associated with the IBM Hyper-Scale Manager.

```
designate_msm_user_get
```

Example:

```
designate_msm_user_get
```

Output:

```
xiv_msms
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **NO_DESIGNATED_MSM_USER**
  There is no designated IBM Hyper-Scale user.

Setting the application administrator's scope of commands

Use the **appadmin_capabilities_set** command to define whether an Application Administrator is authorized to perform the basic or advanced set of commands.

```
appadmin_capabilities_set value=<basic|advanced>
```

Parameters

Name	Type	Description	Mandatory
value	Enumeration	The set of commands that an Application Administrator is authorized to perform.	Y

The Advanced set allows appadmins to run also the following commands:

- **mirror_statistics_get**
- **mirror_activate**
- **mirror_deactivate**
- **mirror_change_role**
- **mirror_switch_roles**

Example:

```
appadmin_capabilities_set value=basic
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Getting the application administrator's scope of commands

Use the **appadmin_capabilities_get** command to display the state of the Application Administrator's capabilities.

```
appadmin_capabilities_get
```

Example:

```
appadmin_capabilities_get
```

Output:

```
BASIC
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Chapter 19. Fibre channel and iSCSI configuration and status commands

This section describes the command-line interface (CLI) for fibre channel port configuration.

Discovering FC hosts

Use the **fc_connectivity_list** command to discover FC hosts and targets on the FC network.

```
fc_connectivity_list  [ role=<dual|initiator|target> ] [ wwpn=WWPN ]
 [ module=ModuleNumber | fc_port=ComponentId ]
```

Parameters

Name	Type	Description	Mandatory	Default
role	Enumeration	Specifies whether to discover initiators or targets.	N	List all - targets and/or initiators.
wwpn	N/A	Limits the output only to this specific address.	N	All addresses
module	N/A	Limits the output to the enabled connectivity to this module.	N	All modules
fc_port	N/A	Limits the output to this specific XIV port.	N	All ports

This command lists FC hosts on the network.

`role=initiator` detects initiators on the network. When `role=initiator`, the *non-logged-in* option can only be used to debug hosts that are on the network, but did not log in.

`role=target` detects targets. When `role=target`, the *non-logged-in* option can only be used to debug targets that rejected the storage system login. This command returns an error for an attempt to list targets from a target-only port, or to list initiators from an initiator-only port. Each output line contains the following information:

- Component ID (of the module)
- Storage system port number (within the module)
- WWPN
- Port ID (can be correlated with the switch database)
- Role: Initiator, Target, Dual
- Initiator/target (is the same for all lines of the same command)
- Login status (Yes/No)

Field ID	Field output	Default position
component_id	Component ID	1
wwpn	WWPN	2
port_id	Port ID	3
role	Role	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Changing FC port configuration

Use the **fc_port_config** command to configure FC ports.

```
fc_port_config  fc_port=ComponentId  [ enabled=<yes|no> ]
[ role=<target|initiator> ] [ rate=<2|4|8|16|auto> ]
```

Parameters

Name	Type	Description	Mandatory	Default
fc_port	N/A	Port identifier.	Y	N/A
enabled	Boolean	Allows you to enable or disable the port.	N	yes
role	Enumeration	Port role: target, initiator or both.	N	Leaves the role unchanged.
rate	Enumeration	Line rate or auto for auto-negotiated rate.	N	Leaves the rate unchanged.

Example:

```
fc_port_config fc_port=1:FC_Port:1:1 enabled=yes role=Target rate=auto
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **COMPONENT_IS_NOT_AN_FC_PORT**
  Component must specify an FC port
- **FC_PORT_DOES_NOT_EXIST**
  Specified FC port does not exist

Listing FC ports

Use the **fc_port_list** command to list the status and configuration of the system's FC ports.

```
fc_port_list [ module=ModuleNumber  | fcport=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All ports in all modules.
fcport	Lists only a specific port.	N	All ports in all modules.

This command lists all or some FC ports on the system. When no parameters are specified, all ports are listed. If a module is specified without a port, all ports on that module are listed. If a port is specified, a single port is listed.

The following information is provided for each port:

- Component ID of the module Port number (internal to module) 1-N
- WWPN
- Port ID
- Role (Initiator, Target, Dual)
- User-enabled (Yes/No)
- Maximum support rate: 2GB, 4GB, 8GB; constant - function of the HBA's capability
- Configured rate: 2GB, 4GB, 8GB, auto-negotiation; cannot be greater than the maximum supported rate
- Current active rate: 2GB, 4GB, 8GB; equal to the configured rate, unless the configured rate is auto-negotiation
- Port state: Online, Offline, Loopback, Link Down (physical connection is on, but no logical connection exists)
- Error counts
- Link type: Fabric Direct Attach, Private Loop, Point-to-Point, Public Loop, Unknown

Example:

```
fc_port_list
```

Output:

```
Component ID     Status   Currently Functioning   WWPN               Port ID    Role
---------------- -------- ---------------------- ------------------ ---------- --------
1:FC_Port:12:1   OK       yes                    5001738035C601C0   FFFFFFFF   Target
1:FC_Port:12:2   OK       yes                    5001738035C601C1   FFFFFFFF   Target
1:FC_Port:12:3   OK       yes                    5001738035C601C2   FFFFFFFF   Target
1:FC_Port:12:4   OK       yes                    5001738035C601C3   00EF009A   Target
1:FC_Port:13:1   OK       yes                    5001738035C601D0   FFFFFFFF   Target
1:FC_Port:13:2   OK       yes                    5001738035C601D1   FFFFFFFF   Target
1:FC_Port:13:3   OK       yes                    5001738035C601D2   FFFFFFFF   Target
1:FC_Port:13:4   OK       yes                    5001738035C601D3   FFFFFFFF   Target
1:FC_Port:8:1    OK       yes                    5001738035C60180   FFFFFFFF   Target
1:FC_Port:8:2    OK       yes                    5001738035C60181   FFFFFFFF   Target
1:FC_Port:8:3    OK       yes                    5001738035C60182   FFFFFFFF   Target
1:FC_Port:8:4    OK       yes                    5001738035C60183   00163AC0   Target

Cont.:

User Enabled   Current Rate (GBaud)   Port State     Link Type
-------------- ---------------------- -------------- ----------------------
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            8                      Online         Fabric Direct Attach
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            Auto                   Link Problem   None
yes            16                     Online         Fabric Direct Attach

Cont.:

Error Count   Active Firmware
------------- -----------------
0             8.3.40
0             8.3.40
0             8.3.40
0             8:3:40
0             8.3.40
0             8.3.40
0             8.3.40
0             8.3.40
0             8.3.40
0             8.3.40
0             8.3.40
0             8:3:40
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
port_num	Port Number	N/A
wwpn	WWPN	4
port_id	Port ID	5
role	Role	6
user_enabled	User Enabled	7
max_supported_rate	Maximum Supported Rate (GBaud)	N/A

Field ID	Field output	Default position
configured_rate	Configured Rate (GBaud)	N/A
current_rate	Current Rate (GBaud)	8
port_state	Port State	9
link_type	Link Type	10
error_count	Error Count	11
active_firmware	Active Firmware	12
credit	Credit	N/A
hba_vendor	HBA Vendor	N/A
is_enabled	Enabled	N/A
module	Module	N/A
serial	Serial	N/A
original_serial	Original Serial	N/A
model	Model	N/A
original_model	Original Model	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
port_up_cnt	Port Up	N/A
loss_sync_cnt	Loss Sync	N/A
loss_signal_cnt	Loss Signal	N/A
PER_cnt	PER	N/A
BER_cnt	BER	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Resetting an FC port

Use the **fc_port_reset** command to reset an FC port.

```
fc_port_reset  fc_port=ComponentId
```

Parameters

Name	Description	Mandatory
fc_port	FC port identifier.	Y

Example:

```
fc_port_reset fc_port=1:FC_Port:1:1
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **COMPONENT_IS_NOT_AN_FC_PORT**
  Component must specify an FC port
- **FC_PORT_DOES_NOT_EXIST**
  Specified FC port does not exist

Listing connectivity to hosts

Use the **host_connectivity_list** command to list FC and iSCSI-level connectivity to a pre-defined host.

```
host_connectivity_list [ host=HostName | fc_host_port=WWPN ]
[ module=ModuleNumber | fcport=ComponentId ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	Limits viewing to the ports of a specific host.	N	All hosts.
fc_host_port	N/A	Limits viewing to this specific port.	N	All ports
module	N/A	Limits output only to the enabled connectivity to this module.	N	All modules
fcport	N/A	Limits output to a specific storage system's port.	N	All ports
domain	Object name	The domain name.	N	All Domains

This command shows the connectivity status between a storage system port and a defined host. The output can be limited to a specific port, module or storage system port. Hosts can attach to the FC and iSCSI either directly (point-to-point), via an FC fabric or via a Gigabit Ethernet switch. Connectivity refers to both physical connectivity and SCSI login. Each output line contains the following information:

- Host (name)

- Host port (WWPN)
- Module ID, preceded by the rack ID
- Port number (within the module)

Example:

```
host_connectivity_list host=demo_host_fc0 fc_host_port=1:FC_Port:5:1
```

Output:

```
Host           Host Port          Module       Local FC port   Local iSCSI port   Type
-------------- ------------------ ------------ --------------- ------------------ ------
demo_host_fc0  100000062B151A98   1:Module:5   1:FC_Port:5:1                      FC
```

Field ID	Field output	Default position
host	Host	1
host_port	Host Port	2
module	Module	3
local_fc_port	Local FC port	4
local_iscsi_port	Local iSCSI port	5
type	Type	6

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Chapter 20. Hardware maintenance commands

This section describes the command-line interface (CLI) for maintaining hardware components.

Displaying an ATS configuration

Use the **ats_list** to display information about the components of an Automatic Transfer Switch (ATS).

```
ats_list  [ ats=ComponentId ]
```

Parameters:

Name	Description	Mandatory	Default
ats	Lists the configuration of the specified ATS.	N	All ATSs

Example:

```
ats_list ats
```

Output:

```
Component ID   Status   Currently Functioning   Model     L1 Input OK   L2 Input OK
-------------- -------- ---------------------- --------- ------------- -------------
1:ATS:1        OK       yes                    ATS-60A   no            yes

Cont.:
Outlet 1 State   Outlet 2 State   Outlet 3 State   Firmware Version
---------------- ---------------- ---------------- ------------------
J2               J2               J2               4

Cont.:
3-Phase   Dual Active
--------- -------------
no        no
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
model	Model	4
input_l1	L1 Input OK	5
input_l2	L2 Input OK	6
out1_state	Outlet 1 State	7
out2_state	Outlet 2 State	8
out3_state	Outlet 3 State	9
firmware_version	Firmware Version	10
three_phase_type	3-Phase	11
dual_active_type	Dual Active	12

Field ID	Field output	Default position
coil_l1	Coil A On	N/A
coil_l2	Coil B On	N/A
pickup_l1	A Pick-Up	N/A
pickup_l2	B Pick-Up	N/A
default_cal	Default Calibration	N/A
serial_control	Serial Control	N/A
logic_power	Logic Power	N/A
output_30A_1	Output 30A #1	N/A
output_30A_2	Output 30A #2	N/A
output_30A_3	Output 30A #3	N/A
output_10A	Output 10A	N/A
ats_reply_errors	ATS Reply Errors	N/A
ats_connect_errors	ATS Connect Errors	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
us_type	US Type	N/A
l1_source	J1 Source	N/A
l2_source	J2 Source	N/A
interlock_failed	Interlock Failed	N/A
p1_current_fault	P1 Current Fault	N/A
p2_current_ fault	P2 Current Fault	N/A
p3_current_ fault	P3 Current Fault	N/A
coil_c	Coil C On	N/A
coil_d	Coil D On	N/A
pickup_c	C Pick-Up	N/A
pickup_d	D Pick-Up	N/A
oc_j1_a	Over-Current J1 Phase A	N/A
oc_j1_b	Over-Current J1 Phase B	N/A
oc_j1_c	Over-Current J1 Phase C	N/A
oc_j2_a	Over-Current J2 Phase A	N/A
oc_j2_b	Over-Current J2 Phase B	N/A
oc_j2_c	Over-Current J2 Phase C	N/A
no_oc_switching	No OC Switching	N/A
rms_current_p1	RMS Current Outlet P1	N/A
rms_current_p2	RMS Current Outlet P2	N/A
rms_current_p3	RMS Current Outlet P3	N/A
firmware_l1_version	Firmware J1 Version	N/A
firmware_l2_version	Firmware J2 Version	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed

User Category	Permission
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying the system's coupling facilities

Use the **cf_list** to display the list of coupling facilities (CF) in the storage system.

```
cf_list [ module=ModuleNumber  | cf=ComponentId ]
```

Parameters:

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All CFs in all modules.
cf	Lists only a specific CF.	N	A specific CF.

Example:

```
cf_list -f all
```

Output:

```
Component ID Status Currently Functioning Hardware Status Serial     Part #
------------ ------ --------------------- --------------- ---------- ------------------
1:CF:10:1    OK     yes                   OK              0_521134A5 TRANSCEND_20070418
1:CF:11:1    OK     yes                   OK              0_5211349C TRANSCEND_20070418
1:CF:12:1    OK     yes                   OK              0_521133F1 TRANSCEND_20070418
1:CF:13:1    OK     yes                   OK              0_521133DF TRANSCEND_20070418
1:CF:14:1    OK     yes                   OK              0_52113389 TRANSCEND_20070418
1:CF:15:1    OK     yes                   OK              0_521134AE TRANSCEND_20070418
1:CF:1:1     OK     yes                   OK              0_5211347A TRANSCEND_20070418
1:CF:2:1     OK     yes                   OK              0_521133C0 TRANSCEND_20070418
1:CF:3:1     OK     yes                   OK              0_521133B0 TRANSCEND_20070418
1:CF:4:1     OK     yes                   OK              0_52113568 TRANSCEND_20070418
1:CF:5:1     OK     yes                   OK              0_5211357D TRANSCEND_20070418
1:CF:6:1     OK     yes                   OK              0_5211330F TRANSCEND_20070418
1:CF:7:1     OK     yes                   OK              0_521133D6 TRANSCEND_20070418
1:CF:8:1     OK     yes                   OK              0_52113C99 TRANSCEND_20070418
1:CF:9:1     OK     yes                   OK              0_5211344C TRANSCEND_20070418
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
hardware_status	Hardware Status	4
device_name	Device Name	5
serial	Serial	N/A
original_serial	Original Serial	N/A
part_number	Part #	N/A
original_part_number	Original Part Number	N/A
size	Size	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Setting a module as equipped

Use the **module_equip** command to mark a hardware module as installed.

```
module_equip module_interconnect_ip=ModuleInterconnectIP
```

Parameters

Name	Description	Mandatory
module_interconnect_ip	A valid IPv4 address of the module interconnect IP address.	Y

This command configures the system to start using the module, assuming that it was assembled. The module is tested by the system. After completing the test, the module is marked as either "Ready" or "Failed".

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_HARD_RESET_MODULE**
  Are you sure you want to hard reset the module?

Return codes

- **EQUIP_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  This component type cannot be equipped
- **FIRMWARE_UPGRADE_IN_PROGRESS**
  Firmware upgrade in progress
  Troubleshooting: Contact support
- **TEST_NOT_ALLOWED_DURING_SDL_RECOVERY**

Component cannot be tested during an SDL recovery

Troubleshooting: Wait for the SDL recovery to complete

- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.
- **DISK_IS_NOT_FUNCTIONING**

  Disk is not functioning.

  Troubleshooting: Replace disk
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **TEST_NOT_ALLOWED_AFTER_UPGRADE_DOWNLOAD**

  Component cannot be tested after the new software version has already been downloaded
- **HOT_UPGRADE_IS_NOT_ONGOING**

  Hot upgrade is not currently ongoing
- **TEST_NOT_ALLOWED_IN_CURRENT_STATUS**

  Component cannot be tested in its current status
- **EQUIP_NOT_ALLOWED_IN_CURRENT_STATUS**

  Component already equipped
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **FAILED_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

  This component type cannot be failed
- **UPS_NOT_ENOUGH_SPARES**

  There are not enough spare UPS's in the rack to safely complete the command

  Troubleshooting: Contact support
- **COMPONENT_IS_NOT_A_MODULE**

  Component must specify a module
- **CONTAINING_COMPONENT_IN_WRONG_STATUS**

  Operation not allowed in current status of containing component.
- **HARD_RESET_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

  Hard reset is not supported for this component type
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **TEST_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

  This component type cannot be tested
- **COMPONENT_DOES_NOT_EXIST**

  Component does not exist
- **IP_ADDRESS_ALREADY_EXISTS**

  The IP address already exists in the configuration and cannot be added
- **ILLEGAL_IPADDRESS**

Illegal IP address was entered

- **CANNOT_ALLOCATE_NEW_MODULE**
  Cannot allocate new module, reached system limit
- **NOT_ALL_MODULES_PHASED_IN**
  Not all Cluster modules are phased in
- **FAILED_TO_RUN_COMMAND_ON_MODULE**
  The attempt to remotely run the command on the module failed
- **FAILED_TO_PARSE_BRINGUP_DATA**
  Failed to parse bringup data (derived from deployment operation)
  Troubleshooting: Contact support
- **INVALID_BRINGUP_DATA**
  Bringup data (derived from deployment operation) of the module is invalid
  Troubleshooting: Contact support
- **BRINGUP_DATA_MISMATCH**
  Bringup data (derived from deployment operation) does not match cluster configuration
  Troubleshooting: See events for details, fix deployment configuration and re-deploy module
- **UNEQUIP_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  This component type cannot be unequipped
- **UNEQUIP_NOT_ALLOWED_IN_CURRENT_STATUS**
  Component cannot be unequipped in its current status
- **MODULE_SOFTWARE_VERSION_DOES_NOT_SUPPORT_OPERATION**
  Module *Component ID* software version *Software Version* does not support operation *Operation*.
- **MODULE_IS_NOT_ACCESSIBLE**
  Could not access remote module
  Troubleshooting: Please check module IP connectivity
- **FAILED_TO_RECEIVE_MODULE_CLUSTER_COMPAT_DATA**
  Failed to receive remote module's cluster compatibility data (derived from deployment operation and module hardware/VM setup)
  Troubleshooting: Please check if remote module is up and connected

Marking a module as unequipped

Use the **module_unequip** command to mark a hardware component as disassembled.

```
module_unequip module=ComponentId
```

Parameters:

Name	Description	Mandatory
module	Module to be unequipped.	Y

This command configures the system to stop using the module.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNEQUIP_NOT_ALLOWED_IN_CURRENT_STATUS**
  Component cannot be unequipped in its current status
- **UNEQUIP_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  This component type cannot be unequipped
- **COMPONENT_DOES_NOT_EXIST**
  Component does not exist
- **FIRMWARE_UPGRADE_IN_PROGRESS**
  Firmware upgrade in progress
  Troubleshooting: Contact support
- **MINIMUM_NUMBER_OF_MODULES_REACHED**
  Number of modules reached minimum limit
- **MODULE_IS_NOT_LAST_MODULE_IN_CLUSTER**
  This module is not the last module in the cluster
- **MODULE_WAS_ALREADY_PHASED_IN**
  Unequip on a module, that was previously phased in is not allowed

Listing system components

Use the **component_list** command to list system components and their status.

```
component_list [ component=ComponentId ] [ filter=<ALL|FAILED|NOTOK> ]
```

Parameters

Name	Type	Description	Mandatory	Default
component	N/A	Lists only this component.	N	All components.
filter	Enumeration	Filters the list to show only failed or only non-OK components.	N	ALL

The list can be filtered to show only a specific component, all failed components or all components in a non-OK state.

For status and configuration of specific component types, refer to the **_list** commands for specific components, such as: **module_list** or **switch_list**.

Example:

```
component_list
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Phasing out a component

Use the **component_phaseout** command to phase out a component.

```
component_phaseout component=ComponentId
```

Parameters

Name	Description	Mandatory
component	Component identification.	Y

This command instructs the system to stop using the component, where the component can be either a module or a switch.

For modules, the system starts copying all the cache data, so that the system will remain redundant even without this module.

For switches, the system configures itself to work without the component. There is no phase-out for power supplies, SFPs or batteries.

If phasing out a module or a switch will make the system non-redundant, phase-out or the system's self shutdown is not permitted. Components must be in either OK or a Phase In status.

Once the phase-out process is completed, the component's state is either Fail or Ready, depending on the argument *markasfailed*. If true, the phased-out component is marked as failed, to enable its replacement. If false, the phased-out component is in Ready state.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **PHASEOUT_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  This component type cannot be phased-out
- **PHASEOUT_WILL_MAKE_SYSTEM_NON_REDUNDANT**
  Cannot phase out the component because it will cause data to be unprotected
- **PHASEOUT_NOT_ALLOWED_IN_CURRENT_STATUS**
  Component cannot be phased-out in its current status
- **COMPONENT_DOES_NOT_EXIST**
  Component does not exist
- **COMPONENT_TYPE_CANNOT_BE_PHASED_OUT_AS_FAILED**
  Components of this type cannot be phased-out and marked as failed
- **MODULE_CANNOT_BE_PHASED_OUT_DUE_TO_MANAGEMENT_REQUIREMENT**
  Module cannot be phased out due to management requirement
  Troubleshooting: Contact support
- **CAN_NOT_PHASE_OUT_DEVICE_WITH_MARKASFAILED_NO**
  Devices cannot be phased-out with markasfailed=no
- **COMPONENT_TYPE_MUST_BE_PHASED_OUT_AS_FAILED**
  Components of this type must be phased-out as failed
- **USE_SERVICE_PHASEOUT_COMMAND**
  Command component_phaseout does not support services. Please use service_phaseout.
- **CONTAINING_COMPONENT_IN_WRONG_STATUS**
  Operation not allowed in current status of containing component.
- **SUBCOMPONENT_IN_WRONG_STATUS**
  Operation not allowed in current status of a subcomponent.
- **CONTROLLING_SERVICES_NOT_ALLOWED_FOR_USER_CATEGORY**
  Controlling services not allowed for user category
- **NOT_ALL_PSUS_OK**
  There is one or more PSUs disconnected or failed, this may cause the requested action to cause module failures
  Troubleshooting: Check that all PSUs are properly wired, and ensure that none is failed
- **SYSTEM_UPGRADE_CANCELED_BECAUSE_OF_NODE_FAILURE_DURING_UPGRADE**
  Last upgrade was canceled because a node failed while the upgrade process was running
- **FAILED_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

This component type cannot be failed

- **HOT_UPGRADE_IS_NOT_ONGOING**
  Hot upgrade is not currently ongoing
- **FIRMWARE_UPGRADE_IN_PROGRESS**
  Firmware upgrade in progress
  Troubleshooting: Contact support
- **CANNOT_WRITE_TO_KEY_REPOSITORY**
  Failed writing keys to the key repository.
  Troubleshooting: Contact support.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**
  Cannot connect to an active key server.
  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.
- **NO_MASTER_KEYSERVER_DEFINED**
  There is no master key server defined on the system.
  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**
  There is no live key server gateway node on the system.
  Troubleshooting: Please restart the key server gateway node and try again.

Phasing in a component

Use the **component_phasein** command to phase in a hardware component.

```
component_phasein component=ComponentId
```

Parameters

Name	Description	Mandatory
component	Component to be phased in.	Y

This command instructs the system to phase in a component. Components are used by the system immediately. For modules, a process of copying data to the components (redistribution) begins. Components must be in Ready or Phasing Out state.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **WARNING_COMPONENT_IS_PHASING_OUT**

  Component is being phased out. Are you sure you want to phase it in?

Return codes

- **PHASEIN_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

  This component type cannot be phased-in
- **PHASEIN_NOT_ALLOWED_IN_CURRENT_STATUS**

  Component cannot be phased-in in its current status
- **PHASEIN_NOT_ALLOWED_DURING_SDL_RECOVERY**

  Component cannot be phased-in during an SDL recovery

  Troubleshooting: Wait for the SDL recovery to complete
- **COMPONENT_DOES_NOT_EXIST**

  Component does not exist
- **USE_SERVICE_PHASEIN_COMMAND**

  Command component_phasein does not support services. Please use service_phasein.
- **CONTAINING_COMPONENT_IN_WRONG_STATUS**

  Operation not allowed in current status of containing component.
- **SUBCOMPONENT_IN_WRONG_STATUS**

  Operation not allowed in current status of a subcomponent.
- **CONTROLLING_SERVICES_NOT_ALLOWED_FOR_USER_CATEGORY**

  Controlling services not allowed for user category
- **SERVICE_CANNOT_BE_PHASED_IN**

  Service cannot be phased in because its interface services cannot be activated.

  Troubleshooting: Check system requirements for activating interface services.
- **FIRMWARE_UPGRADE_IN_PROGRESS**

  Firmware upgrade in progress

  Troubleshooting: Contact support
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Testing a component

Use the **component_test** command to test a hardware component.

```
component_test component=ComponentId
```

Parameters

Name	Description	Mandatory
component	Component ID.	Y

This command instructs the storage system to test the component. The command is used after a failed component is replaced. Components must be in the Failed status. If the test succeeds, the component status changes to Ready or OK. If the test fails, the component status remains Failed.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_HARD_RESET_MODULE**
  Are you sure you want to hard reset the module?

Return codes

- **COMPONENT_DOES_NOT_EXIST**
  Component does not exist
- **TEST_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  This component type cannot be tested
- **DISK_IS_NOT_FUNCTIONING**
  Disk is not functioning.
  Troubleshooting: Replace disk
- **TEST_NOT_ALLOWED_IN_CURRENT_STATUS**
  Component cannot be tested in its current status
- **CONTAINING_COMPONENT_IN_WRONG_STATUS**
  Operation not allowed in current status of containing component.
- **UPS_NOT_ENOUGH_SPARES**
  There are not enough spare UPS's in the rack to safely complete the command
  Troubleshooting: Contact support
- **HARD_RESET_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  Hard reset is not supported for this component type
- **TEST_NOT_ALLOWED_AFTER_UPGRADE_DOWNLOAD**

Component cannot be tested after the new software version has already been downloaded

- **FAILED_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

  This component type cannot be failed
- **FIRMWARE_UPGRADE_IN_PROGRESS**

  Firmware upgrade in progress

  Troubleshooting: Contact support
- **TEST_NOT_ALLOWED_DURING_SDL_RECOVERY**

  Component cannot be tested during an SDL recovery

  Troubleshooting: Wait for the SDL recovery to complete
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Listing system components that require service

Use the **component_service_required_list** command to list system components and their status.

```
component_service_required_list [ component=ComponentId ] [ filter=<ALL|FAILED|NOTOK> ]
```

Parameters

Name	Type	Description	Mandatory	Default
component	N/A	Lists only this component.	N	All components.
filter	Enumeration	Filters the list to show only failed or only non-OK components.	N	ALL

The list can be filtered to show only a specific component, all failed components, or all components in a non-OK state.

For status and configuration of specific component types, refer to the **_list** commands for specific components, such as: **module_list** or **switch_list**.

Example:

```
component_service_required_list
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
requires_service	Requires Service	4
service_reason	Service Reason	5

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Clearing a component's Service Required field

Use the **component_service_force_ok** command to change a component's Service Required field value to OK.

```
component_service_force_ok component=ComponentId
```

Parameters

Name	Description	Mandatory
component	Component whose Service Required field is to be cleared.	Y

Instructs the system to mark the `Service Required` field of a component as OK, which means that no service is required.

Currently this is applicable to modules and vault devices only.

Example:

```
component_service_force_ok component=1:Module:12
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **COMPONENT_DOES_NOT_EXIST**

  Component does not exist

Identifying a component

Use the **component_identify** command to identify a hypervisor's hardware component by blinking its LED.

```
component_identify [ component=ComponentId ] [ serial=Serial ]
[ state=<on|off> ] server_address=IPAddress
server_username=String server_password=String
```

Parameters

Name	Description	Mandatory
component	Component ID. Either component or serial number must be indicated.	N
serial	Disk device serial number. Either component or serial number must be indicated.	N
state	Use **on** (default) to start LED blinking, or **off** to stop LED blinking.	Y
server_address	Address of the hypervisor that includes the component to be identified.	Y
server_username	Username for accessing the hypervisor.	Y
server_password	Password for accessing the hypervisor.	Y

This command can activate LED blinking for supported components (typically disks) that are attached to a hypervisor. It is used to identify physical failed components from the virtual machine.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **COMPONENT_DOES_NOT_EXIST**
  Component does not exist
- **HYPERVISOR_OPERATION_IN_PROGRESS**
  A hypervisor operation is currently in progress. Try again after it has completed.
- **INVALID_SERIAL_NUMBER_SPECIFIED**
  The serial number specified is invalid.
- **IDENTIFY_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**
  The system does not support identifying components of this type.
- **COMPONENT_ID_AND_SERIAL_PARAMETERS_SHOULD_NOT_BOTH_BE_SUPPLIED**
  Please supply only one of component_id or serial number.
- **COMPONENT_LOCATION_INFORMATION_UNAVAILABLE**
  The system does not have physical location information for this component.
- **FAILED_TO_RUN_COMMAND_ON_MODULE**
  The attempt to remotely run the command on the module failed
- **TIMEOUT**
  Remote operation did not complete in time
- **COMPONENT_ID_OR_SERIAL_PARAMETERS_SHOULD_BE_SUPPLIED**
  Please supply component_id or serial number.

Attaching a component

Use the **component_attach** command to attach a hypervisor's hardware component to the cluster's virtual machine.

```
component_attach module=ComponentId device_identifier=NaaIdentifier
server_address=IPAddress server_username=String server_password=String
[ management_server_address=IPAddress ] [ management_server_username=String ]
[ management_server_password=String ] [ component_type=ComponentType ]
```

Parameters

Name	Description	Mandatory
module	Module component ID. Either module or serial number must be indicated.	Y
device_identifier	Identifier used by the hypervisor to refer to the device.	Y
component_type	The type of component being replaced: disk (default) or SSD.	N
server_address	Address of the hypervisor that includes the component to be attached.	Y
server_username	Username for accessing the hypervisor.	Y
server_password	Password for accessing the hypervisor.	Y
management_server_address	Address of the management server (or vCenter) that includes the component to be attached.	N
management_server_username	Username for accessing the management server (or vCenter).	N

Name	Description	Mandatory
management_server_password	Password for accessing the management server (or vCenter).	N
component_type	Enumeration	The component type to be attached: Disk or SSD.

This command re-creates the infrastructure and configuration at the hypervisor after a disk has been replaced.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- ATTACH_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE

  The system does not support attaching components of this type.
- ATTACH_NOT_ALLOWED_FOR_CURRENT_COMPONENT_STATUS

  Component cannot be attached, because its status is not Failed. Only failed components can be attached.
- HYPERVISOR_OPERATION_IN_PROGRESS

  Hypervisor has not completed another operation.

  Troubleshooting: Wait for the hypervisor to complete the operation.

Updating device location for disks

Use the **hypervisor_device_location_refresh** command to update the device location for disks on supported controller types.

```
hypervisor_device_location_refresh
component=ComponentId server_address=IPAddress server_username=String
server_password=String
```

Parameters

Name	Description	Mandatory
component	Component ID.	Y
server_address	Address of the hypervisor hosting the relevant module VM.	Y
server_username	User name for the hypervisor hosting the relevant module VM.	Y
server_password	Password for the hypervisor hosting the relevant module VM.	Y

This command is used to manually refresh the hypervisor location information of a component.

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- FAILED_TO_RUN_COMMAND_ON_MODULE

  An attempt to run the command on the current module failed.
- TIMEOUT

  The operation did not complete in time.

Marking a component as unequipped

Use the **component_unequip** command to mark a hardware component as one that was disassembled.

```
component_unequip component=ComponentId
```

Parameters

Name	Description	Mandatory
component	Component to be unequipped.	Y

This command configures the system to stop using the component, assuming that it was disassembled.

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNEQUIP_NOT_ALLOWED_IN_CURRENT_STATUS**

  Component cannot be unequipped in its current status
- **UNEQUIP_NOT_SUPPORTED_FOR_THIS_COMPONENT_TYPE**

  This component type cannot be unequipped
- **COMPONENT_DOES_NOT_EXIST**

  Component does not exist
- **NOT_ALL_IPINTERFACES_CAN_BE_DELETED**

Not all IP interfaces on module can be deleted. Cannot unequip module.

- **FIRMWARE_UPGRADE_IN_PROGRESS**

  Firmware upgrade in progress

  Troubleshooting: Contact support

Listing InfiniBand host card adapters in the storage system

Use the **hca_list** command to list the InfiniBand host card adapters (HCAs) in the storage system's modules.

```
hca_list [ module=ModuleNumber | hca=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All InfiniBand HCA adapters in all modules.
hca	Lists only a specific HCA.	N	A specific InfiniBand HCA.

Example:

```
hca_list
```

Output:

```
Component ID   Status   Currently Functioning   Board Description
-------------- -------- ----------------------- --------------------------
1:HCA:10:1     OK       yes                     CB194A - Connect-IB QSFP
1:HCA:7:1      OK       yes                     CB194A - Connect-IB QSFP
1:HCA:9:1      OK       yes                     CB194A - Connect-IB QSFP

Cont.:

Board ID        Part Number
--------------- -------------
MT_1210110019   46W0572
MT_1210110019   46W0572
MT_1210110019   46W0572
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
version	Version	N/A
board_description	Board Description	4
original_board_description	Original Board Description	N/A
board_id	Board ID	5
original_board_id	Original Board ID	N/A
board_type	Board Type	N/A
original_board_type	Original Board Type	N/A
serial	Serial	N/A
original_serial	Original Serial	N/A

Field ID	Field output	Default position
part_number	Part Number	6
original_part_number	Original Part Number	N/A
hardware_revision	Hardware Revision	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
adapter_id	HCA Id	N/A
guid	GUID	N/A
vendor_part_id	Vendor Part ID	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing CNA adapters in the system

Use the **cna_list** command to list CNA adapters in the storage system.

```
cna_list [ module=ModuleNumber | cna=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All CNA adapters in all modules.
cna	Lists only a specific CNA.	N	A specific CNA.

A converged network adapter (CNA) is a single network interface card that contains both a Fibre Channel host bus adapter and a TCP/IP Ethernet NIC. It connects servers to FC-based storage area networks (SANs) and Ethernet-based local area networks (LANs).

Example:

```
cna_list
```

Output:

```
Component ID   Status   Currently Functioning   Board Description
-------------- -------- ---------------------- ----------------------------
1:CNA:10:1     OK       yes                    CX312B - ConnectX-3 Pro SFP+
1:CNA:9:1      OK       yes                    CX312B - ConnectX-3 Pro SFP+

Board ID        Part Number
--------------- -------------
MT_1200111023   MCX312B-XCCT
MT_1200111023   MCX312B-XCCT
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
version	Version	N/A
board_description	Board Description	4
original_board_description	Original Board Description	N/A
board_id	Board ID	5
original_board_id	Original Board ID	N/A
board_type	Board Type	N/A
original_board_type	Original Board Type	N/A
serial	Serial	N/A
original_serial	Original Serial	N/A
part_number	Part Number	6
original_part_number	Original Part Number	N/A
hardware_revision	Hardware Revision	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
adapter_id	HCA Id	N/A
guid	GUID	N/A
vendor_part_id	Vendor Part ID	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing DIMMs in the system

Use the **dimm_list** command to list the DIMMs in the storage system.

```
dimm_list [ module=ModuleNumber  | dimm=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All DIMMs in all modules.
dimm	Lists only a specific DIMM.	N	A specific DIMM.

The memory modules (DIMMs) run the microcode and the data cache in the grid controller.

Example:

```
dimm_list -f all
```

Output:

```
Component ID   Status   Currently Functioning   Hardware Status   DIMM Id   CPU
-------------- -------- ----------------------- ----------------- --------- -----
1:DIMM:10:1    OK       yes                     OK                2         0
1:DIMM:10:2    OK       yes                     OK                4         0
1:DIMM:10:3    OK       yes                     OK                6         0
1:DIMM:11:1    OK       yes                     OK                2         0
1:DIMM:11:2    OK       yes                     OK                4         0
1:DIMM:11:3    OK       yes                     OK                6         0

Cont.:
Channel   Slot   Size(Mb)   Speed(MHz)   Manufacturer   Serial     Original Serial
--------- ------ ---------- ------------ -------------- ---------- -----------------
0         0      8192       1333         Samsung        50F84144   50F84144
1         0      8192       1333         Samsung        59F84144   59F84144
2         0      8192       1333         Samsung        FAF74144   FAF74144
0         0      8192       1333         Samsung        4AF84144   4AF84144
1         0      8192       1333         Samsung        A1F74144   A1F74144
2         0      8192       1333         Samsung        90F74144   90F74144

Cont.:
Part #             Original Part Number   Requires Service
------------------ ---------------------- ------------------
M393B1K70CH0-YH9   M393B1K70CH0-YH9
M393B1K70CH0-YH9   M393B1K70CH0-YH9
M393B1K70CH0-YH9   M393B1K70CH0-YH9
M393B1K70CH0-YH9   M393B1K70CH0-YH9
M393B1K70CH0-YH9   M393B1K70CH0-YH9
M393B1K70CH0-YH9   M393B1K70CH0-YH9
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
hardware_status	Hardware Status	4
dimm_id	DIMM Id	N/A
cpu	CPU	N/A
channel	Channel	N/A
slot	Slot	N/A
size	Size(Mb)	N/A
speed	Speed(MHz)	N/A
manufacturer	Manufacturer	N/A
serial	Serial	N/A

Field ID	Field output	Default position
original_serial	Original Serial	N/A
part_number	Part #	N/A
original_part_number	Original Part Number	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing CPUs in the system

Use the **cpu_list** command to list the central processing units (CPU) in the storage system.

```
cpu_list [ module=ModuleNumber  | cpu=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All CPUs in all modules.
cpu	Lists only a specific CPU.	N	A specific CPU.

Example:

```
cpu_list
```

Output:

```
Component ID   Status   Currently Functioning   Hardware Status   CPU Number   Family
-------------- -------- ----------------------- ----------------- ------------ --------
1:CPU:10:1     OK       yes                     OK                1            Xeon
1:CPU:11:1     OK       yes                     OK                1            Xeon
1:CPU:12:1     OK       yes                     OK                1            Xeon
1:CPU:13:1     OK       yes                     OK                1            Xeon
1:CPU:1:1      OK       yes                     OK                1            Xeon
1:CPU:2:1      OK       yes                     OK                1            Xeon
1:CPU:3:1      OK       yes                     OK                1            Xeon
1:CPU:4:1      OK       yes                     OK                1            Xeon
1:CPU:5:1      OK       yes                     OK                1            Xeon
1:CPU:6:1      OK       yes                     OK                1            Xeon
1:CPU:7:1      OK       yes                     OK                1            Xeon
1:CPU:8:1      OK       yes                     OK                1            Xeon
1:CPU:9:1      OK       yes                     OK                1            Xeon
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
hardware_status	Hardware Status	4
number	CPU Number	5
family_string	Family	6
type_string	Type	N/A
id	ID	N/A
type	Type Code	N/A
family	Family Code	N/A
model	Model Code	N/A
stepping	Stepping	N/A
max_speed	Max Speed(MHz)	N/A
current_speed	Current Speed(MHz)	N/A
status_string	Status	N/A
manufacturer	Manufacturer	N/A
version	Version	N/A
model_string	Model	N/A
signature	Signature	N/A
core_count	Cores	N/A
core_enabled	Enabled Cores	N/A
thread_count	Threads	N/A
serial	Serial	N/A
original_serial	Original Serial	N/A
part_number	Part #	N/A
original_part_number	Original Part Number	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing maintenance modules in the system

Use the **mm_list** command to list maintenance modules in the storage system.

```
mm_list [ mm=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
mm	Lists only a specific mm.	N	A specific mm.

Example:

```
mm_list -f all
```

Output:

```
Component ID            Status   Currently Functioning   Enabled   Version
----------------------- -------- ----------------------- --------- ----------
1:MaintenanceModule:1   OK       yes                     yes       MGMT-4.5


Temperature   Serial       Original Serial   Part #       Original Part Number
------------- ------------ ----------------- ------------ --------------------
49            0123456789   0123456789        0123456789   0123456789


Total Memory   Free Memory   Free disk (/)   Free disk (/var)   Link#1
-------------- ------------- --------------- ------------------ --------
932172         602096        39031456        201873624          yes


Link#2   Requires Service
-------- ------------------
yes      None
```

Field ID	Filed output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
enabled	Enabled	N/A
version	Version	N/A
temperature	Temperature	N/A
serial	Serial	N/A
original_serial	Original Serial	N/A
part_number	Part #	N/A
original_part_number	Original Part Number	N/A
total_memory	Total Memory	N/A
free_memory	Free Memory	N/A
free_disk_root	Free disk (/)	N/A
free_disk_var	Free disk (/var)	N/A
link_1	Link#1	N/A
link_2	Link#2	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
last_heartbeat_time	Last Heartbeat Time	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing NICs in the system

Use the **nic_list** command to list the NICs in the storage system.

```
nic_list [ module=ModuleNumber  | nic=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All NICs in all modules.
nic	Lists only a specific NIC.	N	A specific NIC.

Example:

```
nic_list -f all
```

Output:

```
root@nextra-MN00058-module-5:/# xcli.py nic_list -f all
Component ID   Status   Currently Functioning   Hardware Status   Device Name
-------------- -------- ----------------------- ----------------- -------------
1:NIC:4:1      OK       yes                     OK                eth0
1:NIC:4:10     OK       yes                     OK                eth9
1:NIC:4:2      OK       yes                     OK                eth1
1:NIC:4:3      OK       yes                     OK                eth2
1:NIC:4:4      OK       yes                     OK                eth3
1:NIC:4:5      OK       yes                     OK                eth4
1:NIC:4:6      OK       yes                     OK                eth5
1:NIC:4:7      OK       yes                     OK                eth6
1:NIC:4:8      OK       yes                     OK                eth7
1:NIC:4:9      OK       yes                     OK                eth8
1:NIC:5:1      OK       yes                     OK                eth0
1:NIC:5:10     OK       yes                     OK                eth9
1:NIC:5:2      OK       yes                     OK                eth1

Cont.:
Serial             Part #                     Requires Service
------------------ -------------------------- ------------------
00:15:17:65:39:8c  8086_1096_0901e612_1.0-0    no
00:1b:21:29:e2:e2  8086_10bc_0901e612_5.10-2   no
00:15:17:65:39:8c  8086_1096_0901e612_1.0-0    no
00:1b:21:29:e2:d0  8086_10bc_0901e612_5.10-2   no
00:1b:21:29:e2:d0  8086_10bc_0901e612_5.10-2   no
00:1b:21:29:e2:d2  8086_10bc_0901e612_5.10-2   no
00:1b:21:29:e2:d2  8086_10bc_0901e612_5.10-2   no
00:1b:21:29:e2:e0  8086_10bc_0901e612_5.10-2   no
00:1b:21:29:e2:e0  8086_10bc_0901e612_5.10-2   no
00:1b:21:29:e2:e2  8086_10bc_0901e612_5.10-2   no
00:15:17:65:39:20  8086_1096_0901e612_1.0-0    no
00:1b:21:29:e2:ee  8086_10bc_0901e612_5.10-2   no
00:15:17:65:39:20  8086_1096_0901e612_1.0-0    no
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
hardware_status	Hardware Status	4
device_name	Device Name	5
serial	Serial	N/A
original_serial	Original Serial	N/A
part_number	Part #	N/A
original_part_number	Original Part Number	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Monitoring the rebuilding or redistribution processes

Use the **monitor_redist** command to monitor the status of the rebuilding or redistribution process.

```
monitor_redist
```

This command outputs the current rebuild or redistribution process running on a module. The command does not yield information about a Flash enclosure.

The command may inform you that no such process exists. If such a process exists, the following information is shown:

- Type (adding new capacity, replacing failed component, phase-out, rebuild after failure)
- Initial capacity to copy
- Time started
- Capacity remaining to copy
- Time elapsed
- Percent completed
- Estimated time to completion

Field ID	Field output	Default position
type	Type	1
initial_capacity_to_copy	Initial Capacity to Copy (GB	2
capacity_remaining_to_copy	Capacity Remaining to Copy (GB)	3
percent_done	% Done	4
time_started	Time Started	5
estimated_time_to_finish	Estimated Time to Finish	6
time_elapsed	Time Elapsed	7

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing disk status

Use the **disk_list** command to list special disk statuses.

```
disk_list [ module=ModuleNumber  | disk=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
module	Limits the listing to a specific module.	N	All disks in all modules.
disk	Disk for which special statuses are to be listed.	N	All disks.

This command lists the statuses of the disk, including:

- Component generic status
- Disk capacity
- Model
- Serial

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
capacity	Capacity	4
target_status	Target Status	5
vendor	Vendor	6
model	Model	7
size	Size	8
serial	Serial	9
reported_serial	Reported Serial	10
device_identifier	Identifier	11
firmware	Firmware	12
part_number	Fru	13
group	Group	14
temperature	Temperature	15
encryption_state	Encryption State	16
controller_type	Controller Type	17
hypervisor_location	Physical Location	18
media_type	Media Type	19
original_vendor	Original Vendor	N/A
original_model	Original Model	N/A
original_serial	Original Serial	N/A
original_reported_serial	Original Reported Serial	N/A
original_device_identifier	Original Identifier	N/A
original_part_number	Original Fru	N/A
original_firmware	Original Firmware	N/A
original_group	Original Group	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
revision	Revision	N/A
original_revision	Original Revision	N/A
drive_pn	Drive P/N	N/A
original_drive_pn	Original Drive P/N	N/A

Field ID	Field output	Default position
desc.bgd_scan	Background Scan	N/A
desc.disk_id	Disk ID	N/A
desc.last_sample_serial	Last Sample Serial	N/A
desc.last_sample_time	Last Sample Time	N/A
desc.power_is_on	Power On	N/A
desc.power_on_hours	Power On Hours	N/A
desc.power_on_minutes	Power On Minutes	N/A
desc.last_time_pom_was_mod	Last Time Power On Minutes Was Modified	N/A
desc.read_fail	Read Fail	N/A
desc.smart_code	SMART Code	N/A
desc.smart_fail	SMART Fail	N/A
desc.temperature_status. reported_severity	Reported Temperature Severity	N/A
desc.temperature_status. reported_temperature	Reported Temperature	N/A
desc.temperature_status. temperature	Disk Temperature	N/A
security_state	Security State	N/A
security_state_last	Last Security State	N/A
lsa_ios_enabled	LSA IOs Enabled	N/A
desc.ssd_endurance	SSD endurance	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing module configuration

Use the **module_list** command to list the configuration of all or specified modules.

```
module_list [ module=ModuleNumber ]
```

Parameters

Name	Description	Mandatory	Default
module	Lists the configuration of the specified module.	N	All modules

This command lists the following information for each module:

- Generic component status
- Module type

- Number of disks
- Number of FC ports
- Number of Ethernet ports for iSCSI

Additional information is available through running `module_list -t all` :
- Serial
- Original serial
- Part number
- Original part number

Example:

```
module_list
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
target_status	Target Status	4
type	Type	5
disk_bay_count	Data Disks	6
fc_port_count	FC Ports	7
ethernet_port_count	iSCSI Ports	8
normalized_temperature	Temperature	9
serial	Serial	N/A
original_serial	Original Serial	N/A
part_number	Part Number	N/A
original_part_number	Original Part Number	N/A
usm_version	USM	N/A
bmc_version	BMC	N/A
bios_version	BIOS	N/A
fpga_version	FPGA	N/A
ses_version	SES	N/A
pdb_firmware	PDB	N/A
pcm_1_firmware	PSU-1	N/A
pcm_2_firmware	PSU-2	N/A
fan_controller_firmware	Fan Controller	N/A
battery_firmware	Battery Firmware	N/A
sas_version	SAS	N/A
infiniband_hca_version	InfiniBand HCA	N/A
cna_version	CNA	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
memory_gb	Mem	N/A
temperature	SES Temperature	N/A
chassis_serial	Chassis Serial	N/A
chassis_part_number	Chassis Part Number	N/A
electronics_serial	Electronics Serial	N/A

Field ID	Field output	Default position
electronics_part_number	Electronics Part Number	N/A
module_11s_number	11S Number	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Checking serial connections of modules

Use the **serial_console_check** to check serial connections between modules.

```
serial_console_check
```

This command checks serial connections between modules and sends events reflecting the connectivity status.

Example:

```
serial_console_check
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Listing serial console statuses

Use the **serial_consoles_list** command to list serial consoles.

```
serial_consoles_list  [ monitoring_module_id=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
monitoring_module_id	List the status of the specified module only.	N	All modules

Example:

```
serial_consoles_list
```

Output:

```
Monitoring Module Desired Module Connected Module Status         Is Module Alive Is HW Node
----------------- -------------- ---------------- -------------- --------------- ----------
1:Module:1        1:Module:3     1:Module:3       GOOD           yes             yes
1:Module:15       1:Module:14    1:Module:14      GOOD           yes             yes
1:Module:2        1:Module:1     1:Module:1       GOOD           yes             yes
1:Module:3        1:Module:2     1:Module:2       NO_SERIAL_DATA yes             yes
1:Module:4        1:Module:6     1:Module:6       GOOD           yes             yes
1:Module:6        1:Module:5     1:Module:5       MODULE_FAILED  no              no
1:Module:7        1:Module:9     1:Module:9       GOOD           yes             yes
1:Module:8        1:Module:7     1:Module:7       GOOD           yes             yes
1:Module:9        1:Module:8     1:Module:8       GOOD           yes             yes
```

Field ID	Field output	Default position
monitoring_module_id	Monitoring Module	1
desired_module_id	Desired Module	2
connected_module_id	Connected Module	3
state	Status	4
module_alive	Is Module Alive	5
hw_node_alive	Is HW Node Alive	6

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Displaying the status of a UPS component

Use the **ups_list** command to display the status of a UPS component.

```
ups_list [ ups=ComponentId ]
```

Parameters:

Name	Description	Mandatory	Default
ups	Lists the status only for the specified UPS.	N	All UPS systems.

The following information is provided:

- Generic status
- Input power on: Y/N
- Battery charge level

- Last date of self-test
- Result of last self-test
- Is monitoring enabled
- Last calibration date
- result of last calibration
- Status of UPS
- Date of next self test
- Serial Number
- Load level percent
- Apparent load level percent
- Cable check result

Additional information, available through running `ups_list -f all`, includes:

- Last Calibration Date
- Last Calibration Result
- Next Self Test
- Serial
- Original Serial
- Load % Watts
- Apparent Load % VA
- Minutes Left
- Temperature
- AOS Version
- Self-test Status
- Component Test Status
- Batteries Date
- UPS Manufacture Date
- Cable check result

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
input_power_on	Input Power On	4
runtime_remaining	Runtime Remaining	5
battery_charge_level	Battery Charge Level	6
last_self_test_date	Last Self Test Date	7
last_self_test_result	Last Self Test Result	8
is_enabled	Monitoring Enabled	9
ups_status	UPS Status	10
last_calibration_date	Last Calibration Date	N/A
last_calibration_result	Last Calibration Result	N/A
serial	Serial	N/A
original_serial	Original Serial	N/A
load_power_percent	Load % Watts	N/A
apparent_load_power_percent	Apparent Load % VA	N/A

Field ID	Field output	Default position
power_consumption	Power Consumption	N/A
predictive_power_load	Predictive Power Load %	N/A
predictive_remaining_runtime	Predictive Remaining Runtime	N/A
internal_temperature	Temperature	N/A
aos_version	AOS Version	N/A
application_version	Application Version	N/A
firmware_version	Firmware Version	N/A
self_test_status	Self-Test Status	N/A
component_test_status	Component Test Status	N/A
battery_year.0	First Battery Year Born	N/A
battery_week.0	First Battery Week Born	N/A
battery_year.1	Second Battery Year Born	N/A
battery_week.1	Second Battery Week Born	N/A
battery_serial	First Battery Serial	N/A
original_battery_serial	Original First Battery Serial	N/A
second_battery_serial	Second Battery Serial	N/A
original_second_battery_serial	Original Second Battery Serial	N/A
manufacture_date	UPS Manufacture Date	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
cable_check_result	Cable Check Result	N/A

Access Control:

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying the service status

Use the **service_list** command to list all service specific statuses.

```
service_list [ service=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
service	The service to be listed.	N	All services

This command lists the statuses that apply to services. The list includes the following information:

- Component generic status
- Service on/failed

- Comment (optional)

Example:

```
service_list
```

Output:

```
Component ID          Status   Currently Functioning   Target Status
--------------------- -------- ---------------------- ---------------
1:Data:10             OK       yes
1:Data:11             OK       yes
1:Data:7              OK       yes
1:Data:9              OK       yes
1:Data_Reduction:10   OK       yes
1:Data_Reduction:11   OK       yes
1:Data_Reduction:7    OK       yes
1:Data_Reduction:9    OK       yes
1:Interface:10        OK       yes
1:Interface:11        OK       yes
1:Interface:9         OK       yes
1:Remote:10           OK       yes
1:Remote:11           OK       yes
1:Remote:9            OK       yes
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
target_status	Target Status	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Stopping system traces

Use the **traces_stop** command to stop system traces.

```
traces_stop
```

Field ID	Field output	Default position
module	Module	1
status	Status	2

Example:

```
traces_stop
```

Output:

```
Module        Status
------------- ---------
1:Module:1    Stopped
1:Module:2    Stopped
1:Module:3    Stopped
1:Module:4    Stopped
1:Module:5    Stopped
1:Module:6    Stopped
1:Module:7    Stopped
1:Module:8    Stopped
1:Module:9    Stopped
1:Module:10   Stopped
1:Module:11   Stopped
1:Module:12   Stopped
1:Module:13   Stopped
1:Module:14   Stopped
1:Module:15   Stopped
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Resuming system traces

Use the **traces_resume** command to resume system traces.

```
traces_resume
```

Field ID	Field output	Default position
module	Module	1
status	Status	2

Example:

```
traces_resume
```

Output:

```
Module        Status
------------- ---------
1:Module:1    Running
1:Module:2    Running
1:Module:3    Running
1:Module:4    Running
1:Module:5    Running
1:Module:6    Running
1:Module:7    Running
1:Module:8    Running
1:Module:9    Running
1:Module:10   Running
1:Module:11   Running
1:Module:12   Running
1:Module:13   Running
1:Module:14   Running
1:Module:15   Running
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying the status of system traces

Use the **traces_status_list** command to display the status of system traces.

```
traces_status_list
```

Field ID	Field output	Default position
module	Module	1
status	Status	2

Example:

```
traces_status_list
```

Output:

```
Module       Status
------------ ---------
1:Module:1   Running
1:Module:2   Running
1:Module:3   Stopped
1:Module:4   Running
1:Module:5   Running
1:Module:6   Running
1:Module:7   Running
1:Module:8   Running
1:Module:9   Running
1:Module:10  Running
1:Module:11  Running
1:Module:12  Running
1:Module:13  Running
1:Module:14  Running
1:Module:15  Running
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Creating a trace snapshot

Use the **traces_snapshot** command to create a trace snapshot.

```
traces_snapshot [ snapshot_back_time=MINUTES ] [ snapshot_delay_time=MINUTES ]
```

Parameters

Name	Type	Description	Mandatory	Default
snapshot_delay_time	Integer	Max delay between the request and snapshot creation.	N	no. Uses configuration misc.internal.auto_snapshot_trace.last_snapshot_minutes_delay field.
snapshot_back_time	Integer	Time back from the request time to include in the snapshot.	N	no. Uses configuration misc.internal.auto_snapshot_trace.snapshot_back_time field.

Example:

```
traces_snapshot snapshot_back_time=60 snapshot_delay_time=1
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing trace snapshot on a module

Use the **traces_snapshot_list** command to list trace snapshots on a module.

```
traces_snapshot_list module=ModuleNumber
```

Parameters

Name	Description	Mandatory
module	Component ID of the module to query.	Y

Field ID	Field output	Default position
snapshot	Snapshot Directories	1

Example:

```
traces_snapshot_list  module=1:Module:9
```

Output:

```
Snapshots Directories
--------------------------------
1__20120802_1653_20120802_1713
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Enabling XIV Support access

Use the **xiv_support_enable** command to enable XIV Support access for a specific period of time limiting access from the specific address.

```
xiv_support_enable  [ start=TimeStamp ]
< finish=TimeStamp | timeout=Timeout > from=IPaddress comment=Comment
```

Parameters

Name	Type	Description	Mandatory	Default
start	N/A	Start time for allowing XIV Support access.	N	Immediately.
finish	N/A	End time for allowing XIV Support access.	N	N/A
timeout	N/A	Timeout for allowing XIV Support access in either hh:mm format, or a number of minutes. The timeout cannot exceed 23 hours and 59 minutes. The word `unlimited` denotes unexpired timeout.	N	N/A
from	N/A	The source address to which XIV Support access is limited. It may be either IPv4 or IPv6 address, or `any`, or `technician` denoting laptop port.	Y	N/A
comment	String	Reason why XIV Support access is enabled.	Y	N/A

This command enables XIV Support access for a specific period of time limiting access from the specific address.

Example:

```
xiv_support_enable finish=2012-2-3.16:30 from=1.2.3.4 comment="Some reason"
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_ENABLE_XIV_SUPPORT**
  Are you sure you want to enable xiv support?

Return codes

- **XIV_SUPPORT_WORK_INVALID_TIMEOUT**
  Timeout must be positive and define time creater then the current time.
- **XIV_SUPPORT_WORK_INVALID_FINISH**
  Finish must be greater then start and the current time.
- **XIV_SUPPORT_WORK_INVALID_FROM**
  From must be valid IPv4 or IPv6 address.

Disabling XIV Support access

Use the **xiv_support_disable** command to disable XIV Support access.

```
xiv_support_disable
```

Example:

```
xiv_support_disable
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Displaying the XIV Support window

Use the **xiv_support_show** command to display the XIV Support window.

```
xiv_support_show
```

The following information is listed:

- From (IPv4 or IPv6 addresses, or "any address", or "technician port")
- Start (timestamp or "unlimited")
- Finish (timestamp or "unlimited")
- Comment

Example:

```
xiv_support_show
```

Output:

```
From      Start                Finish               Comment
--------- -------------------- -------------------- -----------
1.2.3.4   2012-03-28 12:55:21  2012-03-30 00:00:00  some work
```

Field ID	Field output	Default position
enabled	Enabled	1
from	From	2
start	Start	3
finish	Finish	4
comment	Comment	5

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing SSDs used as flash cache

Use the **ssd_list** command to list SSDs used as flash cache in the storage system.

```
ssd_list [ ssd=ComponentId ]
```

Parameters

Name	Description	Mandatory	Default
ssd	Drive for which status is requested.	N	All SSDs.

Example:

```
ssd_list
```

Output:

```
Component ID   Status   Currently Functioning   Capacity   Target Status   Vendor
-------------- -------- ---------------------- ---------- --------------- --------
1:SSD:1:1      Ready    yes                     480GB                      IBM
1:SSD:1:1      Ready    yes                     480GB                      IBM
1:SSD:3:1      Ready    yes                     480GB                      IBM

Cont:
Model                Size     Serial                 Reported Serial
-------------------- -------- ---------------------- -----------------
MZ7GE480HMHP-000M3   457854   Axwv9mBCxmgjwrvolgj4   40Y7H0RV
MZ7GE480HMHP-000M3   457854   Axwv9mBCxmgjwrvo32j4   40Y7H0RV
MZ7GE480HMHP-000M3   457854   Cwpv9mBoxmgjwrvolhg4   40Y7H0RE

Cont:
Identifier         Firmware   Fru       Group   Temperature   Encryption State
------------------ ---------- --------- ------- ------------- ------------------
5002538800259d9d   EXT0       00FN358           0             Uninitialized
5002538800259d32   EXT0       00FN358           0             Uninitialized
5002538800259d8f   EXT0       00FN358           0             Uninitialized

Cont:
Physical Location
-------------------
slot: 6
slot: 6
slot: 6
```

Field ID	Field output	Default position
component_id	Component ID	1
status	Status	2
currently_functioning	Currently Functioning	3
capacity	Capacity	4
target_status	Target Status	5
vendor	Vendor	6
model	Model	7
size	Size	8
serial	Serial	9
reported_serial	Reported Serial	10
device_identifier	Identifier	11
firmware	Firmware	12
part_number	Fru	13
group	Group	14
temperature	Temperature	15
encryption_state	Encryption State	16
hypervisor_location	Physical Location	17
original_vendor	Original Vendor	N/A
original_model	Original Model	N/A
original_serial	Original Serial	N/A
original_reported_serial	Original Reported Serial	N/A

Field ID	Field output	Default position
original_device_identifier	Original Identifier	N/A
original_part_number	Original Fru	N/A
original_firmware	Original Firmware	N/A
original_group	Original group	N/A
requires_service	Requires Service	N/A
service_reason	Service Reason	N/A
revision	Revision	N/A
original_revision	Original Revision	N/A
drive_pn	Drive_pn	N/A
original_drive_pn	Original drive pn	N/A
desc.last_sample_serial	Last Sample Serial	N/A
desc.last_sample_time	Last Sample Time	N/A
desc.power_on_hours	Power On Hours	N/A
desc.block_wear_leveling	Block Wear Leveling	N/A
desc.secure_erase_status	Secure Erase Status	N/A
desc.temperature_status. reported_severity	Reported Severity	N/A
desc.temperature_status. reported_temperature	Reported Temperature	N/A
desc.temperature_status. temperature	SSD Temperature	N/A

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Disabling the SSD caching

Use the **ssd_caching_disable** command to disable flash caching.

```
ssd_caching_disable
```

Example:

```
ssd_caching_disable
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SSD_CACHING_NOT_ENABLED**
  SSD caching was not enabled.

Enabling the SSD caching

Use the **ssd_caching_enable** command to enable SSD caching.

```
ssd_caching_enable
```

Example:

```
ssd_caching_enable
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **COMPONENT_DOES_NOT_EXIST**
  Component does not exist.
- **SSD_CACHING_ALREADY_ENABLED**
  SSD caching was already enabled.
- **HOT_UPGRADE_IS_NOT_ONGOING**
  Hot upgrade is not currently ongoing.
- **CANNOT_WRITE_TO_KEY_REPOSITORY**
  Failed writing keys to the key repository.
  Troubleshooting: Contact support.

- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Define a master key server by invoking encrypt_key server_update and try again.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.
- **FIRMWARE_UPGRADE_IN_PROGRESS**

  Firmware upgrade in progress.

  Troubleshooting: Contact support.

Getting the default state of the SSD caching

Use the **vol_default_ssd_caching_get** command to get the default state of the SSD caching.

```
vol_default_ssd_caching_get
```

This default state of the SSD caching can be overridden by the **vol_ssd_caching_set** command.

Example:

```
vol_default_ssd_caching_get
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **SSD_CACHING_NOT_ENABLED**

  SSD caching was not enabled.

Setting the default for SSD caching

Use the **vol_default_ssd_caching_set** command to set the default state for SSD caching.

```
vol_default_ssd_caching_set default=<DEFAULT|ENABLED|DISABLED>
```

Parameters

Name	Type	Description	Mandatory
default	Enumeration	The SSD caching state that will be the default.	Y

This command sets the default value for SSD caching state. If a volume is assigned for SSD caching, this default value will be applied automatically.

Example:

```
vol_default_ssd_caching_set default
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Overriding the SSD caching state

Use the **vol_ssd_caching_set** command to override the default SSD caching state for a volume.

```
vol_ssd_caching_set  [ vol=VolName ] state=<enabled|disabled|default>
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	The name of the volume.	N	All volumes.
state	Enumeration	The SSD caching state that overrides the default.	Y	N/A

Example:

```
vol_ssd_caching_set vol state
```

Output:

```
Command executed successfully
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_APPLY_THE_SSD_CACHING_DEFAULT_ON_ALL_VOLUMES**
  Are you sure you want to have all volumes use the default SSD caching setting?
- **ARE_YOU_SURE_YOU_WANT_TO_ENABLE_SSD_CACHING_FOR_ALL_VOLUMES**
  Are you sure you want to enable SSD caching for all volumes?
- **ARE_YOU_SURE_YOU_WANT_TO_DISABLE_SSD_CACHING_FOR_ALL_VOLUMES**
  Are you sure you want to disable SSD caching for all volumes?

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist.
- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots.
- **DOMAIN_IS_NOT_ALLOWED_TO_USE_SSD_CACHING**
  Trying to set volume SSD caching state in domain which is not allowed to use SSD caching.

Displaying the system's average power consumption

Use the **system_average_power_consumption** command to display the storage system's average power consumption.

```
system_average_power_consumption
```

Example:

```
system_average_power_consumption
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Displaying the system's average temperature

Use the **system_average_temperature** command to display the system's average temperature.

```
system_average_temperature
```

Example:

```
system_average_temperature
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Listing SSD endurance for all data SSDs

Use the **ssd_device_endurance_list** command to list the SSD endurance values for data SSDs.

```
ssd_device_endurance_list [ device=ComponentId ] [ module=ModuleNumber ]
```

Parameters

Name	Description	Mandatory	Default
device	Lists only this device.	N	All SSD data devices.
module	Lists only data disk SSD in this module.	N	All modules.

...

Field ID	Field output	Default position
module_id	Module	1
component_id	Device	2

Field ID	Field output	Default position
used_endurance	Last Monitored Endurance	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **DATA_DEVICE_TYPE_NOT_SSD**
  System configuration has no SSD type data devices.
- **ONLY_ONE_PARAMETER_SHOULD_BE_SUPPLIED**
  Please supply only one parameter or none.

Setting SSD endurance monitoring thresholds

Use the **ssd_endurance_thresholds_set** command to set SSD endurance monitoring thresholds.

```
ssd_endurance_thresholds_set severity=<INFORMATIONAL|WARNING|MINOR|MAJOR>
[ threshold=ThresholdValue ]
```

Parameters

Name	Type	Description	Mandatory	Default
severity	Enumeration	Severity of the monitoring event.	Y	N/A
threshold	Positive integer	SSD endurance threshold for triggering monitoring event with the above severity.	N	No threshold

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DATA_DEVICE_TYPE_NOT_SSD**

  System configuration has no SSD type data devices.
- **EVENT_THRESHOLD_IS_ILLEGAL**

  Illegal value for event threshold.

  Troubleshooting: Event threshold values must be monotonic

Displaying SSD endurance monitoring thresholds

Use the **ssd_endurance_thresholds_get** to display SSD endurance monitoring thresholds.

```
ssd_endurance_thresholds_get
```

Field ID	Field output	Default position
threshold	Threshold %	1
severity	Severity	2

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **DATA_DEVICE_TYPE_NOT_SSD**

  System configuration has no SSD type data devices.

Chapter 21. Statistics commands

This section describes the command-line interface (CLI) for getting system statistics.

Getting performance statistics

Use the **statistics_get** command to retrieve performance statistics from the storage system.

```
statistics_get [ perf_class=perfClassName | host=HostName | host_iscsi_name=initiatorName |
host_fc_port=WWPN | target=RemoteTarget | remote_fc_port=WWPN | remote_ipaddress=IPAddress |
vol=VolName | domain=DomainName | ipinterface=IPInterfaceName | local_fc_port=ComponentId ]
< start=TimeStamp | end=TimeStamp > [ module=ModuleNumber ]
count=N interval=IntervalSize resolution_unit=<minute|hour|day|week|month>
```

Parameters

Name	Type	Description	Mandatory	Default
host	Object name	Limits statistics to the specific host only.	N	All hosts
host_fc_port	N/A	FC address of the host port.	N	All ports.
target	Object name	Limits statistics to I/O generated by the specified remote target only (due to remote mirroring).	N	All targets.
remote_fc_port	N/A	Limits statistics to the specified host/remote FC port only.	N	All ports.
remote_ipaddress	N/A	IP address of the remote target port.	N	All ports.
host_iscsi_name	iSCSI initiator name	Limits statistics to the specified iSCSI initiator only.	N	All ports.
ipinterface	Object name	Limits statistics to the specified IP interface (relevant for iSCSI only).	N	All interfaces.
module	N/A	Limits statistics to the specified module only.	N	All modules.
local_fc_port	N/A	Limits statistics to I/O performed on the specified FC port only.	N	All ports.
vol	Object name	Limits statistics to the specified volume only.	N	All volumes.
domain	Object name	Limits statistics to the specified domain only.	N	All domains.

Name	Type	Description	Mandatory	Default
start	N/A	Starting point for the statistics report.	N	N/A
end	N/A	Ending point for the statistics report.	N	N/A
count	Positive integer	Number of time points reported.	Y	N/A
interval	Positive integer	The length of time in each statistic's time point. The resolution of this number is set in *resolution_unit*.	Y	N/A
resolution_unit	Enumeration	Sets the unit of measurement for the length of each bin.	Y	N/A
perf_class	Object name	Displays performance class aggregated statistics for bandwidth and IOPS.	N	All Performance classes.

This command lists I/O statistics. The **count** parameter sets the number of lines in the statistics report. The combination of the **interval** and **resolution_unit** parameters sets the length of time for each statistics line. Either start or end timestamp must be provided. These timestamps set the time for the statistics report. Other parameters restrict statistics to a specific host, host port, volume, domain, interface port and so on.

For each line of statistics, 48 numbers are reported, which represent all the combinations of reads/writes, hits/misses and I/O size reporting for each of the 16 options for bandwidth, IOPS and latency. Statistics collection is limited to 32 pools and 200 volumes.

The syntax for the **start** and **end** fields is as follows: `Y-M-D[.[h[:m[:s]]]]`, where the ranges are as follows:

- Y - year (four digit)
- M - month (1-12)
- D - day (1-31)
- h - hour (0-23, with 0 as default)
- m - minute (0-59, with 0 as default)
- s - second (0-59, with 0 as default)

The year, month and day are separated by dashes, and the optional hours, minutes and seconds are separated by colons.

Output units:

- Very Large blocks are >512KB
- Large blocks - 64-512KB
- Medium blocks - 8-64KB
- Small blocks - 0-8KB

- The latency is in Microseconds
- The bandwidth is in KB

Field ID	Field output	Default position
time	Time	1
failures	Failures	N/A
aborts	Aborts	N/A
read_hit_very_large_iops	Read Hit Very large - IOps	2
read_hit_very_large_latency	Read Hit Very large - Latency	3
read_hit_very_large_ throughput	Read Hit Very large - Throughput	4
read_hit_large_iops	Read Hit Large - IOps	5
read_hit_large_latency	Read Hit Large - Latency	6
read_hit_large_throughput	Read Hit Large - Throughput	7
read_hit_medium_iops	Read Hit Medium - IOps	8
read_hit_medium_latency	Read Hit Medium - Latency	9
read_hit_medium_throughput	Read Hit Medium - Throughput	10
read_hit_small_iops	Read Hit Small - IOps	11
read_hit_small_latency	Read Hit Small - Latency	12
read_hit_small_throughput	Read Hit Small - Throughput	13
read_miss_very_large_iops	Read Miss Very large - IOps	14
read_miss_very_large_latency	Read Miss Very large - Latency	15
read_miss_very_large_ throughput	Read Miss Very large - Throughput	16
read_miss_large_iops	Read Miss Large - IOps	17
read_miss_large_latency	Read Miss Large - Latency	18
read_miss_large_throughput	Read Miss Large - Throughput	19
read_miss_medium_iops	Read Miss Medium - IOps	20
read_miss_medium_latency	Read Miss Medium - Latency	21
read_miss_medium_throughput	Read Miss Medium - Throughput	22
read_miss_small_iops	Read Miss Small - IOps	23
read_miss_small_latency	Read Miss Small - Latency	24
read_miss_small_throughput	Read Miss Small - Throughput	25
write_hit_very_large_iops	Write Hit Very large - IOps	26
write_hit_very_large_latency	Write Hit Very large - Latency	27
write_hit_very_large_ throughput	Write Hit Very large - Throughput	28
write_hit_large_iops	Write Hit Large - IOps	29
write_hit_large_latency	Write Hit Large - Latency	30
write_hit_large_throughput	Write Hit Large - Throughput	31
write_hit_medium_iops	Write Hit Medium - IOps	32
write_hit_medium_latency	Write Hit Medium - Latency	33
write_hit_medium_throughput	Write Hit Medium - Throughput	34
write_hit_small_iops	Write Hit Small - IOps	35
write_hit_small_latency	Write Hit Small - Latency	36
write_hit_small_throughput	Write Hit Small - Throughput	37
write_miss_very_large_iops	Write Miss Very large - IOps	38
write_miss_very_large_latency	Write Miss Very large - Latency	39

Field ID	Field output	Default position
write_miss_very_large_ throughput	Write Miss Very large - Throughput	40
write_miss_large_iops	Write Miss Large - IOps	41
write_miss_large_latency	Write Miss Large - Latency	42
write_miss_large_throughput	Write Miss Large - Throughput	43
write_miss_medium_iops	Write Miss Medium - IOps	44
write_miss_medium_latency	Write Miss Medium - Latency	45
write_miss_medium_throughput	Write Miss Medium - Throughput	46
write_miss_small_iops	Write Miss Small - IOps	47
write_miss_small_latency	Write Miss Small - Latency	48
write_miss_small_throughput	Write Miss Small - Throughput	49
read_memory_hit_very_large_ iops	Read Memory-Hit Very large - IOps	50
read_memory_hit_very_large_ latency	Read Memory-Hit Very large - Latency	51
read_memory_hit_very_large_ throughput	Read Memory-Hit Very large - Throughput	52
read_memory_hit_large_iops	Read Memory-Hit Large - IOps	53
read_memory_hit_large_latency	Read Memory-Hit Large - Latency	54
read_memory_hit_large_ throughput	Read Memory-Hit Large - Throughput	55
read_memory_hit_medium_iops	Read Memory-Hit Medium - IOps	56
read_memory_hit_medium_latency	Read Memory-Hit Medium - Latency	57
read_memory_hit_medium_ throughput	Read Memory-Hit Medium - Throughput	58
read_memory_hit_small_iops	Read Memory-Hit Small - IOps	59
read_memory_hit_small_latency	Read Memory-Hit Small - Latency	60
read_memory_hit_small_ throughput	Read Memory-Hit Small - Throughput	61
time_in_seconds	Time (s)	62

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **BAD_TIME_FORMAT**

  Bad time format. Should be YYYY-MM-DD[.HH[:MM[:SS]]]

- **TARGET_PORT_BAD_ADDRESS**
  Remote port address is illegal or does not belong to the remote target
- **VOLUME_BAD_NAME**
  Volume name does not exist
- **STATS_TOO_MANY_SAMPLES**
  Requested number of statistics samples is too high
- **TARGET_BAD_NAME**
  Target name does not exist
- **COMPONENT_DOES_NOT_EXIST**
  Component does not exist
- **HOST_BAD_NAME**
  Host name does not exist
- **HOST_PORT_DOES_NOT_EXIST**
  Port ID is not defined
- **IPINTERFACE_DOES_NOT_EXIST**
  IP Interface name does not exist
- **PERF_CLASS_BAD_NAME**
  Performance Class does not exist
- **COMMAND_AMBIGUOUS**
  User belongs to more than one domain. Please specify a domain or a specific object.
- **DOMAIN_DOESNT_EXIST**
  Domain does not exist.

Retrieving usage history

Use the **usage_get** command to display the usage history of a volume or a storage pool.

```
usage_get < vol=VolName | pool=PoolName > [ start=TimeStamp | start_in_seconds=StartTime ]
[ end=TimeStamp ] [ max=MaxEntries ]
```

Parameters

Name	Type	Description	Mandatory	Default
vol	Object name	Volume for which usage statistics are retrieved.	N	N/A
pool	Object name	Storage pool for which usage statistics are retrieved.	N	N/A
start	N/A	Starting time for usage history retrieval.	N	Creation time of the object.
end	N/A	Ending time for usage history retrieval.	N	Current time.
max	Integer	Maximum number of entries to retrieve.	N	No limit.

Name	Type	Description	Mandatory	Default
start_in_seconds	Integer	Starting time for usage history retrieval, in seconds since 12:00:00 AM, 1 January 1970.	N	Creation time of the object.

This command retrieves the usage history of a storage pool or volume in megabytes (MB).

Example:

```
usage_get pool=DBPool
```

Output:

```
Time                 Volume Usage (MiB)   Snapshot Usage (MiB)
-------------------- -------------------- ---------------------
2016-03-29 12:00:00   0                    0
2016-03-29 13:00:00   0                    0
2016-03-29 14:00:00   0                    0
```

Field ID	Field output	Default position
time	Time	1
volume_usage	Volume Usage (MiB)	2
snapshot_usage	Snapshot Usage (MiB)	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Disallowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **VOLUME_BAD_NAME**
  Volume name does not exist
- **POOL_DOES_NOT_EXIST**
  Storage Pool does not exist
- **BAD_TIME_FORMAT**
  Bad time format. Should be YYYY-MM-DD[.HH[:MM[:SS]]]
- **END_BEFORE_START**
  End Time should be later than Start Time
- **VOLUME_IS_SNAPSHOT**
  Operation is not permitted on snapshots

Chapter 22. Metadata commands

This section describes the command-line interface (CLI) for handling metadata.

Setting metadata

Use the **metadata_set** command to set metadata of an object.

```
metadata_set object_type=Object name=Name key=Key value=Value
```

Parameters

Name	Type	Description	Mandatory
object_type	Enumeration	An object type. Available values: cg, cluster, dest, destgroup, host, performanceclass, pool, rule, schedule, smsgw, smtpgw, target, user, user_group, vol.	Y
name	Object name	An object name.	Y
key	String	Metadata key.	Y
value	String	Metadata value.	Y

This command sets a new metadata key value for the specified object. The new value overrides the previous one, if it exists.

The value can be an empty string. Up to 16 values are allowed, each limited to 128 bytes.

Example:

```
metadata_set object_type=host name=Host1 key=01 value=Host
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A

User Category	Permission	Condition
Application administrator	Conditionally Allowed	Metadata can be set for only volumes, snapshots, snapshot groups, clusters or hosts, and only for objects associated with the application administrator executing the command. Hosts or clusters should be associated with the user. Volumes should be mapped to a host or a cluster associated with the user. Snapshots or snapshot groups should be ones created by application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **OBJECT_BAD_NAME**
  Referenced object does not exist.
- **MAX_METADATA_OBJECTS_REACHED**
  Maximal number of metadata objects has been reached.

Deleting metadata

Use the **metadata_delete** command to delete an object's metadata.

```
metadata_delete object_type=Object name=Name key=Key
```

Parameters

Name	Type	Description	Mandatory
object_type	Enumeration	Type of object. Available values: cg, cluster, dest, destgroup, host, performanceclass, pool, rule, schedule, smsgw, smtpgw, target, user, user_group, vol.	Y
name	Object name	The name of the target object.	Y
key	String	Metadata key.	Y

This command deletes a metadata key value for the specified object.

The command will fail if the key is not defined.

Example:

```
metadata_delete object_type=host name=Host1 key=01
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission	Condition
Storage administrator	Allowed	N/A
Application administrator	Conditionally Allowed	Metadata can be set for only volumes, snapshots, snapshot groups, clusters or hosts, and only for objects associated with the application administrator executing the command. Hosts or clusters should be associated with the user. Volumes should be mapped to a host or a cluster associated with the user. Snapshots or snapshot groups should be ones created by application administrator.
Security administrator	Disallowed	N/A
Read-only users	Disallowed	N/A
Operations administrator	Disallowed	N/A
Host side accelerator client	Disallowed	N/A

Return codes

- **OBJECT_BAD_NAME**

  Referenced object does not exist.
- **METADATA_OBJECT_KEY_NOT_FOUND**

  The specified metadata object does not exist.

Listing metadata

Use the **metadata_list** command to list an object's metadata.

```
metadata_list [ object_type=Object ] [ name=Name ] [ key=Key ] [ domain=DomainName ]
```

Parameters

Name	Type	Description	Mandatory	Default
object_type	Enumeration	Type of object.	N	Type of object. Available values: cg, cluster, dest, destgroup, host, performanceclass, pool, rule, schedule, smsgw, smtpgw, target, user, user_group, vol.
name	Object name	The name of the target object.	N	All objects
key	String	Metadata key.	N	List all keys and values.
domain	Object name	The domain name.	N	All Domains

This command lists all the value key pairs for this object, or a specific one. The command fails if no key is defined.

Example:

```
metadata_list object_type=host
```

Output:

```
Object Type   Name    Key   Value
------------- ------- ----- -------
Host          Host1   01    Host
```

Field ID	Field output	Default position
object_type	Object Type	1
name	Name	2
key	Key	3
value	Value	4

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Allowed
Security administrator	Disallowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Chapter 23. Encryption enablement and support commands

This section describes the command-line interface (CLI) for encryption configuration.

Disabling encryption

Use the **encrypt_disable** command to disable the data protection feature.

```
encrypt_disable
```

This command disables the data protection feature. A prerequisite for this is that no volumes are defined in the system. In addition to disabling the data protection, a cryptographic erase is performed on all protected bands (ensuring that all existing user data is no longer accessible). After the command successfully completes, all bands are left in the unlocked state. Disabling encryption when the encryption state is other than Active (displayed as `Enabled` in **state_list**) will result in an error.

Example:

```
encrypt_disable -y
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_DISABLE_ENCRYPTION**

  Are you sure you want to disable encryption on this system?

  Troubleshooting: A yes option is required for this command

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.

- **ENCRYPT_NOT_ENABLED**

Encryption is not enabled.

Troubleshooting: Check that encryption is enabled and try again the command.

- **VOLUME(S)_DEFINED**

  There are volumes defined, cannot disable encryption.

  Troubleshooting: All volumes must be removed before encryption is disabled.
- **CANNOT_UNMOUNT_STATISTIC_VOLUME**

  Failed to unmount statistics volume for disabling encryption.

  Troubleshooting: Please contact support.
- **CANNOT_CRYPTO_ERASE_DISKS**

  Cannot crypto-erase disks.

  Troubleshooting: Contact support.
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Enabling encryption

Use the **encrypt_enable** command to enable the data protection feature.

```
encrypt_enable [ recovery_keys=<yes|no> ]
```

Parameters

Name	Type	Description	Mandatory	Default
recovery_keys	Boolean	Defines whether recovery keys are required for encryption activation.	N	yes

This command is entered by a security administrator to enable the data protection feature. In order for this command to complete successfully, all of the following prerequisites must be fulfilled: Current encryption state must be DISABLED (displayed as "Supported" in state_list) One master keyserver configured successfully Recovery keys generated and verified, for and by at least 2 separate security administrators, unless the **recovery_keys** parameter is set to no.

Example:

```
encrypt_enable recovery_keys=yes -y
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_ENABLE_ENCRYPTION**

  Are you sure you want to enable encryption on this system?

  Troubleshooting: A yes option is required for this command

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **INVALID_RECOVERY_KEY_STATE**

  Recovery key state is inconsistent with the option provided.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_status.
- **ENCRYPTION_ALREADY_ENABLED**

  Encryption has already been enabled.

  Troubleshooting: Check the state_list command
- **CANNOT_ENROLL_SOME_DISKS**

  Failed software components prevent enrolling some disks.

  Troubleshooting: Contact support.
- **CANNOT_ENROLL_SOME_SSDS**

  Failed SSDs cannot be enrolled.

  Troubleshooting: Contact support.
- **SYSTEM_IS_REDISTRIBUTING**

  Operation is not allowed during rebuild or phase-in
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.

- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Defining a keyserver

Use the **encrypt_keyserver_define** command to define a keyserver to be used by the system.

```
encrypt_keyserver_define name=Name [ ipv4=Address ] [ ipv6=Address ] [ port=PortNumber ]
 [ master=<yes|no> ] [ keyserver_type=KeyserverType ] certificate=PemCertificate
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	The name of the keyserver being added.	Y	N/A
certificate	N/A	The public certificate of the keyserver being added.	Y	N/A
master	Boolean	Defines whether this keyserver is the primary keyserver used for key retrieval.	N	no
ipv4	N/A	The IPv4 address of the keyserver being added. Either one IPv4 and/or one IPv6 must be used.	N	NONE
ipv6	N/A	The IPv6 address of the keyserver being added. Either one IPv4 and/or one IPv6 must be used.	N	NONE
port	Integer	Port used for keyserver communication.	N	5696
keyserver_type	Enumeration	The type of the keyserver to communicate with.	N	TKLM

This command defines a keyserver to be used by the system upon startup or encryption activation to retrieve the key material required to cryptographically unlock the disks. At least one keyserver (but preferably two, and no more than four) must be defined and accessible in order for **encrypt_enable** to succeed. Only one of the keyservers may be defined as master.

Example:

```
encrypt_keyserver_define
name=snocone ipv4=snocone.ibm.com ipv6=2002::a5a7
certificate="----BEGIN CERTIFICATE---*MIICyTCCAbGgAwIBAgIXLSiyd2FPMA0GCSqGSIb3IiEBCwUAMBQx
EjAQAgNVBVuTCXNrbG5pdHNv*......
*erD5HgQHSkfR3FEM+b6EBOUPFIBrys8rKtLRbWvovobq*---END CERTIFICATE----"
```

Note: To input the certificate as one line, make sure to add asterisks (*) at the beginning and the end of each line.

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**
  Cannot utilize encryption on unsupported hardware.
  Troubleshooting: Contact support to verify encryption status.
- **ENCRYPTION_TOO_MANY_KEYSERVERS**
  Too many key servers, cannot add.
  Troubleshooting: Delete a key server and try again.
- **ENCRYPTION_UNSUPPORTED_KEYSERVER_TYPE**
  Unsupported key server type.
- **ENCRYPTION_KEYSERVER_NAME_EXISTS**
  Key server name already exists.
  Troubleshooting: Check the currently defined key servers
- **ENCRYPTION_KEYSERVER_MUST_HAVE_ADDRESS**
  Key server must have at least one address (IPv4/IPv6).
  Troubleshooting: Add ipv4= or ipv6= to the command
- **ENCRYPTION_KEYSERVER_IPV4_ALREADY_EXISTS**
  The IPv4 address or host name already exists.
  Troubleshooting: Check the currently defined key servers
- **ENCRYPTION_KEYSERVER_IPV6_ALREADY_EXISTS**
  The IPv6 address or host name already exists.
  Troubleshooting: Check the currently defined key servers
- **LOADED_KEYSERVER_CERTIFICATE_TOO_BIG**
  key server not added as the certificate is too large.
  Troubleshooting: Please only use one certificate per PEM file.

- **SSL_CERTIFICATE_HAS_EXPIRED**
  SSL certificate has expired.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**
  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_INVALID_FORMAT**
  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_NOT_YET_VALID**
  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**
  SSL certificate verification has failed because of internal system error.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**
  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_CHAIN_EMPTY**
  No certificates found in input.

Removing a keyserver

Use the **encrypt_keyserver_delete** command to remove a keyserver used by the system.

```
encrypt_keyserver_delete name=Name
```

Parameters

Name	Type	Description	Mandatory
name	String	The name of a defined keyserver.	Y

Example:

```
encrypt_keyserver_delete name=snocone
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **ENCRYPTION_UNKNOWN_KEYSERVER**

  Unknown key server name.

  Troubleshooting: Check the currently defined key servers
- **ENCRYPTION_DELETE_MASTER_KEYSERVER**

  Removal of master key server is not permitted.

  Troubleshooting: A new master key server must be defined before removing the current master.
- **ENCRYPTION_LAST_DEFINED_KEYSERVER**

  Cannot delete the last key server.

  Troubleshooting: Define another master key server before attempting to delete this one.

Displaying keyserver status

Use the **encrypt_keyserver_list** command to list the keyservers currently defined in the system along with their connectivity status.

```
encrypt_keyserver_list
```

Parameters:

Name	Type	Description	Mandatory	Default
check_status	Boolean	Defines whether to update automatically the status of the keyserver communication paths before displaying them.	N	no

Example:

```
encrypt_keyserver_list
```

Output:

```
Module   Name      App/Key Status   Last time checked   Master   Port
3        nachos    NOAPP            2013/03/27 20:18:43 yes      5696
3        nachos    UNKNOWN          2013/03/27 20:18:43 yes      5696
3        snocone   UNKNOWN          2013/03/27 20:18:43 no       5696
3        snocone   ACTIVE           2013/03/27 20:18:43 no       5696
3        TKLM-SA   BAD_CERT         2013/03/27 20:18:43 no       5696

Address
9.11.236.1
2002::1
snocone.tucson.ibm.com
2002:90b:e006:238:209:6bff:fe00:a5a7
tklm-sa.ibm.com
```

Field ID	Field output	Default position
module_id	Module	1
label	Name	2
heartbeat_keyserver_status	App/Key Status	3
last_heartbeat	Last time checked	4
master	Master	5
port	Port	6
address	Address	7
keyserver_type	Keyserver Type	8

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.

Obtaining a new master key

Use the **encrypt_keyserver_rekey** command to initiate a rekey against the master keyserver.

```
encrypt_keyserver_rekey
```

This command initiates a rekeying (getting new cryptographic material) with the master keyserver.

Example:

```
encrypt_keyserver_rekey
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **ENCRYPT_NOT_ENABLED**

  Encryption is not enabled.

  Troubleshooting: Check that encryption is enabled and try again the command.
- **CANNOT_GET_XIV_MASTER_KEY**

  Problem obtaining XIV master key from the key server.

  Troubleshooting: Check that the key server is active and serving keys, and contact support.
- **CANNOT_GET_NEW_KEY_REQUEST**

  Error requesting encryption keys from the key server gateway node.

  Troubleshooting: Check that the key server is actively serving keys
- **CANNOT_UPDATE_KEY_METADATA**

  Cannot update metadata in key repository for new key.

  Troubleshooting: Contact support.
- **CANNOT_CANNOT_GENERATE_EXMK_ESKH**

  Problem generating EXMK and ESKH.

  Troubleshooting: Contact support.
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **CANNOT_COPY_KEYS_IN_KEY_REPOSITORY**

  Problem copying current keys to old keys location in the key repository.

  Troubleshooting: Contact support.
- **ENCRYPTION_KR_WRITE_FAILED**

  Error writing to the key repository.

  Troubleshooting: Contact support
- **ENCRYPTION_KR_READ_FAILED**

  Error reading the key repository.

  Troubleshooting: Contact support
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

Cannot connect to an active key server.

Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Renaming a keyserver

Use the **encrypt_keyserver_rename** command to change the name of a defined keyserver.

```
encrypt_keyserver_rename name=Name new_name=Name
```

Parameters

Name	Type	Description	Mandatory
new_name	String	The new name of the keyserver.	Y
name	String	The current name of a defined keyserver.	Y

Example:

```
encrypt_keyserver_rename name=nachos new_name=snocone
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **ENCRYPTION_UNKNOWN_KEYSERVER**

  Unknown key server name.

  Troubleshooting: Check the currently defined key servers
- **ENCRYPTION_KEYSERVER_NAME_EXISTS**

  Key server name already exists.

  Troubleshooting: Check the currently defined key servers

Changing keyserver properties

Use the **encrypt_keyserver_update** command to change a keyserver's IP address and/or port.

```
encrypt_keyserver_update name=Name [ ipv4=Address ] [ ipv6=Address ] [ port=PortNumber ]
 [ master=<yes|no> ] [ certificate=PemCertificate ]
```

Parameters

Name	Type	Description	Mandatory	Default
name	String	Name of the keyserver to be updated.	Y	N/A
certificate	N/A	The public certificate of the keyserver to be updated.	N	none
master	Enumeration	Indicates whether this keyserver is the master.	N	no
ipv4	N/A	The IPv4 address.	N	none
ipv6	N/A	The IPv6 address.	N	none
port	Integer	Port number for communications.	N	5696

This command is used to update a keyserver's address, port, or certificate.

Example:

```
encrypt_keyserver_update name=nachos master=yes ipv4=10.0.0.1
ipv6=2001::2 port=1010 certificate=''
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **ENCRYPTION_UNKNOWN_KEYSERVER**

Unknown key server name.

Troubleshooting: Check the currently defined key servers

- **ENCRYPTION_KEYSERVER_IPV4_ALREADY_EXISTS**

  The IPv4 address or host name already exists.

  Troubleshooting: Check the currently defined key servers
- **ENCRYPTION_KEYSERVER_IPV6_ALREADY_EXISTS**

  The IPv6 address or host name already exists.

  Troubleshooting: Check the currently defined key servers
- **LOADED_KEYSERVER_CERTIFICATE_TOO_BIG**

  key server not added as the certificate is too large.

  Troubleshooting: Please only use one certificate per PEM file.
- **SSL_CERTIFICATE_HAS_EXPIRED**

  SSL certificate has expired.
- **SSL_CERTIFICATE_VERIFICATION_FAILED**

  SSL certificate chain verification failed.
- **SSL_CERTIFICATE_INVALID_FORMAT**

  SSL certificate format is invalid or corrupted.
- **SSL_CERTIFICATE_NOT_YET_VALID**

  SSL certificate is not yet valid.
- **SSL_CERTIFICATE_VERIFICATION_INTERNAL_ERROR**

  SSL certificate verification has failed because of internal system error.
- **SSL_CERTIFICATE_ISSUER_NOT_FOUND**

  SSL certificate issuer not found in certificate chain.
- **SSL_CERTIFICATE_CHAIN_EMPTY**

  No certificates found in input.

Entering a recovery key

Use the **encrypt_recovery_key_enter** command to unlock encrypted disks when the system reboots and cannot access any of the defined keyservers, and when recovery keys are defined.

```
encrypt_recovery_key_enter key=Key
```

Parameters

Name	Description	Mandatory
key	The 64-character hexadecimal recovery key.	Y

This command is used to unlock encrypted disks when the system reboots and cannot access any of the defined keyservers. To unlock the disks, the **min_req number** (defined by the **encrypt_recovery_key_generate** command) of security administrators must all successfully enter their recovery key (as presented to them via **recovery_key_get**). After the minimum required keys have been entered, the storage administrator must change the state from Maintenance to On by issuing **state_change target_state=on**. When this command is issued with the machine in the On state, it has no effect, and can be used to check the validity of the recovery key.

Example:

```
encrypt_recovery_key_enter
key=CBC9B398373FDE79CD38B23192DABACADB5DA63A915CBF5CA8C4E0C212819DE6
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**
  Cannot utilize encryption on unsupported hardware.
  Troubleshooting: Contact support to verify encryption status.
- **INVALID_RECOVERY_KEY_FRAGMENT**
  Recovery key fragment given does not match stored key.
  Troubleshooting: Verify that the proper key(share) has been used
- **GENERIC_FAILED**
  Generic encryption failure.
  Troubleshooting: Contact support.
- **INVALID_RECOVERY_KEY_USER**
  User is not a valid recovery key administrator.
  Troubleshooting: Check that the user names provided are valid
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**
  There is no live key server gateway node on the system.
  Troubleshooting: Please restart the key server gateway node and try again.
- **CANNOT_READ_FROM_KEY_REPOSITORY**
  Failed reading keys from the key repository.
  Troubleshooting: Contact support.
- **RK_FAILED_VERIFY_SLEEP**
  Too many failed verify attempts, please wait and try again.
  Troubleshooting: Wait a little and try again.
- **ENCRYPTION_KR_WRITE_FAILED**
  Error writing to the key repository.
  Troubleshooting: Contact support
- **RK_ENTER_SYSTEM_STATE_INVALID**
  Command is supported in maintenance mode only.
  Troubleshooting: Switch system state to maintenance mode.

- **INVALID_RECOVERY_KEY_STATE**

  Recovery key state is inconsistent with the option provided.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_status.
- **RECOVERY_KEY_ALREADY_VERIFIED**

  The recovery key has already been verified.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_list.

Generating recovery keys

Use the **encrypt_recovery_key_generate** command to specify which security administrators will receive recovery key shares, and to define the minimum number of recovery key shares that need to be entered.

```
encrypt_recovery_key_generate users=Users [ min_req=MinRequired ]
```

Parameters

Name	Type	Description	Mandatory	Default
min_req	Integer	Minimum number of required security administrator recovery key shares.	N	2
users	Object name	User names of the security administrators.	Y	N/A

This command is used to specify which security administrator will receive recovery keys (or, more accurately, "shares"), and to define the minimum number of recovery keys that need to be entered (using the **encrypt_recovery_key_enter** command) in order to unlock the encrypted keys. Once this command has been entered, all the specified security administrators are expected to retrieve and verify their recovery keys, using **encrypt_recovery_key_get** and **encrypt_recovery_key_verify**, respectively. This command can only be run when **encryption_state** is DISABLED.

Example:

```
encrypt_recovery_key_generate users=secadmin1,secadmin2,secadmin3,secadmin4 min_req=2
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed

User Category	Permission
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **CANNOT_WRITE_TO_KEY_REPOSITORY**

  Failed writing keys to the key repository.

  Troubleshooting: Contact support.
- **CANNOT_GET_NEW_KEY_REQUEST**

  Error requesting encryption keys from the key server gateway node.

  Troubleshooting: Check that the key server is actively serving keys
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.
- **INSUFFICIENT_RK_ADMIN_THRESHOLD**

  Recovery key creation requires at least two security administrators.

  Troubleshooting: try again the command with at least 2 security administrators
- **ENCRYPTION_KR_WRITE_FAILED**

  Error writing to the key repository.

  Troubleshooting: Contact support
- **ENCRYPTION_ALREADY_ENABLED**

  Encryption has already been enabled.

  Troubleshooting: Check the state_list command
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **INVALID_RECOVERY_KEY_STATE**

  Recovery key state is inconsistent with the option provided.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_status.
- **INSUFFICIENT_RK_ADMINS**

  Number of users must be greater than or equal to the minimal required number.

  Troubleshooting: try again the command with at least the minimum number of required users
- **CANNOT_GENERATE_KEYS_ON_KEYSERVER_GATEWAY**

  Failed to generate XMK and hashes on key server gateway node.

  Troubleshooting: Contact support.

- **ENCRYPTION_KR_READ_FAILED**
  Error reading the key repository.
  Troubleshooting: Contact support
- **CANNOT_UPDATE_KEY_METADATA**
  Cannot update metadata in key repository for new key.
  Troubleshooting: Contact support.

Retrieving the security administrator's recovery key

Use the **encrypt_recovery_key_get** command to retrieve the recovery key share generated for the current user.

```
encrypt_recovery_key_get
```

This command retrieves the recovery key generated for the current user (by issuing **encrypt_recovery_key_generate** or **encrypt_recovery_key_rekey**) to be stored in a secure manner. After running this command, the user needs to 'prove' that they have the key by entering it via the **encrypt_recovery_key_verify** command. Once this is completed successfully, **encrypt_recovery_key_get** will no longer present the user's key. Using **encrypt_recovery_key_get** more than once will return the same value again.

Example:

```
encrypt_recovery_key_get
```

Output:

```
Command executed successfully.
key=B07C4374AC26C4DD3EC2E755EB3FAAF04EC792C8BE0D0CB1C1BAC79998EBEC6D
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**
  Cannot utilize encryption on unsupported hardware.
  Troubleshooting: Contact support to verify encryption status.
- **INVALID_RECOVERY_KEY_USER**
  User is not a valid recovery key administrator.
  Troubleshooting: Check that the user names provided are valid
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

There is no live key server gateway node on the system.

Troubleshooting: Please restart the key server gateway node and try again.

- **CANNOT_READ_FROM_KEY_REPOSITORY**

  Failed reading keys from the key repository.

  Troubleshooting: Contact support.
- **CANNOT_GET_NEW_KEY_REQUEST**

  Error requesting encryption keys from the key server gateway node.

  Troubleshooting: Check that the key server is actively serving keys
- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **INVALID_RECOVERY_KEY_STATE**

  Recovery key state is inconsistent with the option provided.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_status.
- **RECOVERY_KEY_ALREADY_VERIFIED**

  The recovery key has already been verified.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_list.

Rekeying the security administrators

Use the **encrypt_recovery_key_rekey** command to restart the recovery key generation process.

```
encrypt_recovery_key_rekey [ users=Users ] [ min_req=MinRequired ]
```

Parameters

Name	Type	Description	Mandatory	Default
min_req	Integer	Minimum number of required security administrator recovery key shares.	N	0
users	Object name	Comma delimited list of security administrator to rekey.	N	N/A

This command restarts the recovery key generation process, described in the section on the **encrypt_recovery_key_generate** command. The only difference is that the parameters **users** and **min_required** are optional, and will default to the values specified in the last call to **encrypt_recovery_key_generate**. Note that none of the new recovery keys will take effect until the last user has verified his or her recovery key. Until then, if recovery is required, the previous keys will remain valid.

Example:

```
encrypt_recovery_key_rekey users=secadmin1,secadmin2,secadmin3,secadmin4 min_req=3
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **NO_LIVE_KEYSERVER_GATEWAY_NODE**

  There is no live key server gateway node on the system.

  Troubleshooting: Please restart the key server gateway node and try again.
- **CANNOT_READ_FROM_KEY_REPOSITORY**

  Failed reading keys from the key repository.

  Troubleshooting: Contact support.
- **INSUFFICIENT_RK_ADMIN_THRESHOLD**

  Recovery key creation requires at least two security administrators.

  Troubleshooting: try again the command with at least 2 security administrators
- **ENCRYPTION_KR_WRITE_FAILED**

  Error writing to the key repository.

  Troubleshooting: Contact support
- **NO_MASTER_KEYSERVER_DEFINED**

  There is no master key server defined on the system.

  Troubleshooting: Please define a master key server by invoking encrypt_key server_update and try again.
- **INVALID_RECOVERY_KEY_STATE**

  Recovery key state is inconsistent with the option provided.

  Troubleshooting: Check the recovery key state using encrypt_recovery_key_status.
- **INSUFFICIENT_RK_ADMINS**

  Number of users must be greater than or equal to the minimal required number.

  Troubleshooting: try again the command with at least the minimum number of required users
- **CANNOT_GENERATE_KEYS_ON_KEYSERVER_GATEWAY**

Failed to generate XMK and hashes on key server gateway node.

Troubleshooting: Contact support.

- **KEYSERVER_COMMUNICATION_GENERIC_ERROR**

  Cannot connect to an active key server.

  Troubleshooting: Invoke encrypt_keyserver_list and event_list for more details.

Displaying recovery key status

Use the **encrypt_recovery_key_status** command to display status information for recovery keys.

```
encrypt_recovery_key_status
```

This command shows status information regarding recovery keys, specifically: Which user has verified his or her recovery key before **encrypt_enable** or in the recovery key rekey process. When using the recovery key to unlock the disks, which user has entered his or her recovery key. For information about the number of shares defined and the minimum number required for recovery, issue the **encrypt_recovery_key_list** command.

Example:

```
encrypt_recovery_key_status
```

Output:

```
Mon Aug 12 20:04:43 IDT 2013
Date Created          User        Status
2013-01-03 18:54:46   secadmin1   Verified
2013-01-03 18:54:46   secadmin2   Verified
2013-01-03 18:54:46   secadmin3   Verified
2013-01-03 18:54:46   secadmin4   Verified
2013-01-03 19:00:03   secadmin1   Unverified
2013-01-03 19:00:03   secadmin2   Unverified
2013-01-03 19:00:03   secadmin3   Unverified
2013-01-03 19:00:03   secadmin4   Unverified

When entering keys to unlock the disks:
Date Created          User        Status
2013-01-03 19:00:03   secadmin1   Accepted
2013-01-03 19:00:03   secadmin2   Accepted
2013-01-03 19:00:03   secadmin3   Pending
2013-01-03 19:00:03   secadmin4   Pending
```

Field ID	Field output	Default position
create_date	Date Created	1
user	User	2
status	Status	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed

User Category	Permission
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **CANNOT_READ_FROM_KEY_REPOSITORY**

  Failed reading keys from the key repository.

  Troubleshooting: Contact support.

Recovering key verification

Use the **encrypt_recovery_key_verify** command to confirm that the current user has correctly copied the recovery key share retrieved by the **encrypt_recovery_key_get** command.

```
encrypt_recovery_key_verify key=Key
```

Parameters

Name	Description	Mandatory
key	The 64 character hexadecimal recovery key.	Y

This command is used by security administrators to confirm that they have correctly copied the recovery key presented by the **encrypt_recovery_key_get** command. Encryption can be enabled (or a rekey can be completed) only when all security administrators have confirmed their respective recovery keys using this command.

Example:

```
encrypt_recovery_key_verify
key=B07C4374AC26C4DD3EC2E755EB3FAAF04EC792C8BE0D0CB1C1BAC79998EBEC6D
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed

User Category	Permission
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**
  Cannot utilize encryption on unsupported hardware.
  Troubleshooting: Contact support to verify encryption status.
- **INVALID_RECOVERY_KEY_FRAGMENT**
  Recovery key fragment given does not match stored key.
  Troubleshooting: Verify that the proper key(share) has been used
- **GENERIC_FAILED**
  Generic encryption failure.
  Troubleshooting: Contact support.
- **INVALID_RECOVERY_KEY_USER**
  User is not a valid recovery key administrator.
  Troubleshooting: Check that the user names provided are valid
- **CANNOT_READ_FROM_KEY_REPOSITORY**
  Failed reading keys from the key repository.
  Troubleshooting: Contact support.
- **RK_FAILED_VERIFY_SLEEP**
  Too many failed verify attempts, please wait and try again.
  Troubleshooting: Wait a little and try again.
- **ENCRYPTION_KR_WRITE_FAILED**
  Error writing to the key repository.
  Troubleshooting: Contact support
- **INVALID_RECOVERY_KEY_STATE**
  Recovery key state is inconsistent with the option provided.
  Troubleshooting: Check the recovery key state using encrypt_recovery_key_status.
- **RECOVERY_KEY_ALREADY_VERIFIED**
  The recovery key has already been verified.
  Troubleshooting: Check the recovery key state using encrypt_recovery_key_list.

Recovering key share information

Use the **encrypt_recovery_key_list** command to list recovery key share information.

```
encrypt_recovery_key_list
```

This command lists information regarding recovery keys, specifically: How many parts was the recovery key shared across, and how many are needed for the recovery process. When the currently valid recovery keys were created. To retrieve per-user information about the status of each key share, use the **encrypt_recovery_key_status** command.

Example:

```
encrypt_recovery_key_list
```

Output:

```
Recovery Key Initial Generation:

Date created        Number of Shares    Min Required
------------        ----------------    ------------
2013-03-11 16:00        3               2

Recovery Key Rekeyed:
Date created        Number of Shares    Min Required
------------        ----------------    ------------
2013-03-11 16:00    3                   2
2013-03-20 16:05    4                   2
```

Field ID	Field output	Default position
create_date	Key Created	1
number_of_shares	Number of Shares	2
min_req	Min Required	3

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Allowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **UNSUPPORTED_HARDWARE**

  Cannot utilize encryption on unsupported hardware.

  Troubleshooting: Contact support to verify encryption status.
- **CANNOT_READ_FROM_KEY_REPOSITORY**

  Failed reading keys from the key repository.

  Troubleshooting: Contact support.

Finishing the recovery process

Use the **encrypt_recovery_finish** command to finish the recovery process and move the system to the On state.

```
encrypt_recovery_finish
```

Upon entering the recovery keys (see Entering a recovery key), this command finishes the recovery process and moves the system to the On state, provided that no more issues exist.

Example:

```
encrypt_recovery_finish
```

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- **ENCRYPT_NOT_ENABLED**

  Encryption is not enabled.

  Troubleshooting: Check that encryption is enabled and try again the command.
- **RK_ENTER_SYSTEM_STATE_INVALID**

  Command is supported in maintenance mode only.

  Troubleshooting: Switch system state to maintenance mode.

Erasing a component cryptography key

Use the **encrypt_crypto_erase** command to erase the cryptography key from a component in the Failed state.

```
encrypt_crypto_erase component=ComponentId
```

Parameters

Name	Description	Mandatory
component	Component ID	Y

Upon the command completion, the system issues a success or failure event.

Example:

```
encrypt_crypto_erase component=1:Disk:1:1
```

Output:

```
Command completed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **ARE_YOU_SURE_YOU_WANT_TO_CRYPTO_ERASE_COMPONENT**
  Are you sure you want to secure erase the component?
  Troubleshooting: A yes option is required for this command

Return codes

- **CRYPTO_ERASE_NOT_SUPPORTED**
  Cryptography erase is not supported for this component.
  Troubleshooting: Contact support.
- **COMPONENT_IN_WRONG_STATUS**
  Operation not allowed in current status of component.
- **CRYPTO_ERASE_FAILED**
  Failed crypto-erasing the component.
  Troubleshooting: Contact support.
- **ENCRYPT_NOT_ENABLED**
  Encryption is not enabled.
  Troubleshooting: Check that encryption is enabled and try again the command.

Creating a remote support key

Use the **remote_support_key_create** command to create a remote support key.

```
remote_support_key_create
```

This command creates the remote support key used by support to access the machine.

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed

User Category	Permission
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **SUPPORT_KEY_ALREADY_CREATED_ARE_YOU_SURE_YOU_WANT_TO_OVERWRITE**

  The remote support key is already created. Are you sure you want to overwrite it with a new one?

Return codes

- **FAILED_TO_CREATE_NEW_SUPPORT_KEY**

  Failed to create a new remote support key for this system.
- **SYSTEM_DOES_NOT_HAVE_FREE_MEM**

  The system does not have enough free memory to execute the command.

Clearing the remote support key

Use the **remote_support_key_clear** command to clear the remote support key.

```
remote_support_key_clear
```

This command clears the remote support key generated by the **remote_support_key_create** command.

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Warnings

- **SUPPORT_KEY_NOT_CLEARED_ARE_YOU_SURE**

  Are you sure want to clear the remote support key?

Return codes

- **FAILED_TO_CLEAR_SUPPORT_KEY**

  Failed to clear the remote support key for this system.
- **SYSTEM_DOES_NOT_HAVE_FREE_MEM**

  The system does not have enough free memory to execute the command.

Retrieving the remote support key

Use the **remote_support_key_get** command to retrieve the remote support key.

```
remote_support_key_get
```

This command retrieves the remote support key generated by the **remote_support_key_create** command.

Output:

```
Command executed successfully.
```

Access control

User Category	Permission
Storage administrator	Allowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Allowed
Host side accelerator client	Disallowed

Return codes

- **SUPPORT_KEY_NOT_CREATED**

  The remote support key does not yet exist.

Adding a TCP or UDP port to IPtables

Use the **service_port_whitelist_add** command to add a TCP or UDP port to IPtables.

```
service_port_whitelist_add type=Type port=Port
```

Parameters

Name	Type	Description	Mandatory
type	Enumeration	The protocol type: tcp or udp	Y
port	Positive integer	The port number	Y

Example:

```
service_port_whitelist_add type=tcp port=234
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- SERVICE_PORT_ALREADY_EXISTS

  Trying to add service port which already exists

  Troubleshooting: Contact Support

Remove a TCP or UDP port from IPtables

Use the **service_port_whitelist_remove** command to remove a TCP or UDP port from IPtables.

```
service_port_whitelist_remove type=Type port=Port
```

Parameters

Name	Type	Description	Mandatory
type	Enumeration	The protocol type: tcp or udp	Y
port	Positive integer	The port number	Y

Example:

```
service_port_whitelist_remove type=tcp port=234
```

Output:

```
Command completed successfully
```

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Return codes

- SERVICE_PORT_DOES_NOT_EXIST
  Trying to remove service port which does not exist
  Troubleshooting: Contact Support

Displaying the whitelist of port numbers and protocol types

Use the **service_port_whitelist_show** to display the whitelist of port numbers and protocol types.

```
service_port_whitelist_show
```

Example:

```
service_port_whitelist_show
```

Output:

```
Type     Number
-------- ----------
tcp      294
```

Field ID	Field output	Default position
port_type	Type	1
port_number	Number	2

Access control

User Category	Permission
Storage administrator	Disallowed
Application administrator	Disallowed
Security administrator	Allowed
Read-only users	Disallowed
Operations administrator	Disallowed
Host side accelerator client	Disallowed

Chapter 24. Events

This section contains detailed information on CLI events, including their severity and descriptions.

VOLUME_CREATE

Severity	informational
Description	Volume was created with name '*volume.name*' and size *volume.size*GB in Storage Pool with name '*volume.pool_name*'.

VOLUME_CREATE_MANY

Severity	informational
Description	*number* Volumes was created with names: '*names*' in Storage Pool with name '*pool.name*'.

VOLUME_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Volume with name '*name*' could not be created. You are attempting to add more volumes than the system permits.
Troubleshooting	Delete volumes to allow new ones to be created.

VOLUME_CREATE_FAILED_BAD_SIZE

Severity	warning
Description	Volume with name '*name*' could not be created with size of *requested_size*GB. Volume size is not a multiple of the volume size quanta (Partitions).
Troubleshooting	Set volume size that is an integer multiple of 16K (number of slices) partitions.

VOLUME_RENAME

Severity	informational
Description	Volume with name '*old_name*' and was renamed '*volume.name*'.

VOLUME_RESIZE

Severity	informational
Description	Volume with name '*volume.name*' was resized from *old_size*GB to *volume.size*GB.

VOL_SET_EXTERNAL_ID

Severity	informational

Description	Volume with name '*volume.name*' changed the external identifier to '*volume.identifier*'.

VOL_CLEAR_EXTERNAL_ID

Severity	informational
Description	Volume with name '*volume.name*' cleared the external identifier.

SECONDARY_VOLUME_RESIZE

Severity	informational
Description	Secondary volume with name '*volume.name*' was resized by primary machine from *old_size*GB to *volume.size*GB.

VOLUME_DELETE

Severity	informational
Description	Volume with name '*volume.name*' was deleted.

VOLUME_FORMAT

Severity	informational
Description	Volume with name '*volume.name*' was formatted.

VOLUME_COPY

Severity	informational
Description	Volume with name '*source.name*' was copied to volume with name '*target.name*'.

VOLUME_COPY_DIFF

Severity	informational
Description	Volume with name '*source.name*' was diff-copied from base '*base.name*' to volume with name '*target.name*'.

VOLUME_LOCK

Severity	informational
Description	Volume with name '*volume.name*' was locked and set to 'read-only'.

VOLUME_UNLOCK

Severity	informational
Description	Volume with name '*volume.name*' was unlocked and set to 'writable'.

VOLUME_MOVE

Severity	informational
Description	Volume with name '*volume.name*' has been moved from Storage Pool '*orig_pool.name*' to Pool '*pool.name*'.

VOLUME_UNFORMAT

Severity	informational
Description	Volume with name '*volume.name*' was unformatted.

VOLUME_SET_FLASH_BYPASS

Severity	informational
Description	Flash Cache Bypass was set to be '*Bypass*' for Volume with name '*volume.name*'.

VOLUME_SET_SSD_CACHING

Severity	informational
Description	SSD Caching was set to be '*state*' for Volume with name '*volume.name*'.

VOLUME_SET_ALL_SSD_CACHING

Severity	informational
Description	SSD Caching was set to be '*state*' for all currently defined Volumes.

VOLUME_SET_DEFAULT_SSD_CACHING

Severity	informational
Description	Default SSD Caching for volumes was set to be '*state*'.

OLVM_CREATE

Severity	informational
Description	Volume with name '*volume.name*' was defined as an IBM Hyper-Scale Mobility.

OLVM_OWNER_CREATE

Severity	informational
Description	Volume with name '*volume.name*' was defined as an OWNER IBM Hyper-Scale Mobility.

OLVM_OWNER_ACTIVATED

Severity	informational

Description	IBM Hyper-Scale Mobility Owner Volume with name '*volume.name*' was activated.

OLVM_ACTIVATE

Severity	informational
Description	IBM Hyper-Scale Mobility Volume with name '*volume.name*' was activated.

OLVM_DEACTIVATE

Severity	informational
Description	IBM Hyper-Scale Mobility Volume with name '*volume.name*' was deactivated.

OLVM_PROXY

Severity	informational
Description	IBM Hyper-Scale Mobility Volume with name '*volume.name*' entered Proxy state. Volume data on the system is freed.

OLVM_DELETE

Severity	informational
Description	IBM Hyper-Scale Mobility Volume process with name '*name*' was deleted.
Troubleshooting	Delete volumes to allow new ones to be created.

OLVM_ABORT

Severity	informational
Description	IBM Hyper-Scale Mobility Volume process with name '*volume.name*' was aborted.

OLVM_OWNER_DELETE

Severity	informational
Description	IBM Hyper-Scale Mobility Owner Volume process with name '*volume.name*' was deleted.

OLVM_OWNER_ABORT

Severity	informational
Description	IBM Hyper-Scale Mobility Owner Volume process with name '*volume.name*' was aborted.

OLVM_SYNC_STARTED

Severity	informational

Description	IBM Hyper-Scale Mobility Synchronization of volume '*name*' has started.

OLVM_SYNC_ENDED

Severity	informational
Description	IBM Hyper-Scale Mobility Synchronization of volume '*name*' has ended.

OLVM_BLACKLIST_EDITED

Severity	informational
Description	Volume serial '*serial*' was cleared from the blacklist.

OLVM_BLACKLIST_CLEARED

Severity	major
Description	All volume serials were cleared from the blacklist.

OLVM_BLACKLIST_FULL

Severity	major
Description	Cannot create new IBM Hyper-Scale Mobility Relations. Too many volume serials are blacklisted.

OLVM_LIMITS_CHANGED

Severity	major
Description	IBM Hyper-Scale Mobility limits were changed. Maximum user volumes now at '*max_user_volumes*', blacklist limit at '*blacklist_limit*'.'

DATA_REBUILD_STARTED

Severity	informational
Description	Rebuild process started because system data is not protected. *data_percent*% of the data must be rebuilt.

DATA_REBUILD_COMPLETED

Severity	informational
Description	Rebuild process completed. System data is now protected.

DATA_REBUILD_COULD_NOT_BE_COMPLETED

Severity	major

Description	Rebuild process could not be completed due to insufficient unused disk space. System data is not protected.
Troubleshooting	Replace failed drives, delete unused pools or decrease pool size where possible.

DATA_REDIST_STARTED

Severity	informational
Description	Starting data transfer to new disks.

OPTIMIZING_DATA_REDIST_STARTED

Severity	informational
Description	Starting optimizing data transfer to new disks.

DATA_REDIST_COMPLETED

Severity	informational
Description	Completed data transfer to new disks.

DATA_REBUILD_COMPLETED_REDIST_STARTED

Severity	informational
Description	Rebuild process completed. System data is now protected. Starting data transfer to new disks.

STORAGE_POOL_EXHAUSTED

Severity	major
Description	Pool '*pool*' is full. All volumes are locked.
Troubleshooting	Enlarge Storage Pool or move or delete volumes or Clones with Clone Deletion Priority 0.

STORAGE_POOL_UNLOCKED

Severity	major
Description	Pool '*pool*' has empty space. All volumes are unlocked.
Troubleshooting	N/A

STORAGE_POOL_VOLUME_USAGE_INCREASED

Severity	variable
Description	Usage by volumes of Storage Pool with name '*pool.name*' has reached *current*%.
Troubleshooting	N/A

STORAGE_POOL_VOLUME_USAGE_DECREASED

Severity	informational

Description	Usage by volumes of Storage Pool with name '*pool.name*' has decreased to *current*%.
Troubleshooting	N/A

STORAGE_POOL_VOLUME_USAGE_TOO_HIGH

Severity	major
Description	Usage by volumes of Storage Pool with name '*pool.name*' has reached *current*% of the total pool size.
Troubleshooting	Increase pool size or decrease snapshot size.

STORAGE_POOL_VOLUME_USAGE_BACK_TO_NORMAL

Severity	informational
Description	Usage by volumes of Storage Pool with name '*pool.name*' is back to normal with *current*% of the total pool size.
Troubleshooting	N/A

STORAGE_POOL_SNAPSHOT_USAGE_INCREASED

Severity	variable
Description	Usage by snapshots of Storage Pool with name '*pool.name*' has reached *current*%.
Troubleshooting	N/A

STORAGE_POOL_SNAPSHOT_USAGE_DECREASED

Severity	informational
Description	Usage by snapshots of Storage Pool with name '*pool.name*' has decreased to *current*%.
Troubleshooting	N/A

HOST_CONNECTED

Severity	informational
Description	Host '*host*' has connected to the system.
Troubleshooting	N/A

HOST_DISCONNECTED

Severity	warning
Description	Host '*host*' has disconnected from the system.
Troubleshooting	N/A

HOST_MULTIPATH_OK

Severity	informational
Description	Host '*host*' has redundant connections to the system. #paths=*npaths*

Troubleshooting	N/A

HOST_NO_MULTIPATH_ONLY_ONE_PORT

Severity	warning
Description	Host '*host*' is connected to the system through only one of its ports. #paths=*npaths*
Troubleshooting	N/A

HOST_NO_MULTIPATH_ONLY_ONE_MODULE

Severity	informational
Description	Host '*host*' is connected to the system through only one interface module. #paths=*npaths*
Troubleshooting	N/A

SYSTEM_SPARES_ARE_LOW

Severity	major
Description	System capacity spares are *modules* modules and *disks* disks.
Troubleshooting	N/A

SYSTEM_NO_SPARES

Severity	critical
Description	System has no spare disks
Troubleshooting	N/A

POOL_CREATE

Severity	informational
Description	Storage Pool of size *pool.size*GB was created with name '*pool.name*'.

POOL_CREATE_THIN

Severity	informational
Description	Storage Pool of soft size *pool.soft_size*GB and hard_size *pool.hard_size*GB was created with name '*pool.name*'.

POOL_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Storage Pool with name '*name*' could not be created. You are attempting to add more Storage Pools than the system permits.
Troubleshooting	Delete Storage Pools to allow new ones to be created.

POOL_RENAME

Severity	informational
Description	Storage Pool with name '*old_name*' was renamed '*pool.name*'.

POOL_RESIZE

Severity	informational
Description	Storage Pool with name '*pool.name*' was resized from size *old_size*GB to *pool.size*GB.

POOL_RESIZE_THIN

Severity	informational
Description	Storage Pool with name '*pool.name*' was resized from soft size *old_soft_size*GB and hard size *old_hard_size*GB to soft size *pool.soft_size*GB and hard size *pool.hard_size*GB.

POOL_RESIZE_SNAPSHOTS

Severity	informational
Description	Snapshot size of Storage Pool with name '*pool.name*' was resized from size *old_size*GB to *pool.snapshot_size*GB.

POOL_CHANGE_LOCK_BEHAVIOR

Severity	informational
Description	Lock Behavior of Storage Pool with name '*pool.name*' is now '*state*'.

POOL_CHANGE_PERF_CLASS

Severity	informational
Description	Performance Class of Storage Pool with name '*pool.name*' is now '*pool.perf_class*'.

POOL_CONFIG_SNAPSHOTS

Severity	informational
Description	Management policy of Mirroring snapshots of Storage Pool with name '*pool.name*' has changed'.

POOL_DELETE

Severity	informational
Description	Storage Pool with name '*pool.name*' was deleted.

COMMAND_SERVICE_FAILED_TOO_MANY_TIMES

Severity	major
Description	Command service *service name* was restarted *times* times within *seconds* seconds on module *module*
Troubleshooting	Please contact support.

COMMAND_SERVICE_EXECUTABLE_INACCESSIBLE

Severity	major
Description	Command service *service name*'s executable was not found on module *module*
Troubleshooting	Please contact support.

FC_PORT_RESTART

Severity	variable
Description	FC port service *port* was restarted due to *code codestr*
Troubleshooting	Please contact support.

ISCSI_PORT_RESTART

Severity	variable
Description	ISCSI port service *port* was restarted due to *code codestr*
Troubleshooting	Please contact support.

FC_PORT_HAS_FAILED

Severity	major
Description	FC port service *port* has failed due to *code codestr* (attempt number *Number of retries*)
Troubleshooting	Please contact support.

ISCSI_PORT_HAS_FAILED

Severity	major
Description	ISCSI port service *port* has failed due to *code codestr* (attempt number *Number of retries*)
Troubleshooting	Please contact support.

REQUIREMENT_IS_MISSING

Severity	critical
Description	Requirement *requirement name* is missing

CRITICAL_THREAD_DID_NOT_HEARTBEAT

Severity	critical

Description	Thread named '*thread name*' in process '*process_name*' for node *node id* on module *module* did not heartbeat
Troubleshooting	Please contact support.

THREAD_DID_NOT_HEARTBEAT

Severity	warning
Description	Thread named '*thread name*' in process '*process_name*' for node *node id* on module *module* did not heartbeat
Troubleshooting	Please contact support.

NODE_DID_NOT_HEARTBEAT

Severity	warning
Description	Node named '*process_name*' with id *node id* on module *module* did not heartbeat
Troubleshooting	Please contact support.

MODULE_STARTED_DOWNLOADING_VERSION

Severity	informational
Description	Module *Module ID* started downloading current version of the system

MODULE_FINISHED_DOWNLOADING_VERSION

Severity	informational
Description	Module *Module ID* finished downloading current version of the system. Downloaded total of *Number of files* files. Status: *Status*

MODULE_DOWNLOAD_TIMEOUT

Severity	warning
Description	Timeout expired trying to download current version of the system to module *Module ID* using interface *Interface*.
Troubleshooting	Please contact support.

MODULE_DOWNLOAD_VERSION_TIMEOUT

Severity	warning
Description	Timeout expired trying to download current version of the system to module *Module ID*.
Troubleshooting	Please contact support.

ERROR_SETTING_UP_INTERFACE

Severity	major

Description	Error attempting setup Ethernet interface *Interface name* on module *Module ID*
Troubleshooting	Possible physical problem with Ethernet card. Contact support

MODULE_CPU_HAS_LESS_CORES_THAN_EXPECTED

Severity	major
Description	CPU of *Component ID* has less cores than expected: got *actual cores*, expected *req cores*.
Troubleshooting	Please contact your Administrator.

MODULE_CPU_HAS_MORE_CORES_THAN_EXPECTED

Severity	informational
Description	CPU of *Component ID* has more cores than expected: got *actual cores* cores, expected only *req cores*.
Troubleshooting	Please contact your Administrator.

MISMATCH_IN_INTERFACE_SPEED

Severity	major
Description	Interface speed on *Component ID* is *actual speed*G, the expected speed is *req speed*G.
Troubleshooting	Please contact your Administrator.

NEW_TIME_CHANGE_IS_INVALID

Severity	warning
Description	Setting time to *Seconds* seconds and *USecs* Usecsonds on module *Module*is invalid and was denied.
Troubleshooting	Please contact your Administrator.

NTP_SERVER_TIME_DIFFERENCE_TOO_BIG

Severity	warning
Description	NTP server *NTP Server* sent a transaction with time difference of *Delta* seconds which exceeds the maximal difference of *Max Allowed* seconds. Transaction will be ignored, please check NTP server's and system's times.
Troubleshooting	Please contact your Administrator.

IPSEC_TUNNEL_OPENED

Severity	informational
Description	The IPSec tunnel named '*name*' between module *Module* and *Right IP* was opened

IPSEC_TUNNEL_CLOSED

Severity	informational
Description	The IPSec tunnel named '*name*' between module *Module* and *Right IP* was closed

MODULE_ROOT_FILESYSTEM_IS_MOUNTED_READ_WRITE

Severity	minor
Description	The root file system of *Component ID* is mounted as read-write, it's impossible to check it for corruption.
Troubleshooting	Please contact support.

IP_ACCESS_CANNOT_RESOLVE_ADDRESS

Severity	informational
Description	Cannot resolve address '*address*' added to the IP access group *IP access group name*.

IP_ACCESS_FAILED_SETTING_RULES

Severity	informational
Description	Failed setting IP access rules.

CACHE_HAS_LESS_MEMORY

Severity	warning
Description	Data module has less memory than expected. node=*node* - *gb_missing* GB missing.
Troubleshooting	some of the DIMMs might have failed

DETECTED_IP_ADDRESS_CONFLICT

Severity	major
Description	Detected IP address conflict on interface *Interface name* on module *Module ID*
Troubleshooting	Possible IP address conflict. Resolve the conflict

LOAD_MONITOR_NATIVE_PROCESS_MEMORY_USAGE_CHANGED

Severity	variable
Description	Process '*Process Name*' with PID *PID* on module *Module*. Threshold: *Threshold Type*. Memory usage: *Memory usage*Kb.

LOAD_MONITOR_NATIVE_PROCESS_FD_USAGE_CHANGED

Severity	variable

Description	Process '*Process Name*' with PID *PID* on module *Module*. Threshold: *Threshold Type*. FD usage: *FD usage*

LOAD_MONITOR_NATIVE_PROCESS_CPU_USAGE_CHANGED

Severity	variable
Description	Process '*Process Name*' with PID *PID* on module *Module*. Threshold: *Threshold Type*. CPU usage: *CPU usage*

LOAD_MONITOR_NUMBER_OF_ALIEN_PROCESSES_EXCEEDS_THRESHOLD

Severity	warning
Description	Number of alien processes on module *Module* exceeds limit. Threshold *Threshold*

LOAD_MONITOR_ALIEN_PROCESSES_MEMORY_USAGE_CHANGED

Severity	variable
Description	Alien Processes on module *Module*. Threshold: *Threshold Type*. Memory usage: *Memory usage*Kb.

LOAD_MONITOR_ALIEN_PROCESSES_FD_USAGE_CHANGED

Severity	variable
Description	Alien Processes on module *Module*. Threshold: *Threshold Type*. FD usage: *FD usage*

LOAD_MONITOR_ALIEN_PROCESSES_CPU_USAGE_CHANGED

Severity	variable
Description	Alien Processes on module *Module*. Threshold: *Threshold Type*. CPU usage: *CPU usage*

LOAD_MONITOR_PROCESS_KILLED

Severity	warning
Description	Process '*Process Name*' with PID *PID* on module *Module* was killed. Reason: *Killing reason*. Usage: *Usage*

LOAD_MONITOR_PROCESS_KILL_FAILED

Severity	minor
Description	Process '*Process Name*' with PID *PID* on module *Module* was not killed. Reason: *Killing reason*. Usage: *Usage*

LOAD_MONITOR_TOTAL_COMMITTED_MEMORY_DELTA_CHANGED

Severity	variable
Description	Total committed memory delta on module *Module*. Threshold: *Threshold Type*. Total committed memory delta: *Total committed memory delta*

LOAD_MONITOR_TOTAL_SLAB_USAGE_CHANGED

Severity	variable
Description	Total slab usage on module *Module*. Threshold: *Threshold Type*. Total slab usage: *Total slab uasage*

LOAD_MONITOR_NATIVE_SLAB_USAGE_CHANGED

Severity	variable
Description	Slab '*Slab Name*' on module *Module*. Threshold: *Threshold Type*. Usage: *Slab usage*Kb.

LOAD_MONITOR_MOUNTING_POINT_USED_SPACE_CHANGED

Severity	variable
Description	Used space on mounting point '*mounting_point_path*' on module *Module* has changed. Threshold: *Threshold Type*. Used space: *Used space*%.

LOAD_MONITOR_ALIEN_SLAB

Severity	minor
Description	Alien slab '*Slab Name*' on module *Module*. Usage: *Slab usage*Kb.

LOAD_MONITOR_NATIVE_IRQ_USAGE_CHANGED

Severity	variable
Description	IRQ from'*Device Name*' type *Type* number *IRQ* on module *Module*. Threshold: *Threshold Type*. Usage: *Usage*.

LOAD_MONITOR_ALIEN_IRQ

Severity	minor
Description	Alien IRQ from '*Device Name*' type *Type* on module *Module*. Usage: *Usage*.

ROOT_RW_REMOUNT_TIMEOUT

Severity	minor
Description	Root R/W remount with id '*ID*' has timed out.

SAS_CONTROLLER_DIED

Severity	warning
Description	Severe SAS controller error occurred. Controller was removed from PCI-E bus.
Troubleshooting	Please contact support.

SAS_CONTROLLER_IMPLICIT_RESET_SUCCESSFUL

Severity	warning
Description	SAS driver sent an implicit reset to SAS controller, controller was successfully reset.
Troubleshooting	Please contact support.

SAS_CONTROLLER_IMPLICIT_RESET_FAILED

Severity	warning
Description	SAS driver sent an implicit reset to SAS controller, but it failed.
Troubleshooting	Please contact support.

SAS_CONTROLLER_BIGHAMMER_SUCCESSFUL

Severity	warning
Description	SAS controller was successfully reset with 'BIG HAMMER' reset.
Troubleshooting	Please contact support.

SAS_CONTROLLER_BIGHAMMER_FAILED

Severity	warning
Description	SAS controller 'BIG HAMMER' reset was attempted, but it failed.
Troubleshooting	Please contact support.

MISSED_KERNEL_EVENTS

Severity	warning
Description	*missed events* kernel events were missed.
Troubleshooting	Please contact support.

BOIDEM_DISK_DEFERRED_ERROR

Severity	warning
Description	Deferred error on *Disk ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, latency=*latency* msec, key=*key*
Troubleshooting	N/A

BOIDEM_DISK_REVIVED

Severity	warning

Description	Boidem disk *Disk ID* revived.

BOIDEM_DISK_KILLED

Severity	warning
Description	Boidem disk *Disk ID* killed.

BOIDEM_DISK_BLACKLIST_MASK_CHANGED

Severity	informational
Description	Boidem disk blacklist changed on module *module* from *old_blacklist* to *new_blacklist*.

BOIDEM_NOT_ENOUGH_DISKS_AFTER_GRACE

Severity	warning
Description	Grace period expired, but there are still not enough disks for boidem RAID on module *module*.

BOIDEM_HAS_ENOUGH_DISKS

Severity	warning
Description	There are now enough disks for boidem RAID on module *module*.

BOIDEM_MISSING_MOUNT_POINT

Severity	warning
Description	Boidem is missing a mount point at *Missing mount point* on module *module*.

BOIDEM_FS_IS_RO

Severity	warning
Description	Boidem mount point *Read-only mount point* is in a read-only state on module *module*.

BOIDEM_DISK_UNRESPONSIVE

Severity	warning
Description	Disk *Disk ID* is unresponsive for *time* ms

BOIDEM_DISK_RESPONSIVE

Severity	warning
Description	Disk *Disk ID* is now responsive. Was unresponsive for *unresponsive_time* ms

BOIDEM_DISK_ERROR_SENSE_INFORMATION

Severity	minor
Description	Disk *Disk ID* had sense information indicating an error: *Sense Key Number*/*Sense Code Number 1*/*Sense Code Number 2* (FRU=*FRU Code*) *Sense Key - Sense Code*.
Troubleshooting	Comes together with other disk errors

BOIDEM_DISK_MEDIUM_ERROR

Severity	warning
Description	Media errors on *Disk ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, latency=*latency* ms.

BOIDEM_DISK_ABNORMAL_ERROR

Severity	warning
Description	Unit attentions or aborts in the last 30 minutes on *Disk ID*, start lba=*start_lba*, last lba=*last_lba*, command=*command*, latency=*latency* ms.

BOIDEM_DISK_LONG_LATENCY

Severity	variable
Description	Disk *Disk ID* has been exhibiting long I/O latency in the last 30 minutes, start LBA=*Start LBA*, last LBA=*Last LBA*, command=*command*, latency=*latency* ms.

BOIDEM_DISK_KEEPALIVE_OK

Severity	minor
Description	Disk *Disk ID* is responding to keepalives of type *Type* after *Time from last success msec*ms

BOIDEM_DISK_KEEPALIVE_FAILED

Severity	warning
Description	Disk *Disk ID* is not responding to keepalives of type *Type* for *Time from last success msec*ms
Troubleshooting	N/A

DISK_KEEPALIVE_FAILED

Severity	major
Description	Disk *Disk ID* is not responding to keepalives of type *Type* for *Time from last success msec*ms, disk cache dirty level is *Disk cache dirty level*%
Troubleshooting	N/A

SSD_KEEPALIVE_FAILED

Severity	major
Description	SSD *SSD ID* is not responding to keepalives of type *Type* for *Time from last success msec*ms
Troubleshooting	N/A

DISK_KEEPALIVE_OK

Severity	major
Description	Disk *Disk ID* is responding to keepalives of type *Type* after *Time from last success msec*ms
Troubleshooting	N/A

SSD_KEEPALIVE_OK

Severity	major
Description	SSD *SSD ID* is responding to keepalives of type *Type* after *Time from last success msec*ms
Troubleshooting	N/A

BUS_RESET_WAS_SENT

Severity	warning
Description	A bus reset was sent on module *module*.
Troubleshooting	Please contact support.

BUS_RESET_FAILED

Severity	major
Description	Bus reset on module *module* has failed. Reset duration *reset duration*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

BUS_RESET_SUCCEEDED

Severity	informational
Description	Bus reset on module *module* succeeded. Reset duration *reset duration*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

HOST_RESET_WAS_SENT

Severity	warning
Description	A host reset was sent on module *module*.
Troubleshooting	Please contact support.

HOST_RESET_FAILED

Severity	major

Description	Host reset on module *module* has failed. Reset duration *reset duration*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

HOST_RESET_SUCCEEDED

Severity	informational
Description	Host reset on module *module* succeeded. Reset duration *reset duration*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

DISK_RESET_WAS_SENT

Severity	warning
Description	A disk reset was sent to *Component ID*.
Troubleshooting	Please contact support.

DISK_RESET_FAILED

Severity	major
Description	Reset to disk *Component ID* has failed. Reset duration *reset duration*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

DISK_RESET_SUCCEEDED

Severity	informational
Description	Reset to disk *Component ID* succeeded. Reset duration *reset duration*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

SAS_CONTROLLER_RESET_WAS_SENT

Severity	warning
Description	A SAS controller reset was sent on *Component ID*, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

SAS_CONTROLLER_RESET_FAILED

Severity	major
Description	Reset to the SAS controller on *Component ID* has failed. Reset duration *reset duration* milliseconds, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

SAS_CONTROLLER_RESET_SUCCEEDED

Severity	informational

Description	Reset to disk *Component ID* succeeded. Reset duration *reset duration* milliseconds, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

DISK_RESET_FAILURE

Severity	major
Description	Reset to disk *Component ID* was executed and failed. Reset duration *reset duration* usecs, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

SSD_RESET_FAILURE

Severity	major
Description	Reset to disk *Component ID* was executed and failed. Reset duration *reset duration* usecs, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

DISK_RESET_DONE

Severity	warning
Description	Reset to disk *Component ID* was executed and succeeded. Reset duration *reset duration* usecs, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

SSD_RESET_DONE

Severity	warning
Description	Reset to disk *Component ID* was executed and succeeded. Reset duration *reset duration* usecs, IOs pending *IOs Pending*.
Troubleshooting	Please contact support.

DISK_POWER_DOWN

Severity	major
Description	Disk *Component ID* was powered-down due to error recovery failures.
Troubleshooting	Please contact support.

SSD_OFFLINE

Severity	major
Description	SSD *Component ID* was marked as offline due to error recovery failures.
Troubleshooting	Please contact support.

DISK_ERROR_SENSE_INFORMATION

Severity	minor
Description	Disk *Disk ID* had sense information indicating an error: *Sense Key Number*/*Sense Code Number 1*/*Sense Code Number 2* (FRU=*FRU Code*) *Sense Key - Sense Code*.
Troubleshooting	Comes together with other disk errors

SSD_ERROR_SENSE_INFORMATION

Severity	minor
Description	SSD *SSD ID* had sense information indicating an error: *Sense Key Number*/*Sense Code Number 1*/*Sense Code Number 2* (FRU=*FRU Code*) *Sense Key - Sense Code*.
Troubleshooting	Comes together with other error events

DISK_REQUEST_ERROR_INFORMATION

Severity	minor
Description	Disk *Disk ID* had error: *Error Name*, latency=*latency* ms.
Troubleshooting	Comes together with other disk errors

SSD_REQUEST_ERROR_INFORMATION

Severity	minor
Description	SSD *SSD ID* had error: *Error Name*, latency=*latency* ms.
Troubleshooting	Comes together with other error events

SSD_RECOVERED_ERROR

Severity	minor
Description	SSD *SSD ID* autonomously recovered from an error successfully, start lba=*first_lba*, last lba=*last_lba*, scsi_opcode=*scsi_opcode*, latency=*latency* usec.
Troubleshooting	N/A

DISK_DEFERRED_ERROR

Severity	warning
Description	Deferred error on *Disk ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, latency=*latency* msec, key=*key*
Troubleshooting	N/A

SSD_DEFERRED_ERROR

Severity	warning

Description	SSD *SSD ID* signaled deferred error on start lba=*first_lba*, last lba=*last_lba*, scsi_opcode=*scsi_opcode*, latency=*latency* usec, key=*key*
Troubleshooting	N/A

DISK_MEDIUM_ERROR

Severity	warning
Description	Media errors on *Disk ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, latency=*latency* msec.
Troubleshooting	N/A

SSD_MEDIUM_ERROR

Severity	warning
Description	Media errors on *SSD ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, latency=*latency* msec.
Troubleshooting	N/A

DISK_ABNORMAL_ERROR

Severity	major
Description	Unit attentions or aborts in the last 30 minutes on *Disk ID*, start lba=*start_lba*, last lba=*last_lba*, command=*command*, latency=*latency* msec.
Troubleshooting	N/A

SSD_ABNORMAL_ERROR

Severity	major
Description	Unit attentions or aborts in the last 30 minutes on *SSD ID*, start lba=*start_lba*, last lba=*last_lba*, command=*command*, latency=*latency* msec.
Troubleshooting	N/A

DISK_LONG_LATENCY

Severity	variable
Description	Long latencies on disk I/Os in the last 30 minutes on *Disk ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, command=*command*, latency=*latency* msec.
Troubleshooting	N/A

SSD_LONG_LATENCY

Severity	variable
Description	Long latencies on ssd I/Os in the last 30 minutes on *SSD ID*, start LBA=*Start LBA*, last LBA=*Last LBA*, scsi_opcode=*scsi_opcode*, latency=*latency* msec.
Troubleshooting	N/A

DISK_BAD_PERFORMANCE

Severity	minor
Description	Bad performance on *Disk ID*, I/O count=*I/O Count*, transferred kbytes=*kbytes*,msecs=*seconds*.
Troubleshooting	N/A

SSD_BAD_PERFORMANCE

Severity	major
Description	Bad performance on *SSD ID*, I/O count=*I/O Count*, transferred kbytes=*kbytes*,msecs=*seconds*.
Troubleshooting	N/A

DISK_UNRESPONSIVE

Severity	major
Description	Disk *Disk ID* is unresponsive for *time* msecs, cache dirty level is *Dirty Level*%

SSD_UNRESPONSIVE

Severity	major
Description	SSD *SSD ID* is unresponsive for *time* msecs

DISK_RESPONSIVE

Severity	major
Description	Disk *Disk ID* is now responsive. Was unresponsive for *unresponsive_time* msecs, cache dirty level is *Dirty Level*%

SSD_RESPONSIVE

Severity	major
Description	SSD *SSD ID* is now responsive. Was unresponsive for *time* msecs

MIRROR_CREATE

Severity	informational
Description	A remote mirror was defined for Volume '*local volume name*'on Target '*target name*'. Remote Volume is '*remote volume name*'.

CG_MIRROR_CREATE

Severity	informational
Description	A remote mirror was defined for Consistency Group '*local CG name*'on Target '*target name*'. Remote Consistency Group is '*remote CG name*'.

MIRROR_CREATE_SLAVE

Severity	informational
Description	A remote mirror was defined by Target '*target name*' for Volume '*local volume name*'. Remote Volume is '*remote volume name*'.

CG_MIRROR_CREATE_SLAVE

Severity	informational
Description	A remote mirror was defined by Target '*target name*' for CG '*local CG name*'. Remote CG is '*remote CG name*'.

MIRROR_SCHEDULE_CHANGE

Severity	informational
Description	Schedule of remote mirror of '*local peer name*' is now '*schedule name*'.

MIRROR_CREATE_FAILED_TARGET_NOT_CONNECTED

Severity	warning
Description	Target could not be reached. Target with name '*target.name*' is currently not connected.
Troubleshooting	Connect the target system to this system.

REMOTE_OPERATION_FAILED_TIMED_OUT

Severity	warning
Description	Operation on remote machine timed out. Invoking '*Function Name*' on target '*Target Name*' timed out.
Troubleshooting	Retry operation. If problem persists contact support.

MIRROR_RESYNC_FAILED

Severity	major
Description	Synchronization of meta data with mirror failed. Configuration of remote mirror of volume '*local volume name*' on target '*target name*' does not match local configuration.
Troubleshooting	Make sure configuration on both machines is compatible and activate the mirror. If problem persists contact support.

MIRROR_RESYNC_FAILED_DUE_TO_THIN_PROVISIONING

Severity	major
Description	Synchronization of bitmaps with mirror failed. Not enough hard capacity left in Pool of volume '*mirror.local_volume_name*'.
Troubleshooting	Delete unnecessary volumes in pool or enlarge the pool's hard size.

MIRROR_SYNC_STARTED

Severity	informational
Description	Synchronization of remote mirror of volume '*local volume name*' on Target '*target name*' has started.

MIRROR_SYNC_ENDED

Severity	informational
Description	Synchronization of remote mirror of peer '*local peer name*' on target '*target name*' has ended.

MIRROR_CANNOT_CREATE_SYNC_JOB_TOO_MANY_VOLUMES

Severity	major
Description	Synchronization of remote mirror of peer '*local peer name*' on target '*target name*' can not be synced , insufficent volume available for this operation.

MIRROR_CANNOT_CREATE_LRS_TOO_MANY_VOLUMES

Severity	major
Description	Synchronization of remote mirror of peer '*local peer name*' on target '*target name*' can not be synced , insufficent volume available for this operation.

MIRROR_REESTABLISH_FAILED

Severity	major
Description	Mirror reestablish failed. Connection to remote mirror of peer '*local peer name*' on target '*target name*' could not be established. Remote action failed.

MIRROR_REESTABLISH_FAILED_CONFIGURATION_ERROR

Severity	major
Description	Mirror reestablish failed. Either configuration of remote mirror of peer '*local peer name*' on target '*target name*' does not match local configuration.
Troubleshooting	Make sure configuration on both machines is compatible and activate the mirror. If problem persists contact support.

MIRROR_ACTIVATE

Severity	informational
Description	The Remote Mirror of peer '*local peer name*' on Target '*target name*' was activated.

MIRROR_DEACTIVATE

Severity	informational
Description	The Remote Mirror of peer '*local peer name*' on Target '*target name*' was deactivated.

MIRROR_DEACTIVATE_SECONDARY_LOCKED

Severity	minor
Description	The Remote Mirror of peer '*local peer name*' on Target '*target name*' was deactivated since the Pool on the secondary machine was locked.

MIRROR_DEACTIVATE_CONFIGURATION_ERROR

Severity	minor
Description	The Remote Mirror of peer '*local peer name*' on Target '*target name*' was deactivated since the Mirror configuration on the slave machine has changed.

MIRROR_DELETE

Severity	informational
Description	The Remote Mirror relation of peer '*local peer name*' to a peer on Target '*target name*' was deleted.

MIRROR_REVERSE_ROLE_TO_SLAVE

Severity	informational
Description	Local peer '*local peer name*' is now Slave of a peer on Target '*target name*'.

MIRROR_REVERSE_ROLE_TO_MASTER

Severity	informational
Description	Local peer '*local peer name*' is now Master of a peer on Target '*target name*'.

MIRROR_REVERSE_ROLE_OF_PEER_WITH_LCS_TO_MASTER

Severity	informational
Description	Local peer '*local peer name*' is now Master of a peer on Target '*target name*' external last consistent snapshot should be deleted manually .

MIRROR_SWITCH_ROLES_TO_SLAVE

Severity	informational
Description	Local peer '*local peer name*' switched roles with peer on Target '*target name*'. It is now Slave.

MIRROR_SWITCH_ROLES_TO_MASTER

Severity	informational
Description	Local peer '*local peer name*' switched roles with peer on Target '*target name*'. It is now Master.

MIRROR_REESTABLISH_FAILED_TOO_MANY_VOLUMES

Severity	major
Description	Last Consistent Snapshot of Slave peer '*local peer name*' could not be created. Maximal number of Volumes are already defined.
Troubleshooting	Delete Volumes to allow new ones to be created. Activate Mirror on the Master Machine.

MIRROR_END_SYNC_FAILED_CONFIGURATION_ERROR

Severity	major
Description	Configuration of remote mirror of peer '*local peer name*' on target '*target name*' does not match local configuration.
Troubleshooting	Make sure configuration on both machines is compatible and activate the mirror. If problem persists contact support.

MIRROR_CHANGE_DESIGNATION

Severity	informational
Description	Local peer '*local peer name*' switched its designated role with peer on Target '*target name*'. It is now *designation*.

MIRROR_CANCEL_SNAPSHOT

Severity	informational
Description	All mirrored snapshots which were created for Mirror of peer '*local peer name*' and were not yet synchronized will not be mirrored in the remote machine.

MIRROR_SYNCHRONIZATION_TYPE_CHANGED

Severity	informational
Description	Synchronization of Mirror of peer '*local peer name*' is now '*mirror synchronization type*'.

DM_DEFINE

Severity	informational
Description	Data Migration was defined to Volume '*local volume name*' from Target '*target name*'.

OM_DEFINE

Severity	informational
Description	Online Migration was defined to Volume '*local volume name*' from Target '*target name*'.

DM_SYNC_STARTED

Severity	informational
Description	Migration to volume '*local volume name*' from Target '*target name*' has started.

DM_SYNC_ENDED

Severity	informational
Description	Migration to volume '*local volume name*' from target '*target name*' is complete.

DM_SYNC_ENDED_WITH_ERRORS

Severity	Critical
Description	Migration to volume '*local volume name*' from target '*target name*' has completed with *medium_errors_in_data_migration* error(s). Check previous events related to this volume for the list of affected LBAs.'.

DM_ACTIVATE

Severity	informational
Description	Migration to Volume '*local volume name*' from Target '*target name*' was activated.

DM_DEACTIVATE

Severity	informational
Description	Migration to Volume '*local volume name*' from Target '*target name*' was deactivated.

DM_DEACTIVATE_LUN_UNAVAILABLE

Severity	minor
Description	Migration to Volume '*local volume name*' from Target '*target name*' was deactivated since LUN is not available on one of the active paths to the target.

DM_START_MIGRATION

Severity	informational
Description	Migration to Volume '*local volume name*' from Target '*target name*' will now start automatically.

DM_DELETE

Severity	informational
Description	Definition of Data Migration to Volume '*local volume name*' from Target '*target name*' was deleted.

SCHEDULE_CREATE

Severity	informational
Description	Schedule was created with name '*schedule name*'.

SCHEDULE_UPDATE

Severity	informational
Description	Schedule with name '*schedule name*' was updated.

SCHEDULE_RENAME

Severity	informational
Description	Schedule with name '*old_name*' was renamed '*schedule name*'.

SCHEDULE_DELETE

Severity	informational
Description	Schedule with name '*schedule name*' was deleted.

MIRROR_RPO_OK

Severity	informational
Description	Mirror of local peer '*local peer name*' is now ahead of its specified RPO.

MIRROR_RPO_LAGGING

Severity	informational
Description	Mirror of local peer '*local peer name*' is now behind its specified RPO.

MIRROR_CHANGE_RPO

Severity	informational
Description	RPO or Mirror of local peer '*local peer name*' is now *RPO*.

MIRROR_IS_LAGGING_BEYOND_PERCENT_THRESHOLD

Severity	warning
Description	Last Replication Time of Mirror of local peer '*local peer name*' is *Last Replication Time*.

MIRROR_AUTO_FIX_REACHED_LIMIT

Severity	warning
Description	A remote checksum diff for mirror '*local peer name*' cannot be fixed automatically because we reached the auto fix limit.

MIRROR_IS_LAGGING_BEYOND_ABSOLUTE_THRESHOLD

Severity	warning
Description	Last Replication Time of Mirror of local peer '*local peer name*' is *Last Replication Time*.

MIRROR_INCOMPATIBLE_VERSION_FOR_UNMAP_SUPPORT

Severity	warning
Description	Mirror of peer '*local peer name*' on target '*target name*' cannot support unmap, remote machine has incompatible version.

XMIRROR_DEFINE

Severity	informational
Description	A xmirror master '*xmirror name*' was defined for volume '*local volume name*'.

XMIRROR_DEFINE_SLAVE

Severity	informational
Description	A xmirror slave '*xmirror name*' was defined for volume '*local volume name*'.

XMIRROR_DEFINE_SMASTER

Severity	informational
Description	A xmirror smaster '*xmirror name*' was defined for volume '*local volume name*'.

XMIRROR_ACTIVATE

Severity	informational
Description	Xmirror '*xmirror name*' was activated.

XMIRROR_DEACTIVATE

Severity	informational
Description	Xmirror '*xmirror name*' was deactivated.

XMIRROR_DELETE

Severity	informational
Description	Xmirror '*xmirror name*' was deleted.

XMIRROR_CHANGE_SLAVE_ROLE_TO_MASTER

Severity	informational
Description	Xmirror '*xmirror name*' was changed to standalone.

XMIRROR_CHANGE_MASTER_ROLE_TO_SLAVE

Severity	informational
Description	Xmirror '*xmirror name*' was changed to slave.

XMIRROR_CHANGE_SMASTER_ROLE_TO_MASTER

Severity	informational
Description	Xmirror '*xmirror name*' was changed to master.

XMIRROR_CHANGE_MASTER_ROLE_TO_SMASTER

Severity	informational
Description	Xmirror '*xmirror name*' was changed to smaster.

XMIRROR_STANDBY_MIRROR_REGISTERED

Severity	informational
Description	Xmirror '*xmirror name*' registered a standby mirror on SMASTER system

XMIRROR_COMPROMISED

Severity	warning
Description	Xmirror '*xmirror name*' is compromised, reason: *Compromise Reason*

XMIRROR_RESTORED

Severity	informational
Description	Xmirror '*xmirror name*' restored after being compromised

XMIRROR_RENAMED

Severity	informational
Description	Xmirror '*Old Xmirror Name*' was renamed to '*xmirror name*'.

MAP_VOLUME

Severity	informational
Description	Volume with name '*volume.name*' was mapped to LUN '*LUN*' for *host_or_cluster* with name '*host*'.

MAP_PROXY_VOLUME

Severity	informational
Description	IBM Hyper-Scale Mobility Volume with name '*name*' was mapped to LUN '*LUN*' for *host_or_cluster* with name '*host*'.

UNMAP_VOLUME

Severity	informational
Description	Volume with name '*volume.name*' was unmapped from *host_or_cluster* with name '*host*'.

UNMAP_PROXY_VOLUME

Severity	informational
Description	IBM Hyper-Scale Mobility Volume with name '*name*' was unmapped from *host_or_cluster* with name '*host*'.

CLUSTER_DEFINE_EXCEPTION

Severity	informational
Description	LUN '*LUN*' was defined as having host specific mapping in cluster '*cluster*'.

CLUSTER_CANCEL_EXCEPTION

Severity	informational
Description	LUN '*LUN*' was defined as having uniform mapping in cluster '*cluster*'.

SPECIAL_TYPE_SET

Severity	informational
Description	Type of *host_or_cluster* with name '*host*' was set to '*type*'.

DATA_LOSS

Severity	critical
Description	Manager found data loss in *num_lost_slices* slices.
Troubleshooting	Please contact support.

SERVICE_HAS_FAILED

Severity	major
Description	*Component ID* has failed.
Troubleshooting	Please contact support.

SERVICE_FAILED_TO_PHASEIN

Severity	major
Description	*Component ID* failed to phase-in.
Troubleshooting	Please contact support.

SERVICE_FAILED_TO_RESTART

Severity	major
Description	*Component ID* failed to restart.
Troubleshooting	Please contact support.

MANAGER_RESIGNED_TO_LET_MODULE_PHASE_OUT

Severity	informational
Description	Previous manager resigned to let *Component ID* phase out.
Troubleshooting	N/A

MODULE_FAILED

Severity	critical
Description	*Component ID* failed.
Troubleshooting	Please contact support.

NODE_FAILED

Severity	critical
Description	Node #*Node ID* of type *Node Type* on *Module Component ID* failed because of *failure_reason*.
Troubleshooting	Please contact support.

NODE_RESET

Severity	informational
Description	Node #*Node ID* of type *Node Type* on *Module Component ID* was reset.
Troubleshooting	N/A

NODE_IS_NOT_UP

Severity	minor
Description	Node #*Node ID* of type *Node Type* on *Module Component ID* is not up.
Troubleshooting	Please contact support

TRACES_SNAPSHOT_CREATE

Severity	informational
Description	Traces snapshot created. ID *snap_id*

Troubleshooting	N/A

MODULE_IS_NOT_UP

Severity	minor
Description	*Module Component ID* is not up.
Troubleshooting	Please contact support

SINGLETON_NODE_IS_NOT_UP

Severity	minor
Description	No singleton of type *Node Type* is up.
Troubleshooting	Please contact support

DISK_HAS_FAILED

Severity	variable
Description	Disk *Component ID* Failed due to: *Component Service Reason*
Troubleshooting	Please contact your Administrator.

SSD_HAS_FAILED

Severity	major
Description	SSD *Component ID* Failed.
Troubleshooting	Please contact your Administrator.

DISK_INFO_EXTRA_EVENT

Severity	informational
Description	Disk *Component ID* extra information event.
Troubleshooting	N/A

SSD_INFO_EXTRA_EVENT

Severity	informational
Description	SSD *Component ID* extra information event.
Troubleshooting	N/A

COMPONENT_TEST_OF_DISK_HAS_FAILED

Severity	major
Description	Test of *Component ID* has failed with error *Error*.
Troubleshooting	Please contact your Administrator.

COMPONENT_TEST_OF_SSD_HAS_FAILED

Severity	major
Description	Test of *Component ID* has failed with error *Error*.

Troubleshooting	Please contact your Administrator.

DISK_INFO_LOAD_FAILED

Severity	major
Description	*Component ID* failed.
Troubleshooting	Please contact your Administrator.

DISK_STARTED_PHASEOUT

Severity	informational
Description	System started phasing out *Component ID*.
Troubleshooting	N/A

DISK_STARTED_AUTO_PHASEOUT

Severity	minor
Description	System started automatic phasing out *Component ID*.
Troubleshooting	Please contact support.

DISK_STARTED_PHASEIN

Severity	informational
Description	System started phasing in *Component ID*.
Troubleshooting	N/A

DISK_FINISHED_PHASEIN

Severity	informational
Description	System finished phasing in *Component ID*.
Troubleshooting	N/A

DISK_FINISHED_PHASEOUT

Severity	informational
Description	System finished phasing out *Component ID*.
Troubleshooting	N/A

SECOND_DISK_FAILURE

Severity	critical
Description	Disk *Component ID* failed during rebuild.
Troubleshooting	N/A

DISK_RECOVERED

Severity	critical
Description	Disk *Component ID* is functioning again.

Troubleshooting	N/A

MODULE_STARTED_PHASEOUT

Severity	informational
Description	System started phasing out *Component ID*.
Troubleshooting	N/A

MODULE_INFO_PRE_EVENT

Severity	informational
Description	*Component ID* information pre event.
Troubleshooting	N/A

MODULE_FINISHED_PHASEOUT

Severity	informational
Description	System finished phasing out *Component ID*.
Troubleshooting	N/A

MODULE_STOPPED_PHASEOUT_DUE_TO_MANAGEMENT_REQUIREMENT

Severity	major
Description	System stopped phasing out *Component ID* due to management requirement.
Troubleshooting	N/A

MODULE_PHASEOUT_FAILURE_REASON

Severity	informational
Description	System could not phaseout *Component ID* due to lack of nodes of type *Node Type*.
Troubleshooting	N/A

START_WORK

Severity	informational
Description	System has entered ON state.

SYSTEM_HAS_ENTERED_MAINTENANCE_MODE

Severity	warning
Description	System has entered MAINTENANCE state [*Reason*]

SYSTEM_ENTERED_CHARGING_STATE

Severity	informational

Description	System cannot start work until it is sufficiently charged.

SYSTEM_LEFT_CHARGING_STATE

Severity	informational
Description	System is sufficiently charged.

USER_SHUTDOWN

Severity	major
Description	System is shutting down due to a user request.

EMERGENCY_SHUTDOWN_NOW

Severity	critical
Description	System is shutting down in emergency shutdown mode due to: *Emergency Shutdown Reason*.
Troubleshooting	Please contact your Administrator.

SHUTDOWN_PARAMS

Severity	major
Description	System action is '*Shutdown Action*'. Target state is '*Target State*'. Safemode is '*Safe Mode*'. UPS Sleep Time=*UPS sleep time in seconds* seconds.

DISK_STARTED_AUTO_PHASEIN

Severity	critical
Description	System started phasing in *Component ID* in order to ensure that data will not be unprotected. Phaseout of the containing service and module has been cancelled.
Troubleshooting	N/A

SANITY_CHECK_FAILED

Severity	critical
Description	Sanity check failed.
Troubleshooting	Please contact support.

SYSTEM_HARD_CAPACITY_CHANGED

Severity	informational
Description	System's hard capacity is now *Capacity* GB.

SYSTEM_DISK_CAPACITY_EXPANDED

Severity	informational
Description	System's hard capacity is now *Capacity* GB.

SYSTEM_DISK_CAPACITY_LIMIT_PERCENTAGE_EXPANDED

Severity	informational
Description	System's hard capacity was expanded to *Capacity limit Percentage* .

SYSTEM_CAN_NOT_INCREASE_SPARES

Severity	informational
Description	System's spares can not be increased to *modules* modules and *disks* disks. *Capacity* GB should be freed.

SYSTEM_SOFT_CAPACITY_CHANGED

Severity	informational
Description	System's soft capacity is now *Capacity* GB.

MODULE_IS_MISSING_DATA_DISKS

Severity	major
Description	*Module ID* has *Num Found* of *Num Expected* data disks.

SERVICE_WAS_RESTARTED

Severity	informational
Description	*Module ID* was restarted.

DATA_SERVICE_STARTED_PHASEOUT

Severity	informational
Description	System started phasing out *Component ID*.
Troubleshooting	N/A

DATA_SERVICE_FINISHED_PHASEOUT

Severity	informational
Description	System finished phasing out *Component ID*.
Troubleshooting	N/A

POWER_SUPPLY_UNIT_STATUS_IS_OK

Severity	informational
Description	The status of *Component ID* is now OK.
Troubleshooting	Please contact support.

POWER_TO_MODULE_SHOULD_BE_DISCONNECTED_ AND_RECONNECTED

Severity	informational
Description	*Component ID* should be disconnected completely from power supply and reconnected after 60 seconds in order to complete the firmware upgrade scheme.
Troubleshooting	N/A

MODULE_FIRMWARE_UPGRADE_FAILED

Severity	warning
Description	*Module Component ID* has failed due to *failure_reason*
Troubleshooting	Please contact support

FC_CHANGE_DETECTED

Severity	major
Description	*Component ID* has been changed from a *Old Model* with a serial of *old_serial* to a *New Model* with a serial of *new_serial*.
Troubleshooting	Was this fiber channel port actually replaced?

DISK_SMALLER_THAN_SYSTEM_DISK_SIZE

Severity	major
Description	Disk *Component ID* has a size of *New size*GB which is smaller than system disk size *System size*GB.

SSD_SMALLER_THAN_SYSTEM_SSD_SIZE

Severity	informational
Description	SSD *Component ID* has a size of *New size*GB which is smaller than system ssd size *System size*GB.

DISK_LARGER_THAN_SYSTEM_DISK_SIZE

Severity	variable
Description	Disk *Component ID* has a size of *New size*GB which is larger than system disk size *System size*GB.

SSD_LARGER_THAN_SYSTEM_SSD_SIZE

Severity	major
Description	SSD *Component ID* has a size of *New size*GB which is larger than system ssd size *System size*GB.

DISK_MODEL_DIFFERENT_THAN_SYSTEM_MODEL

Severity	major

Description	Disk *Component ID* of model *Disk model*, by vendor *Disk vendor*, differs from system disk by vendor *System vendor* and model *System model*.

DISK_MODEL_DIFFERENT_THAN_MODULE_DISK_MODEL

Severity	major
Description	Disk *Component ID* of model *Disk model*, by vendor *Disk vendor*, differs from module's disk model *Module model*, by vendor *Module vendor*.

FIRST_DISK_MODEL_IN_MODULE

Severity	informational
Description	Disk *Component ID* of model *Disk model*, by vendor *Disk vendor*, was the first to be added to a module with an inter-module disk intermix policy, this will require all other disks to have the same model and vendor.

SSD_INTERMIX_DETECTED

Severity	informational
Description	SSD *Component ID* of model *SSD model*, by vendor *SSD vendor*, *User message Required model*

SSD_CACHING_ENABLED

Severity	informational
Description	SSD Caching feature enabled. SSDs can now be installed.
Troubleshooting	N/A

SSD_CACHING_DISABLED

Severity	informational
Description	SSD Caching feature disabled.
Troubleshooting	N/A

FLASH_CACHE_ENABLE

Severity	informational
Description	Flash Cache feature enabled. SSDs can now be installed.
Troubleshooting	N/A

FLASH_CACHE_DISABLE

Severity	informational
Description	Flash Cache feature disabled.
Troubleshooting	N/A

SYSTEM_USABLE_HARD_CAPACITY_LIMIT_SET

Severity	informational
Description	System usable hard capacity limit set to *Usable Capacity* GB.

SYSTEM_USABLE_HARD_CAPACITY_LIMIT_RESET

Severity	informational
Description	System usable hard capacity limit reset, usable capacity is now back to be the entire system hard capacity: *Hard Capacity*.

SYSTEM_HARD_CAPACITY_CHANGE_CAUSED_DECREASE_IN_USABLE_HARD_CAPACITY_LIMIT

Severity	warning
Description	System usable hard capacity reduced from *Old Usable Capacity* to *New Usable Capacity* because the system hard capcity decreased under the previous usable capacity.

MODULE_PHASEOUT_FAILURE_NOT_ENOUGH_ACTIVE_MODULES

Severity	informational
Description	System could not phaseout *Component ID* not enough active modules. System will have *active modules* active modules, but needs at least *minimum active modules*.
Troubleshooting	N/A

MODULE_DATA_DEVICE_SETUP_NOT_COMPLETE

Severity	major
Description	*Module ID* has *Num Ready* of *Num Expected* data devices ready for use.

COMPONENT_NOT_READY_DATA_DEVICE_SETUP_FAILED

Severity	major
Description	Data device *Component ID* is not ready for use.
Troubleshooting	Please contact your Administrator.

LSA_SHUTDOWN_PREP_FAILED

Severity	major
Description	LSA nodes failed to be prepeared for shutdown.

ASYMMETRICAL_SSD_CACHE

Severity	minor

Description	System performance may be seriously affected by Cache device(s) failure when SSD caching is enabled
Troubleshooting	To prevent non-uniform Caching either disable SSD caching or replace faulty devices

SYSTEM_MIGHT_NOT_REACH_FULL_REDUNDANCY_AFTER_PHASEOUT

Severity	warning
Description	The system might not be able to obtain Full Redundancy in case of disk or module failure after phasing out *Component ID*.
Troubleshooting	Consider adding additional capacity.

ENCRYPT_ENABLE_STARTED

Severity	informational
Description	Starting disk encryption activation. This process can take several minutes to complete.

ENCRYPT_ENABLE_COMPLETED

Severity	informational
Description	Disk encryption is in effect.

ENCRYPT_ENABLE_NOT_COMPLETED

Severity	major
Description	Cannot complete encryption activation. *Count* disk(s) could not be enrolled.
Troubleshooting	Please contact technical support

ENCRYPT_DISABLE_STARTED

Severity	informational
Description	Starting disk encryption deactivation process.

ENCRYPT_DISABLE_COMPLETED

Severity	informational
Description	Disk encryption is no longer in effect.

ENCRYPT_DISABLE_NOT_COMPLETED

Severity	major
Description	Cannot complete encryption deactivation. *Count* disk(s) could not be securely erased.
Troubleshooting	Please contact technical support

ENCRYPT_KEYSERVER_ADDED

Severity	informational
Description	A key server named '*Key Server Name*' was added.

ENCRYPT_KEYSERVER_DELETED

Severity	informational
Description	Key server '*Key Server Name*' was deleted.

ENCRYPT_KEYSERVER_EDITED

Severity	informational
Description	Details of key server '*Key Server Name*' were modified.

ENCRYPT_KEYSERVER_RENAMED

Severity	informational
Description	Key server '*Old Name*' was renamed to '*New Name*'.

ENCRYPT_KEYSERVER_REKEY_COMPLETED

Severity	informational
Description	Key server '*Key Server Name*' rekey completed.

ENCRYPT_UNABLE_TO_UPDATE_KEY_DURING_DEACTIVATE _ON_KEYSERVER

Severity	major
Description	Could not update key server '*Keyserver Name*' regarding encryption deactivation. Please check key server status.

ENCRYPT_UNABLE_TO_UPDATE_KEY_DURING_DEACTIVCATE _ON_KEYSERVER

Severity	major
Description	Could not update key server '*Keyserver Name*' regarding encryption deactivation. Please check key server status.

ENCRYPT_KEYSERVER_REKEY_FAILED

Severity	major
Description	Cannot complete rekey with key server '*Key Server Name*'.

ENCRYPT_KEYSERVER_REKEY_ROLLBACK_FAILED

Severity	major

Description	Cannot rollback failed rekey with key server '*Key Server Name*'.

ENCRYPT_RECOVERY_KEY_ENTERED

Severity	informational
Description	Valid recovery key share was entered by user '*User Name*'.

ENCRYPT_INVALID_RECOVERY_KEY_ENTERED

Severity	major
Description	Invalid recovery key share was entered by user '*User Name*'.

ENCRYPT_RECOVERY_KEYS_GENERATED

Severity	informational
Description	Recovery keys created.

ENCRYPT_RECOVERY_KEY_REKEY_SUCCESS

Severity	informational
Description	Recovery key rekey was successful.

ENCRYPT_RECOVERY_KEY_REKEY_FAIL

Severity	major
Description	Recovery key rekey failed.

ENCRYPT_RECOVERY_KEY_VERIFIED

Severity	informational
Description	Recovery key verifed successfully for user '*User Name*'.

ENCRYPT_RECOVERY_KEY_VERIFY_FAILED

Severity	major
Description	Recovery key verification failed for user '*User Name*'.

ENCRYPT_RECOVERY_KEY_ALL_SHARES_VERIFIED

Severity	informational
Description	All recovery key shares have been verified.

ENCRYPT_KR_WRITE_FAILED

Severity	critical

Description	Key repository write failed with error code *rc*.
Troubleshooting	Please contact technical support

ENCRYPT_KR_READ_FAILED

Severity	major
Description	Key repository read failed with error code *rc*.
Troubleshooting	Please contact technical support

ENCRYPT_KEYSERVER_UNREACHABLE

Severity	minor
Description	Cannot ping key server '*Keyserver Name*' *TEXT* from module *module*.

ENCRYPT_UNABLE_TO_RETRIEVE_KEY_FROM_KEYSERVER

Severity	major
Description	Failed to retrieve key from key server '*Keyserver Name*' via *TEXT* on module *node id*. Please verify that the key server type and version are supported. If so, please check its status.

KEYSERVER_GATEWAY_FAILED_TO_REPORT_STATUS

Severity	minor
Description	Key server gateway in module *module* failed to report key server's status: *message*.
Troubleshooting	Please contact technical support

ENCRYPT_RECOVERY_KEY_RECOVER_SUCCESSFUL

Severity	informational
Description	Key recovery was successful, unlocking system.

ENCRYPTION_CERTIFICATE_FOR_XIV_IS_NOT_INSTALLED

Severity	critical
Description	XIV certificate is not installed.
Troubleshooting	Check output of pki_list for a certificate named XIV and contact technical support

ENCRYPT_UNABLE_TO_DELETE_MASTER_KEYSERVER

Severity	informational
Description	Deletion of master key server '*Keyserver Name*' is not allowed. Please define another key server as master first'.

ENCRYPTION_SKMIP_ERROR

Severity	major
Description	Module *Module* reported *Keyserver Name* returned error:*error code - TEXT*
Troubleshooting	Please contact the next level of support.

SSD_HAS_FAILED_WHILE_ENABLING_ENCRYPTION

Severity	major
Description	SSD *Component ID* failed while enabling encryption. User data on the device may not have been cryptographically erased. The failed device should be handled accordingly.
Troubleshooting	Contact support

CF_FAILED

Severity	major
Description	*Component ID* has failed. Hardware status: *Status*.
Troubleshooting	Please contact support.

DIMM_FAILED

Severity	major
Description	*Component ID* has failed. Hardware status: *Status*.
Troubleshooting	Please contact support.

CPU_FAILED

Severity	major
Description	*Component ID* has failed. Hardware status: *Status*.
Troubleshooting	Please contact support.

NIC_FAILED

Severity	major
Description	*Component ID* has failed. Hardware status: *Status*.
Troubleshooting	Please contact support.

UNKNOWN_MODULE_SERIAL_NUMBER

Severity	critical
Description	*Component ID* has an unknown serial number of *serial*.
Troubleshooting	Who generates this serial number?

ILLEGAL_MODULE_SERIAL_NUMBER

Severity	critical

Description	*Component ID* has an illegal serial number of *serial*.
Troubleshooting	Is this a Pre-GA module?

MODULE_ORIGINAL_SERIAL_CLEANED

Severity	major
Description	*Component ID* had an illegal original serial number of *Original Serial* which was changed to *Clean Original Serial*.
Troubleshooting	Is this a Pre-GA module?

MODULE_ORIGINAL_PART_NUMBER_CLEANED

Severity	major
Description	*Component ID* had an illegal original part number of *Original Serial* which was changed to *Clean Original Serial*.
Troubleshooting	Is this a Pre-GA module?

ILLEGAL_MODULE_PART_NUMBER

Severity	critical
Description	*Component ID* has an illegal part number of *part_number*.
Troubleshooting	Is there a problem with the IPMI of the module?

MODULE_CHANGE_DETECTED

Severity	major
Description	*Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	Was this module actually replaced?

CF_CHANGE_DETECTED

Severity	major
Description	*Component ID* has had the CF changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	Was this CF actually replaced?

INFINIBAND_HCA_CHANGE_DETECTED

Severity	major
Description	Adapter *Module* serial number changed from *old_serial* to *new_serial*.
Troubleshooting	Was this InfiniBand HCA actually replaced?

INFINIBAND_HCA_BOARD_CHANGE_DETECTED

Severity	major

Description	Adapter *Module* board type changed from '*old_board_description*' to '*new_board_description*'.
Troubleshooting	Was this InfiniBand HCA actually replaced?

INFINIBAND_HCA_BOARD_ID_CHANGE_DETECTED

Severity	major
Description	Adapter *Module* board ID changed from '*old board id*' to '*new board id*'.
Troubleshooting	Was this InfiniBand HCA actually replaced?

CNA_CHANGE_DETECTED

Severity	major
Description	Adapter *CNA Id* serial number changed from *old_serial* to *new_serial*.
Troubleshooting	Was this CNA actually replaced?

CNA_BOARD_CHANGE_DETECTED

Severity	major
Description	Adapter *CNA Id* board type changed from '*old_board_description*' to '*new_board_description*'.
Troubleshooting	Was this CNA actually replaced?

CNA_BOARD_ID_CHANGE_DETECTED

Severity	major
Description	Adapter *CNA Id* board ID changed from '*old board id*' to '*new board id*'.
Troubleshooting	Was this CNA actually replaced?

INFINIBAND_HCA_ADAPTER_TYPE_CHANGE_DETECTED

Severity	major
Description	Adapter *HCA Id* adapter type changed from '*old_board_type*' to '*new_board_type*'.
Troubleshooting	Was this adapter actually replaced?

SAS_CONTROLLER_CHANGE_DETECTED

Severity	major
Description	The SAS controller on module *Module* was changed from a serial of *old_serial* and board assembly of '*old_assembly*' to serial *new_serial* and board assembly '*new_assembly*'.
Troubleshooting	Was this SAS controller actually replaced?

DIMM_CHANGE_DETECTED

Severity	major

Description	*Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	Was this DIMM actually replaced?

PSU_CHANGE_DETECTED

Severity	informational
Description	*Component ID* has been changed from a serial number '*old_serial*', part number '*old_part_number*', to serial number '*new_serial*' and part number '*new_part_number*'.
Troubleshooting	Was this PSU actually replaced?

PSU_WAS_REMOVED

Severity	warning
Description	*Component ID* with a serial number '*Serial*' and part number '*Part Number*' was removed from the system.
Troubleshooting	Was this PSU actually removed?

PSU_WAS_INSTALLED

Severity	informational
Description	*Component ID* with a serial number '*Serial*' and part number '*Part Number*' was installed in the system.
Troubleshooting	Was this PSU actually installed?

CPU_CHANGE_DETECTED

Severity	major
Description	*Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	Was this CPU actually replaced?

NIC_CHANGE_DETECTED

Severity	major
Description	*Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	Was this NIC actually replaced?

VPD_CHANGE_DETECTED

Severity	informational
Description	Change in VPD *VPD Name* to a value of '*VPD Value*'.
Troubleshooting	NA. This information is for the event center.

MFG_CHANGE_DETECTED

Severity	informational
Description	Change in MFG *MFG Name* to a value of '*MFG Value*'.
Troubleshooting	NA. This information is for the event center.

MM_CONFIG_CHANGE_DETECTED

Severity	informational
Description	Change in MM *MM Name* to a value of '*MM Value*'.
Troubleshooting	NA. This information is for the event center.

REDISTRIBUTION_PRIORITY_SET

Severity	informational
Description	Redistribution priority set to '*Priority Value*'.
Troubleshooting	NA. This information is for the event center.

TECHNICIAN_WORK_STARTED

Severity	informational
Description	Technician work has started, expected to end at *End Time*. Comment: *Comment*.
Troubleshooting	N/A

TECHNICIAN_WORK_ENDED

Severity	informational
Description	Technician work has ended after *Elapsed Time* minutes. Comment: *Comment*.
Troubleshooting	N/A

TECHNICIAN_WORK_TIMED_OUT

Severity	warning
Description	Technician work has timed out after *Elapsed Time* minutes. Comment: *Comment*.
Troubleshooting	N/A

XIV_SUPPORT_ENABLED

Severity	informational
Description	XIV support access from *From* is enabled from *Start Time* until *Finish Time*. Comment: *Comment*.
Troubleshooting	N/A

XIV_SUPPORT_ENABLED_NO_TIME_LIMIT

Severity	informational

Description	XIV support access from *From* is enabled from *Start Time* until explicitly disabled. Comment: *Comment*.
Troubleshooting	N/A

XIV_SUPPORT_DISABLED

Severity	informational
Description	XIV support access is disabled.
Troubleshooting	N/A

XIV_SUPPORT_WINDOW_TIMEOUT

Severity	informational
Description	XIV support work window timeout is expired.
Troubleshooting	N/A

HOST_DEFINE

Severity	informational
Description	Host of type *host.type* was defined with name '*host.name*'.

HOST_UPDATE

Severity	informational
Description	Host named '*host.name*' was updated.

CLUSTER_CREATE

Severity	informational
Description	Cluster was defined with name '*cluster.name*'.

HOST_DEFINE_FAILED_TOO_MANY

Severity	warning
Description	Host with name '*name*' could not be defined. You are attempting to define more hosts than the system permits.
Troubleshooting	Delete Hosts to allow new ones to be defined.

CLUSTER_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Cluster with name '*name*' could not be defined. You are attempting to define more Clusters than the system permits.
Troubleshooting	Delete Clusters to allow new ones to be defined.

HOST_RENAME

Severity	informational
Description	Host with name '*old_name*' was renamed '*host.name*'.

CLUSTER_RENAME

Severity	informational
Description	Cluster with name '*old_name*' was renamed '*cluster.name*'.

HOST_DELETE

Severity	informational
Description	Host with name '*host.name*' was deleted.

CLUSTER_DELETE

Severity	informational
Description	Cluster with name '*cluster.name*' was deleted.

HOST_ADD_PORT

Severity	informational
Description	Port of type *type* and ID '*port_name*' was added to Host with name '*host.name*'.

CLUSTER_ADD_HOST

Severity	informational
Description	Host with name '*host.name*' was added to Cluster with name '*cluster.name*'.

HOST_REMOVE_PORT

Severity	informational
Description	Port of type *type* and ID '*port_name*' was removed from Host with name '*host.name*' was deleted.

CLUSTER_REMOVE_HOST

Severity	informational
Description	Host with name '*host.name*' was removed from Cluster with name '*cluster.name*'.

DESTINATION_DEFINE

Severity	informational
Description	Destination with name '*name*' was defined.

DESTINATION_UPDATE

Severity	informational
Description	Destination with name '*name*' was updated.

DESTINATION_DELETE

Severity	informational
Description	Destination with name '*name*' was deleted.

DESTINATION_RENAME

Severity	informational
Description	Destination with name '*old name*' was renamed '*new name*'.

DESTINATION_GROUP_CREATE

Severity	informational
Description	Destination Group with name '*name*' was created.

DESTINATION_GROUP_UPDATE

Severity	informational
Description	Destination Group with name '*name*' was updated.

DESTINATION_GROUP_DELETE

Severity	informational
Description	Destination Group with name '*name*' was deleted.

DESTINATION_GROUP_RENAME

Severity	informational
Description	Destination Group with name '*old name*' was renamed '*new name*'.

DESTINATION_GROUP_ADD_DESTINATION

Severity	informational
Description	Destination with name '*destination name*' was added to destination group '*destgroup name*'.

DESTINATION_GROUP_REMOVE_DESTINATION

Severity	informational
Description	Destination with name '*destination name*' was removed from destination group '*destgroup name*'.

RULE_CREATE

Severity	informational
Description	Rule with name '*name*' was created.

RULE_UPDATE

Severity	informational
Description	Rule with name '*name*' was updated.

RULE_DELETE

Severity	informational
Description	Rule with name '*name*' was deleted.

RULE_RENAME

Severity	informational
Description	Rule with name '*old name*' was renamed '*new name*'.

SMTP_GATEWAY_DEFINE

Severity	informational
Description	SMTP gateway with name '*name*' was defined.

SMTP_GATEWAY_UPDATE

Severity	informational
Description	SMTP gateway with name '*name*' was updated.

SMTP_GATEWAY_DELETE

Severity	informational
Description	SMTP gateway with name '*name*' was deleted.

SMTP_GATEWAY_RENAME

Severity	informational
Description	SMTP gateway with name '*old name*' was renamed '*new name*'.

SMTP_GATEWAY_PRIORITIZE

Severity	informational
Description	SMTP gateways were prioritized; the new order is *order*.

SMTP_GATEWAY_FAILED

Severity	major
Description	SMTP gateway with name '*name*' has failed. It will not be used until *Retry Time*.

SMTP_GATEWAY_VIA_NODE_FAILED

Severity	warning
Description	Sending event *Event Code* (*Event Index*) through *SMTP Gateway* via *Module ID* has failed; Error message: '*Error Message*'.

SMS_GATEWAY_DEFINE

Severity	informational
Description	SMS gateway with name '*name*' was defined.

SMS_GATEWAY_UPDATE

Severity	informational
Description	SMS gateway with name '*name*' was updated.

SMS_GATEWAY_DELETE

Severity	informational
Description	SMS gateway with name '*name*' was deleted.

SMS_GATEWAY_RENAME

Severity	informational
Description	SMS gateway with name '*old name*' was renamed '*new name*'.

SMS_GATEWAY_PRIORITIZE

Severity	informational
Description	SMS gateways were prioritized; the new order is *order*.

EVENTS_WERE_DISCARDED

Severity	variable
Description	*Number of events* pending events of maximal severity '*maximal severity*' were discarded because of overload.
Troubleshooting	Please contact support.

CONS_GROUP_CREATE

Severity	informational

Description	Consistency Group with name '*cg.name*' was created.

CONS_GROUP_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Consistency Group with name '*name*' could not be created. You are attempting to add more Consistency Groups than the system permits.
Troubleshooting	Delete Consistency Groups to allow new ones to be created.

CONS_GROUP_RENAME

Severity	informational
Description	Consistency Group with name '*old_name*' was renamed '*cg.name*'.

CONS_GROUP_DELETE

Severity	informational
Description	Consistency Group with name '*cg.name*' was deleted.

CONS_GROUP_ADD_VOLUME

Severity	informational
Description	Volume with name '*volume.name*' was added to Consistency Group with name '*cg.name*'.

SLAVE_CONS_GROUP_ADD_VOLUME

Severity	informational
Description	Volume with name '*volume.name*' was added to Consistency Group with name '*cg.name*' by its remote peer.

CONS_GROUP_REMOVE_VOLUME

Severity	informational
Description	Volume with name '*volume.name*' was removed from Consistency Group with name '*cg.name*'.

SLAVE_CONS_GROUP_REMOVE_VOLUME

Severity	informational
Description	Volume with name '*volume.name*' was removed from Consistency Group with name '*cg.name*' by its remote peer.

CONS_GROUP_SNAPSHOTS_CREATE

Severity	informational
Description	Snapshot Group for Consistency Group with name '*cg.name*' was created with name '*cs_name*'.

CONS_GROUP_SNAPSHOTS_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Snapshot Group for Consistency Group '*cg.name*' could not be created. You are attempting to add more Volumes than the system permits.
Troubleshooting	Delete Volumes to allow new ones to be created.

CONS_GROUP_SNAPSHOTS_OVERWRITE

Severity	informational
Description	Snapshot Group named '*cs_name*' was overriden for Consistency Group with name '*cg.name*'.

SLAVE_CONS_GROUP_SNAPSHOTS_CREATE

Severity	informational
Description	Mirrored Snapshot Group for Consistency Group with name '*cg.name*' was created with name '*cs_name*'.

SLAVE_CONS_GROUP_SNAPSHOTS_OVERWRITE

Severity	informational
Description	Mirrored Snapshot Group named '*cs_name*' was overriden for Consistency Group with name '*cg.name*'.

MIRROR_CONS_GROUP_SNAPSHOTS_CREATE

Severity	informational
Description	Mirrored Snapshot Group for Consistency Group with name '*cg.name*' was created with name '*cs_name*'.

MIRROR_CONS_GROUP_SNAPSHOTS_OVERWRITE

Severity	informational
Description	Mirrored Snapshot Group named '*cs_name*' was overriden for Consistency Group with name '*cg.name*'.

MIRROR_SNAPGROUP_CREATE_FAILED

Severity	minor

Description	Remote snapshot group named '*snapshot group name*' was not created successfully. Error code is '*error*'

SNAPSHOT_GROUP_RESTORE

Severity	informational
Description	Volumes were restored from Snapshot Group with name '*cs_name*'.

SNAPSHOT_GROUP_RENAME

Severity	informational
Description	Snapshot Group with name '*cs_name*' were renamed to '*new_name*'.

SNAPSHOT_GROUP_DUPLICATE

Severity	informational
Description	All Snapshots in Snapshot Group with name '*cs_name*' were duplicated. Duplicate Snapshot Group is named '*new_cs_name*'.

SNAPSHOT_GROUP_FORMAT

Severity	informational
Description	All Snapshots in Snapshot Group with name '*cs_name*' were formatted'.

SNAPSHOT_GROUP_DELETE

Severity	informational
Description	All Snapshots in Snapshot Group with name '*cs_name*' were deleted.

SNAPSHOT_GROUP_CHANGE_PRIORITY

Severity	informational
Description	Deletion Priority of all Snapshots in Snapshot Group with name '*cs_name*' were changed from '*old priority*' to '*new priority*'.

SNAPSHOT_GROUP_LOCK

Severity	informational
Description	All Snapshots in Snapshot Group with name '*cs_name*' were locked.

SNAPSHOT_GROUP_UNLOCK

Severity	informational

Description	All Snapshots in Snapshot Group with name '*cs_name*' were unlocked.

SNAPSHOT_GROUP_DELETED_DUE_TO_POOL_EXHAUSTION

Severity	informational
Description	All Snapshots in Snapshot Group with name '*snapshot.sg_name*' have been deleted because Storage Pool with name '*snapshot.pool_name*' is full.
Troubleshooting	N/A

SNAPSHOT_GROUP_DISBAND

Severity	informational
Description	Snapshot Group with name '*cs_name*' was dismantled. All Snapshots which belonged to that Snapshot Group should be accessed directly.

CONS_GROUP_MOVE

Severity	informational
Description	Consistency Group with name '*cg.name*' has been moved from Storage Pool '*orig_pool.name*' to Pool '*pool.name*'.

CONS_GROUP_GROUPED_POOL_MOVE

Severity	informational
Description	Consistency Group with name '*cg.name*' has been moved from Grouped Pool '*orig_gp.name*' to Grouped Pool '*gp.name*'.

XCG_CREATE

Severity	informational
Description	Cross Consistency Group with name '*xcg*' was created.

XCG_DELETE

Severity	informational
Description	Cross Consistency Group with name '*xcg*' was deleted.

XCG_ADD_CG

Severity	informational
Description	CG with name '*cg.name*' was added to Cross Consistency Group with name '*xcg*'.

XCG_REMOVE_CG

Severity	informational
Description	CG with name '*cg.name*' was removed from Cross Consistency Group with name '*xcg*'.

GROUPED_POOL_CREATE

Severity	informational
Description	Grouped Pool with name '*gp.name*' was created.

GROUPED_POOL_RENAME

Severity	informational
Description	Grouped Pool with name '*old_name*' was renamed '*gp.name*'.

GROUPED_POOL_DELETE

Severity	informational
Description	Grouped Pool with name '*gp.name*' was deleted.

GROUPED_POOL_CAPACITY_SHIFT

Severity	informational
Description	On Grouped Pool with name '*gp.name*' Capacity of *capacity_size*GB was shifted from pool '*src_pool.name*' to pool '*dest_pool.name*'.

TARGET_DEFINE

Severity	informational
Description	Target was defined named '*target.name*'.

TARGET_DEFINE_FAILED_TOO_MANY

Severity	warning
Description	Target could not be defined. You are attempting to define more targets than the system permits.
Troubleshooting	Delete targets to allow new ones to be defined.

TARGET_RENAME

Severity	informational
Description	Target named '*old_name*' was renamed '*target.name*'.

TARGET_DELETE

Severity	informational
Description	Target named '*target.name*' was deleted.

TARGET_ALLOW_ACCESS

Severity	informational
Description	Target '*target.name*' is allowed to access this machine.

TARGET_PORT_ADD

Severity	informational
Description	Port '*port_name*' was added to target named '*target.name*'.

TARGET_PORT_REMOVE

Severity	informational
Description	Port '*port_name*' was removed from target named '*target.name*'.

TARGET_PORT_ACTIVATE

Severity	informational
Description	Port '*port_name*' in target named '*target.name*' was activated.

TARGET_PORT_DEACTIVATE

Severity	informational
Description	Port '*port_name*' was deactivated in target named '*target.name*'.

TARGET_CONNECTIVITY_CREATE

Severity	informational
Description	Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' is connected to the system through *Local FC Port*.

TARGET_ISCSI_CONNECTIVITY_CREATE

Severity	informational
Description	Port '*Connection Remote Port Address*' of target named '*Connection Target Name* is connected to the system through ip interface '*Local IP interface*'.

TARGET_CONNECTIVITY_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Port could not be connected to the system. You are attempting to define more connections than the system permits.
Troubleshooting	Delete Connections to allow new ones to be created.

TARGET_CONNECTIVITY_DELETE

Severity	informational
Description	Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' was disconnected from *Local FC Port*.

TARGET_ISCSI_CONNECTIVITY_DELETE

Severity	informational
Description	Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' was disconnected from ip interface '*Local IP interface*'.

TARGET_CONNECTIVITY_ACTIVATE

Severity	informational
Description	Connectivity between Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' and *Local FC Port* was activated.

TARGET_ISCSI_CONNECTIVITY_ACTIVATE

Severity	informational
Description	Connectivity between Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' and ip interface '*Local IP interface*' was activated.

TARGET_CONNECTIVITY_DEACTIVATE

Severity	informational
Description	Connectivity between Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' and *Local FC Port* was deactivated.

TARGET_ISCSI_CONNECTIVITY_DEACTIVATE

Severity	informational
Description	Connectivity between Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' and ip interface '*Local IP interface*' was deactivated.

TARGET_CONNECTIVITY_CONFLICT_DETECTED

Severity	major
Description	Connectivity between Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' and FC port '*Local IP interface*' will be deleted due to a connectivity conflict.

TARGET_ISCSI_CONNECTIVITY_CONFLICT_DETECTED

Severity	major

Description	Connectivity between Port '*Connection Remote Port Address*' of target named '*Connection Target Name*' and IP interface '*Local IP interface*' will be deleted due to a connectivity conflict.

TARGET_CONNECTION_ESTABLISHED

Severity	informational
Description	Target named '*target.name*' is accessible through remote service *module_id*.

TARGET_CONNECTION_DISCONNECTED

Severity	minor
Description	Target named '*target.name*' is no longer accessible through remote service *module_id*.

TARGET_DISCONNECTED

Severity	major
Description	Target named '*target.name*' is no longer accessible through any gateway module.

TARGET_CLOCK_SKEW_ABOVE_LIMIT

Severity	warning
Description	Target '*target.name*' has clock skew above the allowed limit relative to local machine.

TARGET_CLOCK_SKEW_RESOLVED

Severity	informational
Description	Target named '*target.name*' clock skew has been resolved.

TARGET_LINK_DOWN_BEYOND_THRESHOLD

Severity	major
Description	Target named '*target.name*' is not accessible for a long time.

OLVM_DELETE_ALL_REFERENCES_TO_SOURCE

Severity	major
Description	Target named '*target.name*' was released from all IBM Hyper-Scale Mobility relationships.

SNAPSHOT_CREATE

Severity	informational
Description	Snapshot named '*snapshot.name*' was created for volume named '*volume.name*'.

SNAPSHOT_CREATE_MANY

Severity	informational
Description	Created *num_of_vols* snapshots.

SNAPSHOT_OVERWRITE

Severity	informational
Description	Snapshot named '*snapshot.name*' was overriden for volume named '*volume.name*'.

SNAPSHOT_FORMAT

Severity	informational
Description	Snapshot named '*snapshot.name*' was formatted.

SNAPSHOT_CREATE_FAILED_TOO_MANY

Severity	warning
Description	Snapshot for volume named '*volume.name*' could not be created. You are attempting to add more volumes than the system permits.
Troubleshooting	Delete volumes to allow new ones to be created.

SNAPSHOT_DUPLICATE

Severity	informational
Description	Snapshot named '*snapshot.name*' was created as duplicate of Snapshot named '*original_snapshot.name*'.

SNAPSHOT_DUPLICATE_FAILED_TOO_MANY

Severity	warning
Description	Snapshot named '*snapshot.name*' could not be duplicated. You are attempting to add more volumes than the system permits.
Troubleshooting	Delete volumes to allow new ones to be created.

SNAPSHOT_RESTORE

Severity	informational
Description	Volume named '*volume.name*' was restored from Snapshot named '*snapshot.name*'.

SNAPSHOT_CHANGE_PRIORITY

Severity	informational

Description	Snapshot Delete Priority of Snapshot named '*snapshot.name*' was changed from '*old_priority*' to '*snapshot.delete_priority*'.
Troubleshooting	N/A

SNAPSHOT_DELETED_DUE_TO_POOL_EXHAUSTION

Severity	warning
Description	Snapshot named '*snap.name*' has been deleted because Storage Pool named '*snap.pool_name*' is full.
Troubleshooting	N/A

MIRROR_SNAPSHOT_CREATE

Severity	informational
Description	Mirrored Snapshot named '*snapshot.name*' was created for volume named '*volume.name*'.

MIRROR_SNAPSHOT_CREATE_FAILED

Severity	minor
Description	Remote snapshot named '*snapshot name*' was not created successfully. Error code is '*error*'

MIRROR_SNAPSHOT_OVERWRITE

Severity	informational
Description	Mirrored Snapshot named '*snapshot.name*' was overriden for volume named '*volume.name*'.

MIRROR_SLAVE_SNAPSHOT_CREATE

Severity	informational
Description	Mirrored Snapshot named '*snapshot.name*' was created for volume named '*volume.name*'.

MIRROR_SLAVE_SNAPSHOT_OVERWRITE

Severity	informational
Description	Mirrored Snapshot named '*snapshot.name*' was overriden for volume named '*volume.name*'.

INVALID_ASYNC_ASSOC

Severity	critical
Description	Can not start async job without next job. volume uid *volume uid*
Troubleshooting	N/A

INVALID_DATA_GENERATION_ID

Severity	minor
Description	Rejected write with id *write id* on volume *volume nr* for lba *lba*. Expected id is *expected id*
Troubleshooting	N/A

XDRP_FLAGS_ON_AND_NO_MIRROR

Severity	critical
Description	partition *partition number* on volume *Volume* has xdrp flags but master volume *master volume* has no mirroring.
Troubleshooting	N/A

FAILED_TO_ALLOC_FOR_REMOTE_FLAG

Severity	critical
Description	Failed to allocate partition number *partition number* on volume *volume* disk *disk id* when trying to mark bits for remote sync.
Troubleshooting	N/A

FAILED_ALLOC_IN_REBUILD

Severity	critical
Description	Failed to allocate partition number *Partition Number* on volume *volume number* disk *disk id* during REBUILD.
Troubleshooting	N/A

ACQUIRED_INVALID_PARTITION

Severity	critical
Description	Acquired invalid partition number *Partition Number* on volume *volume number*, flags *partition flags* reference count *reference count*.
Troubleshooting	N/A

ACQUIRED_INVALID_PARTIION

Severity	critical
Description	Acquired invalid partition number *Partition Number* on volume *volume number*, flags *partition flags* reference count *reference count*.
Troubleshooting	N/A

INVALID_PARTITION_STATIC_FLAG

Severity	critical

Description	Partition static flag doesn't match requested metadata static flag. Partition number *Partition number* volume *volume number* flags *partition flags* metadata flags *metadata flags*.
Troubleshooting	N/A

SUSPECT_DATA_LOSS

Severity	critical
Description	Suspected data loss on Partition *Disk ID*, volume=*Volume*, logical-partition=*Logical Partition Number*, physical-partition=*Physical Partition Number*.
Troubleshooting	Verify that data is unreadable. Use backup data to recover.

SCRUBBING_CHECKSUM_DIFF

Severity	critical
Description	Scrubbing checksum diff. Primary: *Primary Disk*, checksum=*Primary Checksum* p_phy_part_nr=*p_phy_part_nr*; Secondary: *Secondary Disk* checksum=*Secondary Checksum* s_phy_part_nr=*s_phy_part_nr*; Volume=*Volume*, partition=*Logical Partition Nunber*, is_master=*Is Master*.
Troubleshooting	Compare data on primary and secondary.

SCRUBBER_FIXED_CHECKSUM_DIFF

Severity	informational
Description	Scrubber fixed checksum diff. Volume=*Volume*, Partition=*Logical Partition Nunber*. Fixed from node=*Node*, disk=*Disk*
Troubleshooting	N/A

SCRUBBING_CHECKSUM_DIFF_RETRY_COUNT

Severity	critical
Description	Scrub passed partition *number of retries* times and found diffs *number of times diff found* times. primary: *Primary Disk* secondary: *Secondary Disk* volume=*Volume*, partition=*Logical Partition Nunber*.
Troubleshooting	Compare data on primary and secondary.

SCRUBBING_REMOTE_DIGEST_DIFF

Severity	critical
Description	Scrubbing found different digests in local and remote.disk *disk Tracks Diff Count* tracks are different. First diff track *Track* local: (*Local Digest 0*, *Local Digest 1*) Remote: (*Remote Digest 0*, *Remote Digest 1*), volume=*Volume*, pvi=*PVI*, partition=*Logical Partition Number*.
Troubleshooting	Compare data on primary and secondary.

SCRUBBING_REMOTE_DIGEST_DIFF_IDENTIFIED _AND_CORRECTED

Severity	informational
Description	Scrubbing identified and corrected data on remote system. disk *disk Tracks Diff Count* tracks were different. First diff track *Track* local: (*Local Digest 0*, *Local Digest 1*) Remote: (*Remote Digest 0*, *Remote Digest 1*), volume=*Volume*, pvi=*PVI*, partition=*Logical Partition Number*.
Troubleshooting	N/A

SCRUBBING_REMOTE_DIGEST_DIFF_CORRECT_FAILED

Severity	informational
Description	Scrubbing failed to correct remote system. disk *disk Tracks Diff Count* tracks are different. First diff track *Track* local: (*Local Digest 0*, *Local Digest 1*) Remote: (*Remote Digest 0*, *Remote Digest 1*), volume=*Volume*, pvi=*PVI*, partition=*Logical Partition Number*.
Troubleshooting	N/A

SCRUBBING_FORMATTED_NOT_ZERO

Severity	critical
Description	Scrubbing found formatted partition with non zero checksum on *Disk ID*, partition=*phy_part_nr*, checksum=*checksum*.
Troubleshooting	N/A

SCRUBBING_SUCCESS

Severity	informational
Description	Scrubbing found that digests are now equal at location: *Primary Disk*, p_phy_part_nr=*p_phy_part_nr*; Secondary: *Secondary Disk* s_phy_part_nr=*s_phy_part_nr*; Volume=*Volume*, partition=*Logical Partition Number*.
Troubleshooting	N/A

SCRUBBING_SECONDARY_DIFF_IDENTIFIED_AND_CORRECTED

Severity	informational
Description	Scrubbing identified and corrected diff on secondary: *Secondary Disk* s_phy_part_nr=*s_phy_part_nr*; From primary: *Primary Disk*, p_phy_part_nr=*p_phy_part_nr*; Volume=*Volume*, partition=*Logical Partition Number*.
Troubleshooting	N/A

MEDIUM_ERROR_IN_DATA_MIGRATION

Severity	critical

Description	Medium error in data migration into volume '*Volume Name*' at LBA *LBA* for *Length* blocks.
Troubleshooting	Remote machine indicated Medium Error when read.

ZERO_LENGTH_IO

Severity	warning
Description	Media errors on node=*node*, interface=*interface*, volume=*volume*, LBA=*LBA*, blk_cnt=*Block Count*.
Troubleshooting	N/A

BUFFER_POOL_EMPTY

Severity	major
Description	The memory pool of cache buffers in node=*node* is exhausted. All *pool_size* buffers are allocated.
Troubleshooting	N/A

ORPHANED_ASYNC_PARTITION

Severity	warning
Description	An active async job (*Job ID*) running on cache *node* disk *Disk ID* found partition *Logical partition number* of source and target snapshots to be the same partition. Master volume=*Master Volume*.
Troubleshooting	N/A

CACHE_ALLOCATION_NO_READ_CACHE

Severity	critical
Description	Cache had no read-cache pages available for allocation in the context of *Disk ID*.
Troubleshooting	Look at traces for more details.

SSD_GET_KEY_FAILED

Severity	warning
Description	Failed to get key for SSD *SSD ID*
Troubleshooting	N/A

SSD_GET_KEY_COMPLETED

Severity	informational
Description	Get key completed for SSD *SSD ID*
Troubleshooting	N/A

SSD_CACHE_UPDATED_TO_NEW_MD_VERSION

Severity	informational

Description	SSD cache of *SSD ID* was reset and updated to new metadata version
Troubleshooting	N/A

SSD_ERROR_DETECTED

Severity	minor
Description	Read from SSD *Disk ID* failed the integrity check due to *Reason*, Page Number=*Page Number*. Read from disk instead.
Troubleshooting	N/A

DISK_SHOULD_FAIL

Severity	major
Description	*Disk ID* is malfunctioning and should fail.
Troubleshooting	Please contact your Administrator.

DISK_NEEDS_PHASEOUT

Severity	major
Description	*Disk ID* needs to be phased out.
Troubleshooting	Please contact your Administrator.

SSD_DISK_LABELS_MISMATCH

Severity	major
Description	SSD *SSD ID* has data that mismatches disk *Disk ID*

IGNORED_ALLOCATED_NOT_USED_PARTITION

Severity	informational
Description	While looking for partition (*Disk:*, *Vol:*, *Part:*) we unexpectedly encountered a partition higher in tree (*Disk:*, *Vol:*, *Part:*).

SCRUBBER_WAS_REPOSITIONED

Severity	major
Description	The position of the scrubber on disk *Disk ID* was modified by the user (from *Old Value* to *New Value*).

STATUS_AGENT_ERROR

Severity	critical
Description	Status Agent error: *message* (value=*value*).
Troubleshooting	Please contact support.

UNUSUAL_CONF_LOCK_TIME

Severity	warning
Description	very long conf-lock duration. node=*node*, duration_msec=*duration*,
Troubleshooting	look at traces for more details.

USER_DEFINED

Severity	informational
Description	A user with name '*Name*' and category *Category* was defined.
Troubleshooting	N/A

USER_DELETED

Severity	informational
Description	A user with name '*Name*' and category *Category* was deleted.
Troubleshooting	N/A

USER_RENAMED

Severity	informational
Description	User with name '*Old Name*' was renamed '*New Name*'.
Troubleshooting	N/A

USER_UPDATED

Severity	informational
Description	User with name '*Name*' was updated.
Troubleshooting	N/A

USER_ADDED_TO_USER_GROUP

Severity	informational
Description	User '*User Name*' was added to user group '*User Group Name*'.
Troubleshooting	N/A

USER_REMOVED_FROM_USER_GROUP

Severity	informational
Description	User '*User Name*' was removed from user group '*User Group Name*'.
Troubleshooting	N/A

USER_GROUP_CREATED

Severity	informational

Description	A user group with name '*Name*' was created.
Troubleshooting	N/A

USER_GROUP_DELETED

Severity	informational
Description	A user group with name '*Name*' was deleted.
Troubleshooting	N/A

USER_GROUP_RENAMED

Severity	informational
Description	User group with name '*Old Name*' was renamed '*New Name*'.
Troubleshooting	N/A

LDAP_AUTHENTICATION_ACTIVATED

Severity	informational
Description	LDAP authentication activated.
Troubleshooting	N/A

LDAP_AUTHENTICATION_DEACTIVATED

Severity	warning
Description	LDAP authentication deactivated.
Troubleshooting	N/A

LDAP_CONFIGURATION_CHANGED

Severity	warning
Description	LDAP configuration has changed.
Troubleshooting	N/A

LDAP_CONFIGURATION_RESET

Severity	warning
Description	LDAP configuration has reset.
Troubleshooting	N/A

USER_LOGIN_HAS_SUCCEEDED

Severity	informational
Description	User '*User Name*' from IP '*Client Address*' successfully logged into the system.
Troubleshooting	N/A

USER_LOGIN_HAS_FAILED

Severity	warning
Description	User '*User Name*' from IP '*Client Address*' failed logging into the system.
Troubleshooting	N/A

USER_HAS_FAILED_TO_RUN_COMMAND

Severity	warning
Description	User '*User Name*' from IP '*Client Address*' failed authentication when trying to run command '*Command Line*'.
Troubleshooting	N/A

HSA_WRONG_IQN

Severity	warning
Description	User hsa_client gave wrong iqn '*IQN identifier*'.
Troubleshooting	N/A

LDAP_SERVER_INACCESSIBLE

Severity	minor
Description	LDAP server *FQDN* is inaccessible.
Troubleshooting	N/A

LDAP_SERVER_ACCESSIBLE

Severity	informational
Description	LDAP server *FQDN* is now accessible.
Troubleshooting	N/A

LDAP_SSL_CERTIFICATE_ABOUT_TO_EXPIRE

Severity	warning
Description	SSL Certificate of LDAP server '*Server FQDN*' is about to expire on *Expiration Date* (*Counter* notification).
Troubleshooting	N/A

LDAP_SERVER_WAS_ADDED

Severity	informational
Description	LDAP server '*Server FQDN*' was added to the system.
Troubleshooting	N/A

LDAP_SERVER_WAS_REMOVED

Severity	informational

Description	LDAP server '*Server FQDN*' was removed from the system.
Troubleshooting	N/A

DESIGNATED_MSM_USER

Severity	informational
Description	*Description*
Troubleshooting	N/A

DOMAIN_POLICY_SET

Severity	informational
Description	Domain policy for *Parameter Name* set to '*Parameter Value*'
Troubleshooting	N/A

USER_ADDED_TO_DOMAIN

Severity	informational
Description	User *User Name* was added to domain *Domain Name* (*Exclusive*).
Troubleshooting	N/A

USER_REMOVED_FROM_DOMAIN

Severity	informational
Description	User *User Name* was removed from domain *Domain Name*.
Troubleshooting	N/A

APPADMIN_CAPABILITIES_SET

Severity	informational
Description	Application admin capabilities have been set to *Capabilities*
Troubleshooting	N/A

ACCESS_TO_HOST_GRANTED_TO_USER_GROUP

Severity	informational
Description	User group '*User Group Name*' was granted access to host '*Host Name*'.
Troubleshooting	N/A

ACCESS_OF_USER_GROUP_TO_HOST_REMOVED

Severity	informational
Description	Access of User group '*User Group Name*' to host '*Host Name*' was removed.

Troubleshooting	N/A

ACCESS_TO_CLUSTER_GRANTED_TO_USER_GROUP

Severity	informational
Description	User group '*User Group Name*' was granted access to cluster '*Cluster Name*'.
Troubleshooting	N/A

ACCESS_OF_USER_GROUP_TO_CLUSTER_REMOVED

Severity	informational
Description	Access of User group '*User Group Name*' to cluster '*Cluster Name*' was removed.
Troubleshooting	N/A

COMPONENT_TEST_HAS_FAILED

Severity	minor
Description	Test of *Component ID* has failed. Failure reason: *Failure Reason*.
Troubleshooting	Please contact support.

COMPONENT_TEST_SUCCEEDED

Severity	informational
Description	Test of *Component ID* succeeded.
Troubleshooting	Please contact support.

MODULE_COMPONENT_TEST_STARTED

Severity	informational
Description	Test of *Component ID* started.
Troubleshooting	N/A

DISK_COMPONENT_TEST_STARTED

Severity	informational
Description	Test of *Component ID* started.
Troubleshooting	N/A

IB_SWITCH_COMPONENT_TEST_STARTED

Severity	informational
Description	Test of *Component ID* started.
Troubleshooting	N/A

SSD_COMPONENT_TEST_STARTED

Severity	informational
Description	Test of *Component ID* started.
Troubleshooting	N/A

COMPONENT_WAS_PHASED_OUT

Severity	informational
Description	*Component ID* was phased-out.
Troubleshooting	N/A

COMPONENT_WAS_FAILED

Severity	informational
Description	Component *Component ID* was marked as failed.
Troubleshooting	N/A

COMPONENT_FAILURE_WAS_CANCELED

Severity	informational
Description	Component *Component ID* failure status was reset.
Troubleshooting	N/A

COMPONENT_WAS_PHASED_IN

Severity	informational
Description	*Component ID* was phased-in.
Troubleshooting	N/A

COMPONENT_WAS_EQUIPPED

Severity	informational
Description	*Component ID* was equipped.
Troubleshooting	N/A

COMPONENT_WAS_UNEQUIPPED

Severity	informational
Description	*Component ID* was unequipped.
Troubleshooting	N/A

INTERFACE_SERVICES_ACTIVATED

Severity	informational
Description	Interface services of *Module ID* were activated.
Troubleshooting	N/A

INTERFACE_SERVICES_DEACTIVATED

Severity	informational
Description	Interface services of *Module ID* were deactivated.
Troubleshooting	N/A

COMPONENT_FIRMWARE_UPGRADE_ABORTING

Severity	warning
Description	Aborting *Upgrade type* upgrade of *Firmware type* firmware, version *Label*, on *Scope*. Abort reason: *Reason*. Waiting for current upgrade item to complete.
Troubleshooting	N/A

COMPONENT_FIRMWARE_UPGRADE_ABORTED

Severity	warning
Description	Aborted *Upgrade type* upgrade of *Firmware type* firmware, version *Label*, on *Scope*. Abort reason: *Reason*. Progress *Attempted/Total*, *Successes* succeeded, *Failures* failed, *No-Ops* no-ops.
Troubleshooting	N/A

COMPONENT_FIRMWARE_UPGRADE_DONE

Severity	informational
Description	Finished *Upgrade type* upgrade of *Firmware type* firmware, version *Label*, on *Scope*. *Successes* succeeded, *Failures* failed, *No-Ops* no-ops.
Troubleshooting	N/A

COMPONENT_FIRMWARE_UPGRADE_STARTED

Severity	informational
Description	Starting *Upgrade type* upgrade of *Firmware type* firmware, version *Label*, on *Scope*.
Troubleshooting	N/A

COMPONENT_FIRMWARE_CANNOT_PHASEOUT_COMPONENT

Severity	minor
Description	Cannot phase out *Component ID*: *Error*. Firmware upgrade result was: *Upgrade result*.
Troubleshooting	N/A

COMPONENT_FIRMWARE_CANNOT_FAIL_COMPONENT

Severity	minor
Description	Cannot fail *Component ID*: *Error*. Firmware upgrade result was: *Upgrade result*.
Troubleshooting	N/A

COMPONENT_EQUIP_RECOVERY_OPERATION_FAILED

Severity	major
Description	Recovery operation on *Component ID* failed with return value *Error*.
Troubleshooting	Please contact support

MODULE_BRINGUP_CONFIGURATION_MISMATCH

Severity	major
Description	Conflict between module *Component ID* bringup data and cluster configuration. Bringup data *Field name*: expected value is *Expected Value* however actual value is *Actual Value*.
Troubleshooting	Please fix module's deployment configuration field, and re-deploy

MODULE_BRINGUP_DATA_GET_OPERATION_FAILED

Severity	major
Description	Module *Component ID* bringup data operation failed because *Reason Code*.
Troubleshooting	Please check module ip connectivity

MODULE_BRINGUP_CONFIGURATION_RANGE_MISMATCH

Severity	major
Description	Conflict between module *Component ID* bringup data and cluster configuration. Field *Field name*: remote module has value *Actual Value*, but system accepts only *System Value* with maximum allowed deviation of *Allowd Deviation*.
Troubleshooting	Please fix module's deployment configuration field, and re-deploy

MODULE_SOFTWARE_VERSION_DOES_NOT_SUPPORT _OPERATION

Severity	major
Description	Module *Component ID* software version *Software Version* does not support operation *Operation*.
Troubleshooting	Please deploy/upgrade to new version

MIRRORING_CONNECTIVITY_TO_NON_XIV_TARGET

Severity	warning
Description	Gateway Node #*Node ID*: connection to *target name*:*target's connection index* mirroring connection was established, but being ignored because the remote end is not an XIV target or is not properly configured
Troubleshooting	Please make sure the target's designation is correct, that the connection's parameters identify the intended system and that the intended system has a target_port defined for this system.

DM_CONNECTIVITY_TO_XIV_TARGET

Severity	warning
Description	Gateway Node #*Node ID*: connection to *target name*:*target's connection index* DM connection was established, but being ignored because the remote end is an XIV target configured for mirroring, rather than a host
Troubleshooting	Please make sure the target's designation is correct, that the connection's parameters identify the intended system and that the intended system has a host defined for this system (and not a target_port).

TAKEN_OVER

Severity	informational
Description	Module *Module ID* has taken over as *Singleton Node ID*.

EMERGENCY_ROOT_ACCESS

Severity	warning
Description	Emergency login to 'root' account on module '*Component ID*' from '*IP Address*' using key number '*Authorized Key Number*'.
Troubleshooting	N/A

EMERGENCY_CONSOLE_ACCESS

Severity	warning
Description	Emergency login to '*Unix Account Name*' account on module '*Component ID*' from tty '*TTY Device*'.
Troubleshooting	N/A

CR_BYPASS_ACCESS

Severity	warning
Description	*Command that bypasses CR mechanism* access to '*Unix Account Name*' account on module '*Component ID*' from '*IP Address*'.
Troubleshooting	N/A

CR_KEY_SETUP_OK

Severity	informational
Description	Challenge-response key was successfully set on all modules in the system.
Troubleshooting	N/A

CR_KEY_UPGRADE_NOT_DONE

Severity	warning
Description	Challenge-response key was not upgraded on the system since a valid key has been previously set.
Troubleshooting	N/A

CR_KEY_SETUP_FAILED

Severity	major
Description	Failed to set challenge-response key on module '*Component ID*'.
Troubleshooting	N/A

SSH_REVOKE_KEY_OK

Severity	informational
Description	Authorized SSH key ending with '*Tail of Authorized SSH key*' was successfully revoked for user '*Unix Account Name*' on all modules in the system.
Troubleshooting	N/A

SSH_REVOKE_KEY_FAILED

Severity	major
Description	Failed to revoke authorized SSH key ending with '*Tail of Authorized SSH key*' for user '*Unix Account Name*' on module '*Component ID*'.
Troubleshooting	N/A

CLEAR_FACTORY_SETTINGS_STARTED

Severity	informational
Description	Started clear factory settings.
Troubleshooting	Please contact support.

CLEAR_FACTORY_SETTINGS_FINISHED

Severity	informational
Description	Finished clear factory settings.
Troubleshooting	Please contact support.

CLEAR_FACTORY_SETTINGS_FAILED

Severity	critical
Description	Failed to finish clear factory settings.
Troubleshooting	Please contact support.

PROBLEMATIC_DISK_BEHAVIOR_DETECTED

Severity	variable
Description	*Component ID* exhibits problematic behavior.
Troubleshooting	Please contact support.

PROBLEMATIC_DISK_BEHAVIOR_CLEARED

Severity	informational
Description	*Component ID* no longer exhibits problematic behavior.
Troubleshooting	Please contact support.

DISK_PROBLEMATIC_BEHAVIOR_DETECTED

Severity	variable
Description	*Component ID* exhibits problematic behavior.
Troubleshooting	Please contact support.

DISK_PROBLEMATIC_BEHAVIOR_CLEARED

Severity	informational
Description	*Component ID* no longer exhibits problematic behavior.
Troubleshooting	Please contact support.

DISK_HIGH_MEDIA_ERROR_RATE_DETECTED

Severity	variable
Description	*Component ID* exhibits high media error rate of rule *rule_type* per *cycle_type*.
Troubleshooting	Please contact support.

DISK_HIGH_MEDIA_ERROR_RATE_CLEARED

Severity	informational
Description	*Component ID* no longer exhibits high media error rate.
Troubleshooting	Please contact support.

SSD_PROBLEMATIC_BEHAVIOR_DETECTED

Severity	variable
Description	*Component ID* exhibits problematic behavior.
Troubleshooting	Please contact support.

SSD_PROBLEMATIC_BEHAVIOR_CLEARED

Severity	informational

Description	*Component ID* no longer exhibits problematic behavior.
Troubleshooting	Please contact support.

SSD_HIGH_MEDIA_ERROR_RATE_DETECTED

Severity	variable
Description	*Component ID* exhibits high media error rate of rule *rule_type*.
Troubleshooting	Please contact support.

SSD_HIGH_MEDIA_ERROR_RATE_CLEARED

Severity	informational
Description	*Component ID* no longer exhibits high media error rate.
Troubleshooting	Please contact support.

IB_SWITCH_FAILED

Severity	critical
Description	IB Switch *Component ID* failed.
Troubleshooting	Please contact support.

IB_SWITCH_STARTED_PHASEOUT

Severity	informational
Description	System started phasing out *Component ID*.
Troubleshooting	N/A

IB_SWITCH_STARTED_PHASEIN

Severity	informational
Description	System started phasing in *Component ID*.
Troubleshooting	N/A

IB_SWITCH_CONFIG_FAILED

Severity	warning
Description	*Component ID* could not be configured; *reason*
Troubleshooting	Please contact support

IB_SWITCH_IS_NOT_ANSWERING

Severity	warning
Description	*Component ID* is not answering
Troubleshooting	Please contact support

IB_SWITCH_BEGAN_ANSWERING

Severity	informational
Description	*Component ID* began answering after a period it did not

IB_SWITCH_HAS_POWER_FAILURE

Severity	warning
Description	Power supply #*PS Number* failure for *Component ID*.
Troubleshooting	Check power cables

IB_SWITCH_POWER_FAILURE

Severity	warning
Description	Power supply #*PS Number* failure for *Component ID*.
Troubleshooting	Check power cables

IB_SWITCH_POWER_RESTORED

Severity	informational
Description	Power supply #*PS Number* restored for *Component ID*.

IB_SWITCH_HAS_FAN_FAILURE

Severity	warning
Description	Fan #*fan* failure for *Component ID*.
Troubleshooting	Check fans, replace switch

IB_SWITCH_FAN_FAILURE

Severity	warning
Description	Fan #*fan* failure for *Component ID*.
Troubleshooting	Check fans, replace switch

IB_SWITCH_FAN_RESTORED

Severity	informational
Description	Fan #*fan* restored for *Component ID*.

IB_SWITCH_HAS_TEMPERATURE

Severity	variable
Description	*Component ID* - temperature of *temperature sesnsor* is *temperature*C.
Troubleshooting	Please contact support.

IB_SWITCH_HIGH_TEMPERATURE

Severity	variable
Description	*Component ID* - temperature of *temperature sesnsor* is *temperature*C.
Troubleshooting	Please contact support.

IB_SWITCH_HAS_VOLTAGE

Severity	variable
Description	Voltage #*voltage number* is *Voltage* Milli Volt and deviation from expected voltage is *Voltage Deviation* Milli Volt (which is *Voltage Deviation Percent*%) for *Component ID*.
Troubleshooting	Check voltage, replace switch

IB_SWITCH_VOLTAGE_PROBLEM

Severity	variable
Description	Voltage #*voltage number* is *Voltage* Milli Volt and deviation from expected voltage is *Voltage Deviation* Milli Volt (which is *Voltage Deviation Percent*%) for *Component ID*.
Troubleshooting	Check voltage, replace switch

IB_SWITCH_VOLTAGE_RESTORED

Severity	informational
Description	Voltage #*voltage number* was restored for *Component ID*.

IB_SWITCH_BAD_INDICATION

Severity	warning
Description	We got bad indication of type *Indication* for *Component ID*.
Troubleshooting	Check switch

IB_SWITCH_INTERN_ERROR

Severity	warning
Description	We got bad indication of type *Indication* for *Component ID*.
Troubleshooting	Check switch

IB_SWITCH_BAD_MANAGEMENT_WIRING

Severity	warning
Description	The wiring for IB switch management is incorrect. IB switch *Component ID* should be connected to module *Component ID*
Troubleshooting	Check wiring

IB_SWITCH_FIRMWARE_INCOMPATIBLE

Severity	warning
Description	The firmware version of '*Component ID*' is '*New Version*'. It should be '*Old Version*
Troubleshooting	None

IB_SWITCH_FIRMWARE_UPDATE_IN_PROG

Severity	warning
Description	Firmware version of '*Component ID*' is '*New Version*'. It should be '*Old Version*'. Firmware will be updated. It may take a while.
Troubleshooting	Wait for IB switch to complete initialization.

IB_SWITCH_FIRMWARE_UPDATED

Severity	informational
Description	The firmware version of '*Component ID*' was updated to '*New Version*'.
Troubleshooting	None.

IB_SWITCH_PORT_POWER_UP_FAILED

Severity	minor
Description	Power up failed for port '*Component ID*'
Troubleshooting	Please contact support

IB_SWITCH_LOG_COLLECT_SUCCESSFUL

Severity	informational
Description	Log collection for IB switch '*switch_id*' completed successfuly. Log can be found in module '*log_module*' in the following directory: '*log_location*'.

IB_SWITCH_LOG_COLLECT_FAILED

Severity	warning
Description	Log collection for IB switch '*switch_id*' failed. Failure reason: '*failure_reason*'.

IB_SWITCH_PORT_ACTIVATION_FAILED

Severity	minor
Description	Power up failed for port '*Component ID*'
Troubleshooting	Please contact support

IB_SWITCH_ALL_PORTS_DOWN

Severity	major

Description	All the ports of *Component ID* are down.
Troubleshooting	Please contact support

IB_SWITCH_SOME_PORTS_UP

Severity	informational
Description	Some ports of *Component ID* are up now.
Troubleshooting	N/A

IB_PORT_MOVED

Severity	informational
Description	Infinibind module port '*module_port*' moved from '*from_port*' to '*to_port*'.

IB_SWITCH_CHANGE_DETECTED

Severity	major
Description	*Component ID* has been changed from GUID *old_guid* to GUID *new_guid*.
Troubleshooting	If IB_Switch replacement was intended, there is no problem.

MODULE_HAS_ACQUIRED_DHCP_ADDRESS

Severity	informational
Description	Module *Module ID* acquired DHCP address as part of the module equip process

UPS_IS_NOT_OK

Severity	major
Description	*Component ID* is currently not functioning, Reason: *Problem Code*.
Troubleshooting	Please contact support.

UPS_IS_OK

Severity	informational
Description	*Component ID* is currently functioning.
Troubleshooting	N/A

UPS_RACK_STATUS_CHANGE

Severity	informational
Description	Rack *Rack ID* UPSs are in the following states: UPS:1=*UPS 1 State* UPS:2=*UPS 2 State* UPS:3=*UPS 3 State*.

UPS_WAS_RECONFIGURED

Severity	informational
Description	New configuration was uploaded to *Component ID*.

UPS_WAS_NOT_RECONFIGURED

Severity	warning
Description	Unable to load new configuration to *Component ID*.

UPS_NEEDS_A_FIRMWARE_UPGRADE

Severity	informational
Description	UPS *Component ID* needs firmware upgrade

AOS_FILE_UPLOADED_TO_UPS

Severity	informational
Description	AOS bios file was uploaded to *Component ID*.

SUMX_FILE_UPLOADED_TO_UPS

Severity	informational
Description	SUMX application file was uploaded to *Component ID*.

UPS_SELF_TEST_HAS_STARTED

Severity	informational
Description	A UPS self-test was started on UPS *Component ID*.

UPS_SELF_TEST_WILL_BE_STARTED

Severity	informational
Description	About to start a UPS self-test on UPS *Component ID*.

UPS_SELF_TEST_HAS_PASSED

Severity	informational
Description	A UPS self-test has passed on UPS *Component ID*.

UPS_SELF_TEST_HAS_FAILED

Severity	major
Description	A UPS self-test has failed on UPS *Component ID*.

UPS_SELF_TEST_WAS_SKIPPED

Severity	warning
Description	A UPS self-test for *Component ID* has been skipped.*Reason*

UPS_SELF_TEST_IS_POSSIBLY_INACCURATE

Severity	informational
Description	A UPS self-test for *Component ID* might be inaccurate, capacity is *Battery Capacity* and is lower or equal to the minimum capacity *Minimum Capacity for Self Test*.

UPS_NEEDS_A_MANUAL_SELF_TEST

Severity	warning
Description	*Component ID* finished component test but it requires a manual self-test.
Troubleshooting	A component test should include self-testing, due to network link failure to the UPS a manual self-test is needed by waiting for full charge of the UPS and then pressing the UPS self-test button.

UPS_WAS_SUCCESSFULLY_UPGRADED

Severity	informational
Description	A UPS firmware upgrade has been successfully completed on UPS *Component ID*.

UPS_UPGRADE_HAS_FAILED

Severity	warning
Description	A UPS firmware upgrade has failed on UPS *Component ID*.

UPS_WILL_BE_CONFIGURED_NOW

Severity	informational
Description	UPS *Component ID* will be loaded with new configuration file due to *Configure Reason*.

UPS_CHANGE_DETECTED

Severity	informational
Description	*Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	If UPS replacement was intended, there is no problem.

UPS_BATTERY_CHANGE_DETECTED

Severity	informational

Description	Battery *Battery ID* of *Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	If battery replacement was intended, there is no problem.

UPS_SELF_TEST_TIMED_OUT

Severity	warning
Description	*Component ID* self-test failed to complete in reasonable time.
Troubleshooting	N/A

UPS_CLOCK_OUT_OF_SYNC

Severity	minor
Description	*Component ID* clock is more than a day out of sync
Troubleshooting	If it repeats, contact support

UPS_POWER_LOAD_PERCENT_TOO_HIGH

Severity	major
Description	UPS *Component ID* has power load percent of *Power Load Percent*.
Troubleshooting	If it repeats, contact support

UPS_POWER_LOAD_PERCENT_OK

Severity	minor
Description	The power load percent of UPS *Component ID* is now OK.
Troubleshooting	N/A

UPS_REMAINING_RUNTIME_TOO_LOW

Severity	critical
Description	UPS *Component ID* has a remaining runtime of *Remaining Runtime* minutes, this value might not be enough for an emergency shutdown in case of a power failure.
Troubleshooting	Contact support

UPS_REMAINING_RUNTIME_OK

Severity	minor
Description	UPS *Component ID* has a remaining runtime of *Remaining Runtime* minutes, this value should be enough for an emergency shutdown in case of a power failure.
Troubleshooting	N/A

UPS_PREDICTIVE_REMAINING_RUNTIME_TOO_LOW

Severity	minor
Description	UPS *Component ID* has a remaining runtime of *Remaining Runtime* minutes, but the time will drop to *Predictive Remaining Runtime* minutes in case one of the other UPSes stops working.
Troubleshooting	Contact support

UPS_PREDICTIVE_REMAINING_RUNTIME_OK

Severity	informational
Description	UPS *Component ID* has a remaining runtime of *Remaining Runtime* minutes, the time will drop to *Predictive Remaining Runtime* minutes in case one of the other UPSes stops working.
Troubleshooting	Contact support

UPS_HAS_FAILED

Severity	critical
Description	*Component ID* failed.
Troubleshooting	Please contact support.

UPS_IS_ON_BATTERY

Severity	major
Description	*Component ID* switched to battery power.
Troubleshooting	Check power input.

UPS_ON_UTILITY_POWER

Severity	informational
Description	*Component ID* switched back to utility power.

UPS_IS_IN_BYPASS

Severity	major
Description	*Component ID* entered bypass state.
Troubleshooting	Please contact support.

UPS_OUT_OF_BYPASS

Severity	informational
Description	*Component ID* went out of bypass state.

UPS_IS_TURNED_OFF

Severity	critical
Description	*Component ID* was turned off and does not supply output power.

UPS_TURNED_ON

Severity	informational
Description	*Component ID* was turned on.

UPS_BATTERY_IS_WEAK

Severity	major
Description	*Component ID* has weak battery .
Troubleshooting	Replace battery.

UPS_BATTERY_IS_NOT_WEAK

Severity	major
Description	*Component ID* has no weak battery .

UPS_BATTERY_IS_PREDICTIVE_WEAK

Severity	major
Description	*Component ID* has weak battery .
Troubleshooting	Replace battery.

UPS_BATTERY_IS_NOT_PREDICTIVE_WEAK

Severity	major
Description	*Component ID* has no weak battery .

UPS_CONTROL_COMMAND_FAILED

Severity	variable
Description	UPS control command '*Command*' on *Component ID* failed.

ATS_STATUS_UNSTABLE

Severity	informational
Description	Two consecutive readouts from *Component ID* were not equal.
Troubleshooting	If this persists contact support.

ATS_BAD_REPLY

Severity	warning
Description	Invalid reply from ATS *Component ID*, possible ATS failure.
Troubleshooting	N/A

ATS_SET_INPUT_LINE

Severity	informational

Description	ATS *Component ID* input line will be set to J*Input Line*.
Troubleshooting	N/A

ATS_SET_INPUT_LINE_FAILURE

Severity	warning
Description	Failed setting ATS *Component ID* input line to J*Input Line*.
Troubleshooting	Try running command again, make sure input line wasn't switched by using ats_list and/or looking at the ATS LEDs. If all fail, switch the lines manually by disconnecting one input line and reconnecting it.

ATS_SET_INPUT_TO_DOWN_LINE

Severity	warning
Description	Line J*Input Line* of ATS *Component ID* is down, will not switch input line.
Troubleshooting	Make sure the target input line is up and functioning and try again.

ATS_NO_REDUNDANCY

Severity	warning
Description	Line J*Input Line* of ATS *Component ID* is down, there is no input line redundancy.
Troubleshooting	Contact support

UPS_HAS_TEMPERATURE

Severity	variable
Description	*Component ID* - temperature is *temperature*C. Serial *serial*.
Troubleshooting	Please contact support.

UPS_CALIBRATION_PENDING

Severity	informational
Description	UPS calibration is pending for *Componend ID*.

UPS_CALIBRATION_STARTED

Severity	informational
Description	UPS *Origin* calibration started for *Componend ID*.

UPS_CALIBRATION_PASSED

Severity	informational
Description	UPS calibration passed for *Componend ID*.

UPS_CALIBRATION_FAILED

Severity	major
Description	UPS calibration failed for *Componend ID*.

UPS_CALIBRATION_CANCELED

Severity	informational
Description	UPS calibration canceled for *Componend ID*, due to *Origin* cancel.

UPS_CALIBRATIONS_DISABLED

Severity	informational
Description	UPS calibrations will be disabled for the pre-defined blackout period to allow maintenance.

UPS_CALIBRATIONS_ENABLED

Severity	informational
Description	UPS automatic calibrations will be enabled.

UPS_LAST_CALIBRATION_DATE_IN_FUTURE

Severity	warning
Description	The last calibration date for *Componend ID* is *Calibration Date*, which is in the future, assume it's time to calibrate it.

UPS_DISABLED

Severity	informational
Description	*Component ID* has been disabled (will not be monitored).

UPS_ENABLED

Severity	informational
Description	*Component ID* has been enabled.

UPS_NETWORK_LINK_UP

Severity	warning
Description	Network link to *Component ID* was regained.
Troubleshooting	N/A

UPS_NETWORK_LINK_IS_DOWN

Severity	critical
Description	Network link to UPS *Component ID* is down.
Troubleshooting	Please contact support.

UPS_SERIAL_LINK_UP

Severity	warning
Description	Serial link to *Component ID* was regained.
Troubleshooting	N/A

UPS_SERIAL_LINK_DOWN

Severity	warning
Description	Serial link to UPS *Component ID* is down.
Troubleshooting	Please contact support.

UPS_LINK_READ_IGNORED_DATA_TIMEDOUT

Severity	warning
Description	Link to UPS *Component ID* timed out skipping ignored data.
Troubleshooting	Please contact support.

UPS_CABLE_CHECK_FAILED

Severity	minor
Description	Cable check of *Component ID* failed, either its serial or network cables are crosswired with *Hostname*.
Troubleshooting	Either the cable is disconnected or network and serial cables are miswired.

UPS_CABLE_CHECK_PASSED

Severity	informational
Description	Cable check of *Component ID* passed.

UPS_CABLE_CHECK_CONNECTION_FAILED

Severity	minor
Description	Cable check of *Component ID* failed, cannot connect to *Failed Link* link.
Troubleshooting	Failed to access the UPS through serial or network link, contact support.

ATS_LINK_UP

Severity	informational
Description	Link to ATS *Component ID* was regained.
Troubleshooting	N/A

ATS_LINK_DOWN

Severity	warning
Description	Link to ATS *Component ID* is down.
Troubleshooting	Please contact support.

ATS_LINE_INPUT_IS_OFF

Severity	major
Description	ATS *Component ID* input line J*Line* turned off.
Troubleshooting	N/A

ATS_LINE_INPUT_IS_ON

Severity	informational
Description	ATS *Component ID* input line J*Line* turned on.
Troubleshooting	N/A

ATS_LINE_OUTPUT_OFF

Severity	major
Description	ATS *Component ID* output line *Name* turned off.
Troubleshooting	Please contact support.

ATS_LINE_OUTPUT_ON

Severity	informational
Description	ATS *Component ID* output line *Name* turned on.
Troubleshooting	N/A

ATS_SOURCE_HAS_SWITCHED

Severity	informational
Description	ATS *Component ID* source line switched from J*Previous* to J*Current*.
Troubleshooting	N/A

ATS_SOURCE_HAS_SWITCHED_FOR_OUTLET

Severity	informational
Description	ATS *Component ID* source line for outlet P*Outlet*switched from J*Previous* to J*Current*.
Troubleshooting	N/A

ATS_INPUT_LINE_OVER_CURRENT

Severity	warning
Description	Over-Current on ATS *Component ID* input line J*Line, Phase*.
Troubleshooting	Please contact support.

ATS_INPUT_LINE_CURRENT_RECOVERY

Severity	informational
Description	Recovered from over-current on ATS *Component ID* input line J*Line*, *Phase*.
Troubleshooting	N/A

ATS_OUTLET_OVER_CURRENT

Severity	warning
Description	Over-Current on ATS *Component ID* outlet P*Outlet*.
Troubleshooting	Please contact support.

ATS_OUTLET_CURRENT_RECOVERY

Severity	informational
Description	Recovered from over-current on ATS *Component ID* outlet P*Outlet*.
Troubleshooting	N/A

ATS_FAILED

Severity	minor
Description	ATS *Component ID* exhibits a failure state.
Troubleshooting	Please contact support.

ATS_RECOVERED

Severity	informational
Description	ATS *Component ID* exited from the failure state.
Troubleshooting	N/A

MODULE_NO_IP_CONNECTIVITY

Severity	warning
Description	There is no IP connectivity to failed *Component Id*.
Troubleshooting	Information sent to event center in case of module failure.

MODULE_NO_BMC_CONNECTIVITY

Severity	warning
Description	There is no BMC connectivity to failed *Component Id*.
Troubleshooting	Information sent to event center in case of module failure.

IB_HCA_DIAGNOSTICS

Severity	warning
Description	Diagnostics from IB HCA for *Component Id*.
Troubleshooting	Information sent to event center in case of module failure.

IB_HCA_DIAGNOSTICS_FAILED

Severity	warning
Description	Diagnostics for IB HCA card of *Component Id* failed due to *Failure Reason*.
Troubleshooting	Information sent to the event center in case of module failure.

MODULE_FAILED_WAS_POWERED_OFF

Severity	major
Description	The failed module *Failed module* has been powered off.
Troubleshooting	Information sent to event center in case of module failure.

MODULE_FAILED_WAS_NOT_POWERED_OFF

Severity	major
Description	The failed module *Failed module* has not been powered off as a failsafe due to *Failed IPMI module* not having IPMI set.
Troubleshooting	Information sent to event center in case of module failure.

MODULE_FAILED_COULD_NOT_BE_POWERED_OFF

Severity	major
Description	The failed module *Failed module* could not be powered off.
Troubleshooting	Information sent to event center in case of module failure.

MODULE_FAILED_SHOULD_BE_POWERED_OFF

Severity	major
Description	The failed module *Failed module* should be powered off based upon *Log String*.
Troubleshooting	Information sent to event center in case of module failure.

MODULE_SDR_INFO

Severity	major
Description	*Component ID* IPMI SDR info.

MODULE_SDR_EVENT_FAILURE

Severity	major
Description	*Component ID* IPMI SDR Event Error.

MODULE_SEL_LOG

Severity	warning
Description	*Component ID*:[*Index*] *Log string*. Raw event data is '*d0 d1 d2*'.
Troubleshooting	Please contact support.

MODULE_FAILURE_DATA

Severity	critical
Description	*Component ID*: *Count* lines *Log string*.
Troubleshooting	Please contact support.

CONNECTION_TO_MAINTENANCE_MODULE_IS_OK

Severity	informational
Description	The Maintenance module can now be reached from *Component ID*.
Troubleshooting	Please contact support

NO_CONNECTION_TO_MAINTENANCE_MODULE

Severity	major
Description	The Maintenance module can not be reached from *Component ID*.
Troubleshooting	Please contact support

MODULE_TEMPERATURE_INCONSISTENT_WITH_OTHERS

Severity	warning
Description	*Component ID* external temperature not consistent with other modules.

SYSTEM_TEMPERATURE_IS_HIGH

Severity	warning
Description	System temperature is *System Temperature*C, which is high. It approaches the maximal allowable value.
Troubleshooting	Cool the system down.

SYSTEM_TEMPERATURE_IS_HIGH_AND_STABILIZING

Severity	warning

Description	System temperature is *System Temperature*C. It is stabilizing, but still close to the maximal allowable value.
Troubleshooting	Cool the system down.

SYSTEM_TEMPERATURE_IS_CRITICALLY_HIGH

Severity	critical
Description	System temperature is *System Temperature*C, which is critically high. Shutting down the system.
Troubleshooting	Contact support.

SYSTEM_TEMPERATURE_IS_CRITICALLY_HIGH _SHUTDOWN_IMMEDIATELY

Severity	critical
Description	System temperature is *System Temperature*C - which is critically high - but automatic shutdown is disabled. Shut down the system immediately!
Troubleshooting	Cool the system down immediately or shut down the system using 'shutdown -y' and contact support.

SYSTEM_TEMPERATURE_IS_CRITICALLY_HIGH_ SHUT_IT_DOWN_IMMEDIATELY

Severity	critical
Description	System temperature is *System Temperature*C - which is critically high - but automatic shutdown is disabled. You need to manually shut down the system immediately!
Troubleshooting	Cool the system down immediately or shut down the system using 'shutdown -y' and contact support.

SYSTEM_TEMPERATURE_IS_TOO_HIGH_AND_STABILIZING

Severity	major
Description	System temperature is *System Temperature*C. It is stabilizing, but is still higher than the maximal allowable value. If the system doesn't cool down soon, it might be automatically shut down.
Troubleshooting	Contact support.

SYSTEM_TEMPERATURE_IS_TOO_HIGH

Severity	major
Description	System temperature is *System Temperature*C, which is higher than the maximal allowable value. If the system doesn't cool down soon, it might be automatically shut down.
Troubleshooting	Contact support.

SYSTEM_TEMPERATURE_TOO_HIGH_AND_STABILIZING

Severity	major
Description	System temperature is *System Temperature*C. It is stabilizing, but is still higher than the maximal allowable value.
Troubleshooting	Cool the system down and contact support.

SYSTEM_TEMPERATURE_TOO_HIGH

Severity	major
Description	System temperature is *System Temperature*C, which is higher than the maximal allowable value.
Troubleshooting	Cool the system down and contact support.

SYSTEM_TEMPERATURE_TOO_HIGH_AND_STABILIZING_ SHUTDOWN

Severity	major
Description	System temperature is *System Temperature*C. It is stabilizing, but is still higher than the maximal allowable value. If the system doesn't cool down soon, it will be automatically shut down.
Troubleshooting	Cool the system down and contact support.

SYSTEM_TEMPERATURE_TOO_HIGH_SHUTDOWN

Severity	major
Description	System temperature is *System Temperature*C, which is higher than the maximal allowable value. If the system doesn't cool down soon, it will be automatically shut down.
Troubleshooting	Cool the system down and contact support.

SYSTEM_TEMPERATURE_IS_TOO_LOW

Severity	major
Description	System temperature is *System Temperature*C, which is lower than the minimal allowable value.
Troubleshooting	Contact support.

SYSTEM_TEMPERATURE_IS_OK_NOW

Severity	informational
Description	System temperature is *System Temperature*C, which is within allowed limits.
Troubleshooting	N/A

SYSTEM_TEMPERATURE_RISES_SUSPICIOUSLY_FAST

Severity	warning

Description	System temperature (*System Temperature* C) is rising suspiciously fast (from *Previous Temperature*C). Check air conditioning system.
Troubleshooting	Check air conditioning system or contact support.

SERVICE_MODE_OF_SYSTEM_HAS_CHANGED

Severity	variable
Description	Service mode of system has changed. The urgency of service actions has changed from *Previous Maintenance Urgency* to *Maintenance Urgency*

MM_OK

Severity	informational
Description	*Component ID* is now OK.
Troubleshooting	Please contact support.

MM_FAILED

Severity	major
Description	*Component ID* has failed. Hardware status: *Status*.
Troubleshooting	Please contact support.

MM_CHANGE_DETECTED

Severity	major
Description	*Component ID* has been changed from a serial of *old_serial* to *new_serial*.
Troubleshooting	Was this MM actually replaced?

MODULE_MCH_DATA

Severity	critical
Description	*Component ID*:[*Bus.Device.Function*] *Count* lines *Log string*.
Troubleshooting	Please contact support.

UPS_BAD_BATTERY_FOUND_IN_SELF_TEST

Severity	major
Description	*Component ID* has low capacity or discharge state following self test.
Troubleshooting	Replace battery.

UPS_TURNED_OFF_AFTER_SELF_TEST_BAD_BATTERY

Severity	major
Description	*Component ID* turned itself off as a result of a self test, the battery is bad.
Troubleshooting	Replace battery.

UPS_TURNED_OFF_DURING_CALIBRATION_BAD_BATTERY

Severity	major
Description	*Component ID* turned itself off during a calibration, the battery is bad.
Troubleshooting	Replace battery.

UPS_BAD_BATTERY_FOUND_IN_CALIBRATION

Severity	major
Description	*Component ID* is off after calibration.
Troubleshooting	Replace battery.

UPS_INITIALIZATION_TIMED_OUT

Severity	informational
Description	*Component ID* Initialization timed out.

COMPONENT_ATTACH_STARTED

Severity	informational
Description	Attach started for *Component ID* Serial: *Serial Number* Reported Serial: *Reported Serial* Device Identifier: *Reported Serial*.

COMPONENT_ATTACHED_SUCCESSFULLY

Severity	informational
Description	Attach succeeded for *Component ID* Serial: *Serial Number* Reported Serial: *Reported Serial* Device Identifier: *Reported Serial*.

COMPONENT_ATTACH_FAILED

Severity	warning
Description	Attach failed for *Component ID* Reason: *Reason*.

COMPONENT_IDENTIFY_STARTED

Severity	informational
Description	Identify '*State*' requested for *Component ID* Serial: *Serial Number* Reported Serial: *Reported Serial* Device Identifier: *Reported Serial*.

COMPONENT_IDENTIFY_SUCCESS

Severity	informational
Description	Identify '*State*' succeeded for *Component ID* Serial: *Serial Number* Reported Serial: *Reported Serial* Device Identifier: *Reported Serial*.

COMPONENT_IDENTIFY_FAILED

Severity	warning
Description	Identify '*State*' failed for *Component ID* Reason: *Reason*.

HYPERVISOR_DEVICE_REFRESH_STARTED

Severity	informational
Description	Hypervisor device refresh started for *Module ID* at hypervisor: *Hostname*.

HYPERVISOR_DEVICE_REFRESH_ENDED

Severity	informational
Description	Hypervisor device refresh ended for *Module ID*.

HYPERVISOR_DEVICE_REFRESH_FAILED

Severity	major
Description	Hypervisor device refresh failed for *Module ID* Reason: *Reason*.

DISK_HIGH_VALUE_OF_SSD_ENDURANCE_DETECTED

Severity	variable
Description	*Component ID* exhibits high ssd endurance value *endurance*.
Troubleshooting	Please replace SSD.

IPMI_SEL_ENTRY_INFO

Severity	informational
Description	*Entry Name* SEL entry on *component ID Date Time* with data d0=*d0* d1=*d1* d2=*d2* dir=*direction*.
Troubleshooting	Please contact support.

MEMORY_COMMITMENT_IS_NEAR_LIMIT

Severity	warning
Description	*module* is *difference* KB below memory commit limit - a low margin.
Troubleshooting	Please contact support

MEMORY_COMMITMENT_OK

Severity	informational
Description	*module* is *difference* KB below memory commit limit - returned to a safe margin.
Troubleshooting	There is no problem at the moment.

HAS_TOO_MANY_PROCESSES

Severity	critical
Description	*module* has *processes* processes running.
Troubleshooting	Please contact support

DISK_DOES_NOT_EXIST

Severity	major
Description	*Component ID* doesn't exist.
Troubleshooting	Please contact support.

DISK_FIRMWARE_NOT_UPGRADEABLE

Severity	major
Description	Firmware upgrade for *Component ID* failed.
Troubleshooting	Please contact support.

ENCRYPT_ENABLE_DRIVE_FAILED

Severity	major
Description	Failed to enable encryption for *Component ID*. Error code: *Failure Reason*.
Troubleshooting	Please contact support.

ENCRYPTING_DISK_CRYPTO_ERASE_FAILED

Severity	warning
Description	Failed to cryptographically erase *Component ID*. Error code: *Failure Reason*.
Troubleshooting	Please contact support.

ENCRYPTING_DISK_CRYPTO_ERASE_COMPLETED

Severity	informational
Description	The cryptography erase of *Component ID* completed successfully.
Troubleshooting	N/A

ENCRYPTION_DISK_BAND_FAILED

Severity	major
Description	Failed to band *Component ID*. Error code: *Failure Reason*.
Troubleshooting	Please contact support.

ENCRYPT_SECURITY_HEALTH_CHECK_DISK_DEGRADED

Severity	major

Description	*Component ID* failed periodic security health check, reason: *Reason*.
Troubleshooting	Please contact support.

COMPONENT_FRU_REJECTED

Severity	major
Description	*Component ID* - Failed FRU validation.
Troubleshooting	Please contact support.

COMPONENT_FRU_ACCEPTED_IMPLICIT

Severity	informational
Description	*Component ID* - Passed implicit FRU validation.
Troubleshooting	There is no problem at the moment

DISK_FAILED_SHORT_STANDARD_TEST

Severity	major
Description	*Component ID* - Failed short standard test.
Troubleshooting	Please contact support.

DISK_CHANGE_WAS_DETECTED

Severity	informational
Description	*Component ID* has been changed from a *Old Vendor-Old Model* with a serial of *Old Serial* and with a firmware of *Old Firmware* to a *New Vendor-New Model* with a serial of *New Serial* and with a firmware of *New Firmware*.
Troubleshooting	Confirm that the disk replacement was intended.

DISK_FIRMWARE_CHANGE_WAS_DETECTED

Severity	informational
Description	The firmware of *Component ID* has changed from '*Old Firmware*' to '*New Firmware*'.
Troubleshooting	Confirm that the firmware change was intended.

FAILURE_TO_RUN_DISK_SHORT_STANDARD_TEST

Severity	warning
Description	*Component ID* - Failed to initiate Disk Short Standard Test (DST).
Troubleshooting	Confirm that running with disks that do not support DST was intended.

FAILURE_TO_RUN_SSD_SHORT_STANDARD_TEST

Severity	warning

Description	*Component ID* - Failed to initiate Disk Short Standard Test (DST).
Troubleshooting	Confirm that running with SSDs that do not support DST was intended.

DISK_BMS_ERROR_DETECTED

Severity	warning
Description	*Component ID* - BMS error detected: *Sense Key/Additional Sense Code/Additional Sense Code Qualifier Sense Key - Sense Code* (LBA: *LBA*).
Troubleshooting	Please contact support.

DISK_EXCESSIVE_BMS_ACTIVITY

Severity	variable
Description	*Component ID* exhibits excessive BMS activity, fill time is *Time to fill BMS log* minutes.
Troubleshooting	Please contact support.

SATA_SMART_STATUS_READING_FAILED

Severity	warning
Description	reading SMART attributes of Disk ID failed. SMART trip value=
Troubleshooting	Please contact support.

SATA_SMART_STATUS_READING_FAILURE

Severity	warning
Description	*Component ID* reading SMART attributes failed. SMART trip value=
Troubleshooting	Please contact support.

DISK_SMART_STATUS_BAD

Severity	major
Description	*Component ID* - SMART status: Bad.
Troubleshooting	Please contact support.

DISK_SMART_STATUS_GOOD

Severity	informational
Description	*Component ID* - SMART status: Good.
Troubleshooting	Please contact support.

DISK_SMART_READING_FAILED

Severity	warning
Description	*Component ID* - SMART reading failed.

Troubleshooting	Please contact support.

DISK_SMART_READING_OK

Severity	informational
Description	*Component ID* - SMART reading OK.
Troubleshooting	Please contact support.

DISK_BLOCK_SIZE_IS_INVALID

Severity	major
Description	*Component ID* was formatted with invalid block size of *Block Size*.
Troubleshooting	Please contact support.

DISK_ENCRYPTION_BAND_IS_INVALID

Severity	major
Description	The encryption configuration (banding) for *Component ID* is incorrect.
Troubleshooting	Please contact support.

DISK_ENCRYPTION_BAND_NOT_SET

Severity	major
Description	The encryption configuration (banding) for *Component ID* was not set.
Troubleshooting	Please contact support.

DISK_ENCRYPTION_ENROLLMENT_STATE_UNDETERMINED

Severity	minor
Description	The encryption enrollment state of *Component ID* cannot be determined.
Troubleshooting	Please contact support.

NON_ENCRYPTING_DISK_IN_ENCRYPTION_CAPABLE_SYSTEM

Severity	major
Description	*Component ID* does not support encryption.
Troubleshooting	Please contact support.

ENCRYPTING_DISK_DISCOVERY_FAILED

Severity	major
Description	The encryption state of *Component ID* could not be queried.
Troubleshooting	Please contact support.

ENCRYPTING_DISK_UNLOCK_FAILED

Severity	major
Description	Could not unlock encrypted disk *Component ID*.
Troubleshooting	Please contact support.

SES_STATUS_IS_ABNORMAL_NOW

Severity	warning
Description	On *module* SES component '*Sensor Name*' is in state '*State*'.
Troubleshooting	Please contact support.

SES_STATUS_IS_NORMAL_NOW

Severity	informational
Description	On *module* SES component '*Sensor Name*' is in state '*State*'.
Troubleshooting	N/A

SES_ALARM_IS_SIGNALING

Severity	warning
Description	On *module* alarm of type '*Component type*' is signaling.
Troubleshooting	Please contact support.

SES_ALARM_NO_LONGER_SIGNALING

Severity	informational
Description	On *module* alarm of type '*Component type*' is no longer signaling.
Troubleshooting	Please contact support.

SES_DOOR_LATCH_UNLOCKED

Severity	warning
Description	The door latch on module *module* is unlocked.
Troubleshooting	Please contact support.

SES_DOOR_LATCH_LOCKED

Severity	informational
Description	The door latch on module *module* is locked properly.
Troubleshooting	N/A

SES_PDB_FAILURE

Severity	major

Description	The PDB on module *module* has failed.
Troubleshooting	Please contact support.

SES_PDB_WARNING_ON

Severity	warning
Description	The PDB on module *module* displays some warning conditions.
Troubleshooting	Please contact support.

SES_PDB_IS_WORKING

Severity	informational
Description	The PDB module *module* is working now.
Troubleshooting	N/A

SES_BMC_ERROR_SIGNAL

Severity	warning
Description	The BMC on module *module* signals an error.
Troubleshooting	Please contact support.

SES_BMC_IS_OK_NOW

Severity	informational
Description	The BMC on module *module* is OK now.
Troubleshooting	N/A

SES_ALARM_LED_IS_SIGNALING

Severity	warning
Description	On *module* alarm of type '*Component type* (*LED type*)' is signaling.
Troubleshooting	Please contact support.

SES_ALARM_LED_NO_LONGER_SIGNALING

Severity	informational
Description	On *module* alarm of type '*Component type* (*LED type*)' is no longer signaling.
Troubleshooting	Please contact support.

SES_EXPANDER_RESET

Severity	warning
Description	The SES expander on *module* has been reset. Reset type was: *Reset type*.
Troubleshooting	Please contact support.

SES_EXPANDER_RESET_COUNTER_CLEAR

Severity	informational
Description	The SES expander reset counter on *module* has reached it's maxiaml value and will be cleared.
Troubleshooting	N/A

IB_HCA_OVERHEATING

Severity	major
Description	Adapter *Module Component ID* is overheating and reached a temperature of *IB HCA Temperature*.
Troubleshooting	Please contact support.

CNA_OVERHEATING

Severity	major
Description	Adapter *CNA Component ID* is overheating and reached a temperature of *CNA Temperature*.
Troubleshooting	Please contact support.

COMPONENT_TEMPERATURE_IS_NORMAL

Severity	informational
Description	*Component ID* temperature is *temperature*C. The temperature is normal.

COMPONENT_TEMPERATURE_IS_HIGH

Severity	warning
Description	*Component ID* temperature is *temperature*C. The temperature is high.

COMPONENT_TEMPERATURE_IS_HIGH_AND_STABILIZING

Severity	warning
Description	*Component ID* temperature is *temperature*C. The temperature is stabilizing, but still high.

COMPONENT_TEMPERATURE_IS_HIGH_AND_DROPPING

Severity	warning
Description	*Component ID* temperature is *temperature*C. The temperature is dropping, but still high.

COMPONENT_TEMPERATURE_IS_ABNORMALLY_HIGH

Severity	minor
Description	*Component ID* temperature is *temperature*C. The temperature is abnormally high.

COMPONENT_TEMPERATURE_IS_ABNORMALLY_HIGH_AND_STABILIZING

Severity	minor
Description	*Component ID* temperature is *temperature*C. The temperature is stabilizing, but still abnormally high.

COMPONENT_TEMPERATURE_IS_ABNORMALLY_HIGH_AND_DROPPING

Severity	minor
Description	*Component ID* temperature is *temperature*C. The temperature is dropping, but still abnormally high.

COMPONENT_TEMPERATURE_IS_VERY_HIGH

Severity	major
Description	*Component ID* temperature is *temperature*C. The temperature is very high and may effect on component performance or even damage it.

COMPONENT_TEMPERATURE_IS_VERY_HIGH_AND_STABILIZING

Severity	major
Description	*Component ID* temperature is *temperature*C. The temperature is stabilizing, but still very high.

COMPONENT_TEMPERATURE_IS_VERY_HIGH_AND_DROPPING

Severity	major
Description	*Component ID* temperature is *temperature*C. The temperature is dropping, but still very high.

COMPONENT_TEMPERATURE_IS_EXTREMELY_HIGH

Severity	critical
Description	*Component ID* temperature is *temperature*C. The temperature is extremely high. The component may immediately fail and permanent damage may occur.

COMPONENT_TEMPERATURE_IS_RISING

Severity	variable
Description	*Component ID* temperature is *temperature*C. Temperature is rising.

COMPONENT_TEMPERATURE_IS_STABILIZING

Severity	variable

Description	*Component ID* temperature is *temperature*C. Temperature is stabilizing.

COMPONENT_TEMPERATURE_IS_DROPPING

Severity	variable
Description	*Component ID* temperature is *temperature*C. Temperature is dropping.

DISK_MEDIA_PRE_SCAN_ON

Severity	warning
Description	*Component ID* - Disk media pre scan is ON.
Troubleshooting	Please contact support.

DISK_MEDIA_PRE_SCAN_OFF

Severity	informational
Description	*Component ID* - Disk media pre scan is OFF.
Troubleshooting	Please contact support.

SES_FAN_HAS_SPEED_CHANGED

Severity	informational
Description	*Fan* speed changed from *Previous RPM* RPM to *New RPM* RPM.

SES_FAN_STATUS_OK

Severity	informational
Description	*Fan* is now OK.

SES_FAN_STATUS_BAD

Severity	warning
Description	*Fan* is failed or off.

SES_PSU_STATUS_HAS_CHANGED

Severity	variable
Description	*psu* changed state from *old_state* to *new state*.

SES_PSU_VOLTAGE_OUT_OF_RANGE

Severity	minor
Description	The *Voltage Type* DC voltage sensor of *PSU* shows *Voltage* which is not in the range of *Low Threshold-High Threshold*.
Troubleshooting	Please contact support.

SES_PSU_VOLTAGE_OK

Severity	informational
Description	*PSU Voltage Type* output DC voltage value is now *Voltage*, which is within the valid range.

SES_PSU_MONITORING_UNAVAILABLE

Severity	minor
Description	Can't monitor *PSU*, but it seems to supply power.
Troubleshooting	Please contact support.

SES_DOUBLE_PSU_FAILURE

Severity	major
Description	Both PSUs on *Module* report critical failures, this is probably because of a faulty PDB.
Troubleshooting	Please contact support.

SES_AMBIENT_TEMPERATURE_SEVERITY_CHANGED

Severity	variable
Description	Module *module sensor desc* reports (*reading*C) *state desc*.
Troubleshooting	Adjust ambient temperature at this module intake.

SES_TEMPERATURE_SEVERITY_CHANGED

Severity	variable
Description	Module *module sensor desc* reports (*reading*C) *state desc*.
Troubleshooting	Please contact support.

SES_TEMPERATURE_OK

Severity	informational
Description	Module *module sensor desc* reports (*reading*C) *state desc*.
Troubleshooting	N/A

INVALID_USM_VERSION_FOUND

Severity	minor
Description	The USM version on *Component* is invalid
Troubleshooting	Please contact support.

USM_VERSION_UNEXPECTED

Severity	warning
Description	USM on *Component* - unexpected code-level, found '*Label*' which is old and should be upgraded

Troubleshooting	Please contact support.

SES_VERSION_UNEXPECTED

Severity	warning
Description	SES on *Component* - unexpected enclosure management code-level, found *Major.Minor.Level.Level2* which is old and should be upgraded
Troubleshooting	Please contact support.

PDB_FIRMWARE_VERSION_UNEXPECTED

Severity	warning
Description	PDB firmware on *Component* - unexpected code-level, found *Major.Minor* which is old and should be upgraded
Troubleshooting	Please contact support.

PCM_FIRMWARE_VERSION_UNEXPECTED

Severity	warning
Description	PCM-*Id* firmware on *Component* - unexpected code-level, found *Major.Minor* which is old and should be upgraded
Troubleshooting	Please contact support.

PSU_FIRMWARE_VERSION_UNEXPECTED

Severity	major
Description	*Component*, of model '*Model*', has an unexpected code-level *Major.Minor*, which is old and should be upgraded.
Troubleshooting	Please contact support.

INVALID_PSU_MODEL

Severity	major
Description	Invalid model '*PSU Model*' for *PSU*.
Troubleshooting	Replace PSU.

SUSPICIOUS_PSU_INFORMATION

Severity	warning
Description	Suspicious information was found for *PSU*, this might happen after a PSU replacement. Some of the hardware sensors monitoring will be disabled until the module is power cycled.
Troubleshooting	Was the PSU replaced? If yes, power cycle the module when possible, if not notify support.

PSU_MODEL_IS_OK_NOW

Severity	informational
Description	Model '*PSU Model*' for *PSU* is valid.
Troubleshooting	N/A

ILLEGAL_PSU_MODEL_MIX

Severity	major
Description	*PSU-1*, of model '*PSU-1 Model*', can't be installed together with *PSU-2* of model '*PSU-2 Model*'.
Troubleshooting	Replace one of the PSUs to appropriate model.

PSU_MODEL_MIX_IS_OK_NOW

Severity	informational
Description	*PSU-1*, of model '*PSU-1 Model*', is compatible with *PSU-2* of model '*PSU-2 Model*'.
Troubleshooting	N/A

ILLEGAL_PSU_FIRMWARE_VERSIONS_MIX

Severity	major
Description	*PSU-1*, of model '*PSU-1 Model*', has firmware version *Major.Minor* which is not compatible with firmware version *Major.Minor* installed on *PSU-2*.
Troubleshooting	Install the latest PSU firmware version on both PSUs.

FAN_CONTROLLER_FIRMWARE_VERSION_UNEXPECTED

Severity	warning
Description	Fan controller firmware on *Component* - unexpected code-level, found *Major.Minor.Level.Build* (configuration *Major.Minor.Level*) which is old and should be upgraded
Troubleshooting	Please contact support.

IPMI_BMC_FIRMWARE_VERSION_UNEXPECTED

Severity	warning
Description	IPMI BMC firmware on *Module* - version *fmajor.fminor.faux* is old and should be upgraded
Troubleshooting	Please contact support.

BIOS_VERSION_IS_UNEXPECTED

Severity	warning
Description	BIOS on *Module* version *fmajor.fminor.faux* is old and should be upgraded
Troubleshooting	Please contact support.

FPGA_VERSION_IS_UNEXPECTED

Severity	warning
Description	FPGA on *Module* version *fmajor.fminor.faux* is old and should be upgraded
Troubleshooting	Please contact support.

INFINIBAND_HCA_VERSION_UNEXPECTED

Severity	warning
Description	Adapter *Module* version *Major.Minor.Build* is old and should be upgraded
Troubleshooting	Please contact support.

CNA_VERSION_UNEXPECTED

Severity	warning
Description	Adapter *CNA* version *Major.Minor.Build* is old and should be upgraded
Troubleshooting	Please contact support.

IPMI_BMC_IS_IN_UNEXPECTED_STATE

Severity	warning
Description	IPMI BMC firmware on *Module* is in unexpected state, possibly non-responsive
Troubleshooting	Please contact support.

IPMI_WATCHDOG_HAS_ERRORS

Severity	major
Description	IPMI watchdog on *Module* experienced command errors.
Troubleshooting	Please contact support.

SAS_VERSION_IS_UNEXPECTED

Severity	warning
Description	SAS Controller Firmware version on module *Module* version *actual* is old and should be upgraded
Troubleshooting	Please contact support.

SAS_VERSION_IS_INCONSISTENT

Severity	minor
Description	SAS Controller Firmware version on module *Module* version *actual* is inconsistent with persistent version *persistent*.
Troubleshooting	Please contact support.

SAS_CONTROLLER_FAULT

Severity	warning
Description	SAS Controller Firmware on *component ID* faulted with code *Fault Code*
Troubleshooting	Please contact support.

SAS_CONTROLLER_FAULT_CLEARED

Severity	informational
Description	SAS Controller Firmware on *component ID* recovered from its fault state.
Troubleshooting	Please contact support.

SAS_RESET_DETECTED

Severity	warning
Description	SAS Controller reset was detected on *component ID* total *Reset Count* times.
Troubleshooting	Please contact support.

IPMI_NOT_WORKING

Severity	major
Description	IPMI is not working on *Module*.
Troubleshooting	Please contact support.

IPMI_SEL_ENTRY_CRIT

Severity	critical
Description	*Entry Name* SEL entry on *component ID Date Time* with data d0=*d0* d1=*d1* d2=*d2* dir=*direction*.
Troubleshooting	Please contact support.

FC_PORT_HAS_UNEXPECTED_FIRMWARE

Severity	minor
Description	fc port *Component* firmware version is old and should be upgraded: *active firmware* instead of *correct firmware*.
Troubleshooting	Please contact support.

FC_LINK_ERROR_THRESH_EXCEEDED

Severity	major
Description	FC port *Component counter* threshold exceeded: *value* limit: *max*
Troubleshooting	Please contact support.

FC_MONITOR_ALERT

Severity	informational
Description	FC Port *Component* counter *counter* is out of range: now *value* range: *min max*
Troubleshooting	Please contact support.

KDB_HALT

Severity	major
Description	*Component ID* was stopped on KDB.
Troubleshooting	Please contact support.

KDB_LOG

Severity	major
Description	*Component ID* : *Line Count* lines *Log string*
Troubleshooting	Please contact support.

MCE_LOG

Severity	major
Description	*Component ID* : *Log string*.
Troubleshooting	Please contact support.

NETWORK_LINK_IS_NOW_DOWN

Severity	major
Description	Network interface *Interface Role #Interface Index* on *Component ID* - link disconnected.
Troubleshooting	Please contact support.

NETWORK_LINK_IS_NOW_UP

Severity	informational
Description	Network interface *Interface Role #Interface Index* on *Component ID* - link regained.
Troubleshooting	Please contact support.

FC_LINK_IS_NOW_DOWN

Severity	major
Description	FC port *Component* - link disconnected.
Troubleshooting	Please contact support.

FC_LINK_IS_NOW_UP

Severity	informational
Description	FC port *Component* - link regained.
Troubleshooting	Please contact support.

NETWORK_LINK_NO_DATA

Severity	minor
Description	Network interface *Interface Role #Interface Index* on *Component ID* - link has no data flowing through for the last *Time Not flowing* seconds.
Troubleshooting	Please contact support.

NETWORK_LINK_NO_DATA_LONG

Severity	major
Description	Network interface *Interface Role #Interface Index* on *Component ID* - link has no data flowing through for the last *Time Not flowing* seconds.
Troubleshooting	Please contact support.

NETWORK_LINK_HAS_DATA

Severity	warning
Description	Network interface *Interface Role #Interface Index* on *Component ID* - link has data flowing through again.
Troubleshooting	Please contact support.

NETWORK_LINK_WAS_RESET_CONSECUTIVELY

Severity	major
Description	Network interface *Interface Role #Interface Index* on *Component ID* - link was reset consecutively .

NETWORK_LINK_PARTIAL_LOSS

Severity	variable
Description	Network interface *Interface Role #Interface Role Index* on *Component ID* has partial packet loss at a rate of *Packet Error Rate*.
Troubleshooting	Please contact support.

NETWORK_LINK_RETURNED_TO_NORMAL

Severity	informational
Description	Network interface *Interface Role #Interface Role Index* on *Component ID* no longer has partial packet loss.

COMPONENT_NETWORK_LINK_IS_DOWN

Severity	major
Description	Network interface to *Connected Component* on *Component ID* - link disconnected.
Troubleshooting	Please contact support.

COMPONENT_NETWORK_LINK_IS_UP

Severity	informational
Description	Network interface to component *Connected Component* on *Component ID* - link regained.
Troubleshooting	Please contact support.

MM_ETH_PORT_IS_DOWN

Severity	major
Description	Network interface *Component ID* to the maintenance module is down.
Troubleshooting	Please contact support.

MM_ETH_PORT_IS_UP

Severity	informational
Description	Network interface *Component ID* to the maintenance module is up.
Troubleshooting	Please contact support.

DAISY_CHAIN_IS_MISWIRED

Severity	major
Description	Daisy chain on module *Module*, device *Device name* is miswired.
Troubleshooting	Please contact support.

DAISY_CHAIN_IS_WIRED_OK

Severity	informational
Description	Daisy chain on module *Module*, device *Device name* is wired ok.
Troubleshooting	Please contact support.

DAISY_CHAIN_LINK_IS_DOWN

Severity	major
Description	Daisy chain link on module *Module*, device *Device name* is down.
Troubleshooting	Please contact support.

DAISY_CHAIN_LINK_IS_UP

Severity	informational
Description	Daisy chain link on module *Module*, device *Device name* is up.
Troubleshooting	Please contact support.

ETHERNET_INTERFACE_RESET

Severity	informational
Description	Network interface *Component ID* was reset.
Troubleshooting	N/A

NETWORK_LINK_FLOW_CONTROL_OFF

Severity	minor
Description	Network interface *Interface Role #Interface Role Index* on *Component ID* has flow control turned off.
Troubleshooting	N/A

NETWORK_LINK_FLOW_CONTROL_ON

Severity	informational
Description	Network interface *Interface Role #Interface Role Index* on *Component ID* has flow control turned on.
Troubleshooting	N/A

CF_PARTITION_INCONSISTENT

Severity	major
Description	Some of the partitions on the compact flash on *Component ID* have inconsistencies
Troubleshooting	The compact flash has inconsistencies on some of it's partitions.

UPS_WARMSTART

Severity	informational
Description	*Component ID* did a warmstart
Troubleshooting	Normally this is fine, if there is another issue at around the same time, it is worth mentioning this event to the support

CPU_LOCKUP

Severity	major
Description	*Component ID* had a lockup on CPU *#locked_cpu*
Troubleshooting	Please contact support.

FS_CORRUPTED

Severity	warning
Description	Filesystem *Device* of *Module* is corrupted
Troubleshooting	Please contact support.

FS_GOOD

Severity	informational

Description	Filesystem *Device* of *Module* is ok
Troubleshooting	Please contact support.

SERIAL_CONSOLE_LINK_DOWN

Severity	warning
Description	Serial console link of *Target Module* read by *Source Module* is down, due to *Failure Reason*.
Troubleshooting	Please contact support.

SERIAL_CONSOLE_LINK_MISWIRED

Severity	warning
Description	Serial console link of *Target Module* read by *Source Module* is miswired, we expected module id *Target Module ID* but received *Received Module ID*.
Troubleshooting	Please contact support.

SERIAL_CONSOLE_LINK_CORRECT

Severity	informational
Description	Serial console link of *Target Module* read by *Source Module* is now correct.
Troubleshooting	Please contact support.

PROCESS_CORE_DUMP

Severity	warning
Description	Process *Process Name* with pid *Process ID* killed by signal *Signal* on module *Module Component ID*.

TOO_MANY_SYSLOG_MSGS

Severity	informational
Description	Syslog messages got updated more than once today on module *Module Component ID*.
Troubleshooting	There is no problem at the moment.

SAS_LINK_STATE_CHANGE

Severity	variable
Description	SAS link *SAS Type*[*ID*] on module *Module* changed state from *State* to *State*.
Troubleshooting	Please contact support.

SAS_LINK_SPEED_CHANGE

Severity	variable
Description	SAS link *SAS Type*[*ID*] on module *Module* speed changed from *Old Speed* to *New Speed*.
Troubleshooting	Please contact support.

SAS_LINK_ERRORS

Severity	variable
Description	SAS link *SAS Type*[*ID*] on module *Module* has too many errors, *Delta* since last sample.
Troubleshooting	Please contact support.

SAS_LINK_NO_MORE_ERRORS

Severity	informational
Description	SAS link *SAS Type*[*ID*] on module *Module* no longer has errors, *Delta* since last sample.
Troubleshooting	N/A

SAS_LINK_TOO_MANY_RESETS

Severity	major
Description	SAS link *SAS Type*[*ID*] on module *Module* had *Delta* resets, only *Allowed* resets are allowed. Disk *Disk* will be automatically phased out.
Troubleshooting	Please contact support.

SAS_LINK_TOO_MANY_RESETS_PHASEOUT_DISK

Severity	minor
Description	SAS link *SAS Type*[*ID*] on module *Module* had *Delta* resets, only *Allowed* resets are allowed. Please phase out disk *Disk*.
Troubleshooting	Phase out the disk and contact support.

ERROR_ON_SATA_HOST

Severity	major
Description	SATA device failure on *Module*.
Troubleshooting	Please contact support.

ERROR_ON_BOOT_DEVICE

Severity	major
Description	Boot device failure on module *Module*.
Troubleshooting	Please contact support.

ERROR_ON_AHCI_PORT

Severity	major
Description	AHCI device failure on module *Module* port *Port*.
Troubleshooting	Please contact support.

AHCI_PORT_RESCAN_REQUEST_WAS_SENT

Severity	major
Description	Rescan request for ahci port *Port* on module *Module* was sent.
Troubleshooting	Please contact support.

RESET_DETECTED_ON_AHCI_PORT

Severity	minor
Description	Hard reset detected on AHCI device, module *Module*, port *Port*.
Troubleshooting	Please contact support.

ERROR_ON_REMOTE_BOOT_DEVICE

Severity	major
Description	Boot device failure on module *Module*.
Troubleshooting	Please contact support.

CPU_LAPIC_IDLE

Severity	major
Description	*Component ID* is nearing NMI_CPU problem on CPU *#locked_cpu*
Troubleshooting	Please contact support.

FRU_PRODUCT_INFO_AREA_CHECKSUM_UNREADABLE

Severity	major
Description	FRU product information area checksum on module *Component ID* can't be read.
Troubleshooting	Please contact support.

DIMM_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Installed DIMMs on module *Component ID* do not conform to the specification: *Failure reason*
Troubleshooting	Please contact support.

DIMM_COMPLIANCE_CHECK_DIMM_FAILED

Severity	major
Description	DIMM in slot *DIMM id*, part number '*Part number*', on module *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

CPU_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Installed processor on module *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

PCI_ADAPTER_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Specification compliance check failed for PCI adapters on module *Component ID*.
Troubleshooting	Please contact support.

PCI_ADAPTER_COMPLIANCE_CHECK_ADAPTER_FAILED

Severity	major
Description	PCI adapter on module *Component ID* does not conform to the specification. Adapter details: '*Description*'.
Troubleshooting	Please contact support.

INFINIBAND_HCA_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Adapter *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

CNA_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Adapter *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

PCIE_SLOT_COMPLIANCE_CHECK_FAILED

Severity	major
Description	PCIE slot on module *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

PCIE_SLOT_COMPLIANCE_CHECK_SLOT_FAILED

Severity	major
Description	PCIE slot *ID* on module *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

PCIE_SLOT_COMPLIANCE_CHECK_SPEED_FAILED

Severity	major
Description	PCIE slot *ID* on module *Component ID* does not conform to the speed specifications.
Troubleshooting	Please contact support.

CF_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Installed compact flash card on module *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

CF_BIGGER_THAN_EXPECTED

Severity	warning
Description	Installed compact flash card on module *Component ID* has a size of *Size*MB which is bigger than the expected size of *Spec Size*MB.
Troubleshooting	Please contact support.

SSD_COMPLIANCE_CHECK_FAILED

Severity	major
Description	Installed SSD *Component ID* does not conform to the specification.
Troubleshooting	Please contact support.

SSD_DOES_NOT_EXIST

Severity	major
Description	SSD *Component ID* doesn't exist.
Troubleshooting	Please contact support.

SSD_FIRMWARE_UPGRADE_FAILED

Severity	major
Description	SSD *Component ID* failed firmware upgrade
Troubleshooting	Please contact support.

SSD_FIRMWARE_UPGRADE_SKIPPED

Severity	warning
Description	SSD *Component ID* has a new firmware version already installed, upgrade skipped.
Troubleshooting	N/A

SSD_BIGGER_THAN_EXPECTED

Severity	warning

Description	Installed SSD *Component ID* has a size of *Size*GB which is bigger than the expected size of *Spec Size*GB.
Troubleshooting	Please contact support.

SSD_SMALLER_THAN_EXPECTED

Severity	major
Description	Installed SSD *Component ID* has a size of *Size*GB which is smaller than the expected size of *Spec Size*GB.
Troubleshooting	Please contact support.

SSD_FOUND_UNEXPECTED

Severity	warning
Description	SSD *Component ID* was found while SSD Caching feature is disabled.
Troubleshooting	Please contact support.

SSD_SECURE_ERASE_FAILED

Severity	warning
Description	SSD *Component ID* secure erase failed.
Troubleshooting	Please contact support.

SSD_GENERIC_SUPPORT_USED

Severity	minor
Description	SSD *Component ID* using default smart attributes.
Troubleshooting	Please contact support.

SSD_SMART_READING_FAILED

Severity	major
Description	SSD *Component ID* failed reading smart attributes.
Troubleshooting	Please contact support.

SSD_NEAR_WEAROUT

Severity	variable
Description	SSD *Component ID* has bad SMART status. Attribute *Attribute* (*Attribute*) has value of *Value*.
Troubleshooting	Please contact support.

SSD_WORN_OUT

Severity	variable
Description	SSD *Component ID* has very bad SMART status and must be replaced. Attribute *Attribute* (*Attribute*) has value of *Value*.

Troubleshooting	Please contact support.

SSD_CYCLE_INFO

Severity	variable
Description	SSD *Component ID* passed *Cycles* cycles.
Troubleshooting	Please contact support.

SSD_LIFE_GAUGE

Severity	variable
Description	SSD *Component ID* smart attribute LIFE GAUGE exceeds a threshold. Value is *Value*.
Troubleshooting	Please contact support.

SSD_CHANGE_WAS_DETECTED

Severity	informational
Description	*Component ID* has been changed.
Troubleshooting	Confirm that the ssd replacement was intended.

SSD_FIRMWARE_CHANGE_WAS_DETECTED

Severity	informational
Description	The firmware of *Component ID* has changed from '*Old Firmware*' to '*New Firmware*'.
Troubleshooting	Confirm that the SSD firmware change was intended.

SSD_SMART_ATTRIBUTE_THRESHOLD

Severity	variable
Description	SSD *Component ID* smart attribute *Smart attribute* (*Attribute*) exceeds a threshold. Value is *Value*.
Troubleshooting	Please contact support.

SSD_SPEED_HAS_CHANGED

Severity	major
Description	SSD *Component ID* speed has changed to *Speed* Gbps
Troubleshooting	Please contact support.

MODULE_DOWNLOAD_FAILED

Severity	minor
Description	Failure occured trying to download current version of the system to module *Module ID*, failure reason: *Reason*.
Troubleshooting	Please contact support.

MEMORY_ECC_ERRORS_DETECTED

Severity	warning
Description	Memory ECC errors were detected on *Module*.
Troubleshooting	Please contact support.

DIMM_CORRECTABLE_ERROR_DETECTED

Severity	variable
Description	Memory correctable ECC errors were detected on *Module*, *Count* errors on DIMM channel *Channel*, position *Position*.
Troubleshooting	Please contact support.

DIMM_UNCORRECTABLE_ERROR_DETECTED

Severity	variable
Description	Memory uncorrectable ECC errors were detected on *Module*, *Count* errors on DIMM channel *Channel*, position *Position*.
Troubleshooting	Please contact support.

DIMM_ERRORS_PHASING_OUT_MODULE

Severity	major
Description	*Module* will be phased out as we detected too many DIMM errors there.
Troubleshooting	Please contact support.

PCIE_LINK_FATAL_ERROR

Severity	major
Description	A fatal error was detected on a PCIe link in *Module*.
Troubleshooting	Please contact support.

PCIE_LINK_ERROR

Severity	warning
Description	An error was detected on a PCIe link in *Module*.
Troubleshooting	Please contact support.

GEM_STATE_DUMPED

Severity	informational
Description	The GEM state on *Module* was dumped, reason: *Reason*.
Troubleshooting	N/A

DISK_WAS_TURNED_OFF

Severity	minor
Description	Disk *Component ID* was turned off.
Troubleshooting	Please contact your Administrator.

DISK_WAS_TURNED_ON

Severity	informational
Description	Disk *Component ID* was turned on.
Troubleshooting	N/A

DISK_GLIST_SIZE_TOO_HIGH

Severity	variable
Description	Disk *Component ID* GLIST size is *Glist Size*, which is too high.
Troubleshooting	Please contact support.

DISK_GLIST_CHANGED

Severity	warning
Description	Disk *Component ID* GLIST changed from *Previous glist size* to *Current glist Size*.
Troubleshooting	Please contact support.

DISK_IS_NOW_OFFLINE

Severity	warning
Description	Disk *Component ID* is now offline. It has been taken offline by the SCSI mid-layer.
Troubleshooting	Please contact support.

DISK_LOG_PAGE_READING_FAILED

Severity	warning
Description	Disk *Component ID* Failed reading log page. Opcode is *opcode*, page code is *page code*.
Troubleshooting	N/A

SSD_LOG_PAGE_READING_FAILED

Severity	warning
Description	SSD *Component ID* Failed reading log page *log*.
Troubleshooting	N/A

MODULE_IS_MISSING_MEMORY

Severity	major

Description	*Component ID* is missing memory. Actual memory size is *actual_mem* GB but should be *req_mem* GB.
Troubleshooting	Please contact your Administrator.

MODULE_IS_MISSING_REQUIRED_MEMORY

Severity	major
Description	*Component ID* has less memory (*actual_mem* GB) than is defined for use (*req_mem* GB).
Troubleshooting	Please contact your Administrator.

MODULE_HAS_MORE_MEMORY_THAN_EXPECTED

Severity	informational
Description	*Component ID* has more memory than expected. actual memory size is : *actual_mem* GB,should be : *req_mem* GB.
Troubleshooting	Please contact your Administrator.

DISK_HIGH_READ_CORRECTED_WITH_DELAY_RATE

Severity	variable
Description	Disk *Component ID* has *number of read corrected with delay* read corrected errors with delay rate *rate*.
Troubleshooting	Please contact your Administrator.

DISK_FIRMWARE_VERSION_UNEXPECTED

Severity	warning
Description	Disks in module *Component* have unexpected firmware level. Check full event details for the complete list of the mismatched disks.
Troubleshooting	Please update the firmware level.

SSD_FIRMWARE_VERSION_UNEXPECTED

Severity	warning
Description	SSDs in module *Component* have unexpected firmware level. Check full event details for the complete list of the mismatched ssds.
Troubleshooting	Please update the firmware level.

MODULE_ROOT_FILESYSTEM_MIGHT_BE_CORRUPTED

Severity	minor
Description	The root file system of *Component ID* might be corrupted.
Troubleshooting	Please contact support.

IPMI_USER_SETUP_FAILED

Severity	major
Description	Error setting up IPMI USER for module *Module*.
Troubleshooting	Contact support.

IPMI_LAN_SETUP_FAILED

Severity	major
Description	Error setting up IPMI LAN channel *Channel* for module *Module*.
Troubleshooting	Contact support.

FRU_PRODUCT_INFO_AREA_CHECKSUM_IS_INCORRECT

Severity	minor
Description	FRU product information area checksum on module *Component ID* is incorrect and can't be automatically fixed.
Troubleshooting	Please contact support.

FRU_PRODUCT_INFO_AREA_CHECKSUM_WAS_INCORRECT

Severity	warning
Description	FRU product information area checksum on module *Component ID* was incorrect and had to be reset.
Troubleshooting	N/A

FRU_PRODUCT_INFO_AREA_UNREADABLE

Severity	minor
Description	FRU product information area on module *Component ID* can't be read.
Troubleshooting	Please contact support.

IPMI_SEL_LOG_ENTRY

Severity	variable
Description	IPMI SEL log entry '*Entry Name*' found on *component ID* at '*Date Time*'. Raw event data is '*d0 d1 d2*', direction is *direction*.
Troubleshooting	Please contact support.

IPMI_SEL_ENTRY_NEW

Severity	major
Description	*Entry Name* SEL entry on *component ID Date Time* SType=*sensor_type* SNum=*sensor_number* with data d0=*d0* d1=*d1* d2=*d2* dir=*direction*.
Troubleshooting	Please contact support.

MSR_CPU_REG_INFO

Severity	major
Description	*Component ID* MSR CPU registers info.

INTERFACE_NODE_CHOKING

Severity	warning
Description	Interface node #*Node* has long Cache latency. Entered choked state *choke_time* msec ago on node=*Node*
Troubleshooting	Please contact support.

INTERFACE_NODE_UNCHOKING

Severity	variable
Description	Interface node #*Node* is leaving choked state after *choke_time* msec. Longest choke on node=*Node*
Troubleshooting	Please contact support.

INTERFACE_CHOKE_REPORT

Severity	informational
Description	Interface node #*Node* choked for a total of *choke_time* msecs in the last *report_period* minutes. The longest choke was of *longest_choke* msecs on node=*Node-ID*
Troubleshooting	Please contact support.

INTERFACE_ABORTS_REPORT

Severity	warning
Description	Interface node #*Node* handled *num_aborts* aborts in the last *report_period* seconds.
Troubleshooting	Please contact support.

VERY_LONG_LATENCY_TO_CACHE

Severity	variable
Description	Interface #*Node* has long latencies to the caches for *interval* seconds. Longest latency is *longest_latency* msecs to node *cache*
Troubleshooting	Please contact support.

LONG_LATENCY_TO_CACHE

Severity	variable
Description	Interface #*Node* had long latencies to the caches for *interval* msecs. Longest latency is *longest_latency* msecs to node *cache*
Troubleshooting	Please contact support.

TASK_MANAGEMENT_FUNCTION_RECEIVED

Severity	minor
Description	Interface node #*Node* got task management function *task_management_function_code* from Host *host_name* at *port_type* port *port_name* to volume *volume*.
Troubleshooting	N/A

PERF_CLASS_RESOURE_EXHAUSTION

Severity	warning
Description	Exhausted all allowed resources for performance classes on *Module Id*, BUSY until resources available.

PERF_CLASS_RESOURCE_EXHAUSTION

Severity	warning
Description	Exhausted all allowed resources for performance classes on *Module Id*, BUSY until resources available.

CONNECTED_HOSTS_LIMIT_REACHED

Severity	informational
Description	Number of connected Hosts was reached for port '*port_id*' in Module *Module Id*.

QoS_HAS_BEEN_TRIGGERED

Severity	informational
Description	Queues on port '*port_id*' in Module *Module Id* caused QoS to be activated.

INODE_CONNECTED_TO_ALL_CACHES

Severity	informational
Description	Interface '*node_id*' is connected to all cache nodes.

IO_FAILURES_TO_ALL_CACHES

Severity	warning
Description	Interface node #*Node* got bad statuses from all caches during the last *failure_duration* seconds (last *failure_count* IOs) and therefore killed itself.

PERF_CLASS_RATE_AT_LIMIT

Severity	informational
Description	Performance class '*perf_class*' on *Module Id* reached its limit of *Limit Limit Name*, IOs being throttled.

PARTIAL_WRITE

Severity	warning
Description	Interface node #*Node* reports partial write to volume '*volume*' on lba *lba*, primary failed=*primary_failed*, secondary failed=*secondary_failed*, remote failed=*remote_failed*.

PORT_PREP_FOR_UPGRADE_TIMED_OUT

Severity	warning
Description	Preparation of *port_type* port '*local_port_name*' for hot-upgrade timed out due to host '*host_name*' port '*host_port_name*'*host_port_addr*

INTERFACE_DISCONNECTED_FROM_TARGET

Severity	major
Description	Interface node on module *module* cannot access target '*target*' through any gateway module.

INTERFACE_RECONNECTED_TO_TARGET

Severity	major
Description	Interface node on module *module* can access target '*target*'.

ZOMBIE_TASK

Severity	warning
Description	Interface node #*Node* got a zombie task with op 0x*cmd* on volume '*volume*'. total zombie tasks: *ztasks* total zombie pages: *zpages*.
Troubleshooting	N/A

METADATA_SERVICE_ENABLE

Severity	informational
Description	Metadata service is now enabled
Troubleshooting	N/A

METADATA_SERVICE_DB_CREATE

Severity	informational
Description	Database *DB* was created
Troubleshooting	N/A

METADATA_SERVICE_DB_DELETE

Severity	informational
Description	Database *DB* was deleted
Troubleshooting	N/A

IPINTERFACE_CREATE

Severity	informational
Description	A new iscsi IP interface was defined with name '*interface name*' on module *module* with ports '*port list*' and IP address *IP address*

IPINTERFACE_DELETE

Severity	informational
Description	ISCSI IP interface with name '*interface name*' was deleted

IPINTERFACE_RENAME

Severity	informational
Description	ISCSI IP interface with name '*old name*' and was renamed '*interface name*'

IPINTERFACE_ADD_PORT

Severity	informational
Description	Port #*port index* was added to ISCSI IP interface with name '*interface name*'

IPINTERFACE_REMOVE_PORT

Severity	informational
Description	Port #*port index* was removed from ISCSI IP interface with name '*interface name*'

IPINTERFACE_UPDATE

Severity	informational
Description	ISCSI IP interface with name '*interface name*' was updated. Its IP address is *IP address*

IPINTERFACE_UPDATE_MANAGEMENT

Severity	informational
Description	Management IP interfaces were updated. Management IPs are *IP addresses*

IPINTERFACE_UPDATE_MANAGEMENT_IPV6

Severity	informational
Description	Management IP interfaces were updated. Management IPv6 addresses are *IPv6 addresses*

IPINTERFACE_UPDATE_VPN

Severity	informational
Description	VPN IP interfaces were updated. VPN IPs are *IP addresses*

IPINTERFACE_UPDATE_VPN_IPV6

Severity	informational
Description	VPN IPv6 interfaces were updated. VPN IPv6 addresses are *IP addresses*

AUXILIARY_INTERNAL_PORTS_ENABLED

Severity	informational
Description	*Port Count* auxiliary internal Ethernet ports were enabled

AUXILIARY_INTERNAL_PORTS_DISABLED

Severity	informational
Description	*Port Count* auxiliary internal Ethernet ports were disabled

IPINTERFACE_UPDATE_INTERCONNECT

Severity	informational
Description	Interconnect all interfaces MTU was updated. old MTU: *Old MTU*, new MTU: *New MTU*

IPSEC_ENABLED

Severity	informational
Description	IPSec was enabled

IPSEC_DISABLED

Severity	informational
Description	IPSec was disabled

IPSEC_CONNECTION_ADDED

Severity	informational
Description	A new IPSec connection named '*name*' was added

IPSEC_CONNECTION_UPDATED

Severity	informational
Description	The IPSec connection named '*name*' was updated

IPSEC_CONNECTION_REMOVED

Severity	informational
Description	The IPSec connection named '*name*' was removed

PRIVATE_KEY_ADDED

Severity	informational
Description	A new private key named '*name*' with fingerprint '*fingerprint*' and size *key_size* bits was added.

CERTIFICATE_REMOVED

Severity	informational
Description	The certificate named '*name*' was removed.

PKCS12_CERTIFICATE_ADDED

Severity	informational
Description	A new PKCS#12 named '*name*' with fingerprint '*fingerprint*' was added.

PKI_RENAME

Severity	informational
Description	PKI with the name '*old name*' was renamed to '*new name*'

PKI_UPDATED

Severity	informational
Description	PKI with the name '*name*' and fingerprint '*fingerprint*' was updated

EMAIL_HAS_FAILED

Severity	variable
Description	Sending event *Event Code* (*Event Index*) to *Destination List* via *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

BULK_EMAIL_HAS_FAILED

Severity	variable
Description	Sending bulk email with *Events Number* events to *Destination List* via *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

SMS_HAS_FAILED

Severity	variable
Description	Sending event *Event Code* (*Event Index*) to *Destination List* via *SMS Gateway* and *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

HTTPS_HAS_FAILED

Severity	variable
Description	Sending event *Event Code* (*Event Index*) to *Destination List* via *HTTPS address* failed. Module: *Module ID*; Error message: '*Error Message*' (*HTTP error code*); timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

EMAIL_NOT_SENT

Severity	variable
Description	Sending event *Event Code* (*Event Index*) to *Destination List* via *SMTP Gateway* was waived because of failed SMTP gateway. It will be not be used until *Retry Time*.
Troubleshooting	Please contact support.

SMS_NOT_SENT

Severity	variable
Description	Sending event *Event Code* (*Event Index*) to *Destination List* via *SMS Gateway* and *SMTP Gateway* was waived because of failed SMTP gateway. It will be not be used until *Retry Time*.
Troubleshooting	Please contact support.

HEARTBEAT_EMAIL_HAS_FAILED

Severity	minor
Description	Sending heartbeat to *Destination Name* via *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

HEARTBEAT_SMS_HAS_FAILED

Severity	minor
Description	Sending heartbeat to *Destination Name* via *SMS Gateway* and *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

TEST_EMAIL_HAS_FAILED

Severity	minor
Description	Sending test to *Destination Name* via *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

TEST_SMS_HAS_FAILED

Severity	minor
Description	Sending test to *Destination Name* via *SMS Gateway* and *SMTP Gateway* failed. Module: *Module ID*; Error message: '*Error Message*'; timeout expired: *Timeout Expired?*.
Troubleshooting	Please contact support.

EVENTS_WERE_NOT_SAVED

Severity	variable
Description	Node #*Node* could not save *Num Lost* events of maximal severity *Maximal Severity*.
Troubleshooting	Please contact support.

EVENT_TEST

Severity	variable
Description	Event *Index* of *Count* test events (description: *Description*; severity: *Severity*; node: *Node*).
Troubleshooting	N/A

CUSTOM_EVENT

Severity	variable
Description	*Description*
Troubleshooting	N/A

INTERNAL_CUSTOM_EVENT

Severity	variable
Description	*Description*
Troubleshooting	N/A

MM_EVENT

Severity	variable
Description	Maintenance Module *Category* event : *Description*
Troubleshooting	Events coming from the Maintenance Module

TRACES_DUMPING

Severity	informational
Description	*Description*
Troubleshooting	N/A

SYSTEM_LOGS_COLLECTION

Severity	variable
Description	*Description*
Troubleshooting	N/A

SCRIPT_EXIT_STATUS

Severity	variable
Description	Script '*Script Name*' exited with status *Exit Status Description*.
Troubleshooting	N/A

USB_TO_SERIAL_CONNECTED_TO_WRONG_MODULE

Severity	warning
Description	The serial port *Serial Port* on module *Source Module* should be connected to *Target Module* but it is not.
Troubleshooting	Connect the serial cable to the correct module.

ALL_USB_TO_SERIAL_CONNECTED_CORRECTLY

Severity	informational
Description	All USB to serial cables are correctly connected to their designated modules.
Troubleshooting	N/A

FAILED_SAVING_EVENTS

Severity	warning
Description	Module *Module* failed saving events locally.
Troubleshooting	Please contact support.

XMPNS_ADMIN_CONTROL

Severity	informational
Description	*Action*;username=*User*
Troubleshooting	N/A

XMPNS_USER_CONTROL

Severity	informational
Description	*Action*;username=*User*

Troubleshooting	N/A

INTERCONNECT_TIMED_OUT

Severity	major
Description	Node #*Node ID* of type *Node Type* on *Module Component ID* could not establish connection to Node #*Node ID* of type *Node Type* on *Module Component ID* for *Timeout* seconds.
Troubleshooting	Please contact support.

EVENTS_WERE_LOST

Severity	variable
Description	*Number of events* Events of maximal severity '*maximal severity*' were lost due to overload.
Troubleshooting	Please contact support.

EVENTS_WERE_SUPPRESSED

Severity	variable
Description	*Number of Events Event Code* Events of maximal severity '*maximal severity*' were suppressed in the last *period* minutes.
Troubleshooting	N/A

NODE_HALTED

Severity	critical
Description	Node #*Node* has halted.
Troubleshooting	Please contact support

UPGRADE_MODULES_SW_NOT_IDENTICAL

Severity	warning
Description	File lists of different platform nodes are not identical to each other. Differing module is *differing_module*
Troubleshooting	Please contact support

UPGRADE_SOFTWARE_DOWNLOAD_FINISHED

Severity	informational
Description	Finished downloading software needed for upgrade to version *version*. Upgrade consequence is *consequence*
Troubleshooting	N/A

UPGRADE_FILE_LIST_RETRIEVAL_FAILED

Severity	critical

Description	Could not receive new version's file list from repository. Error code is *error*.
Troubleshooting	Contact support

UPGRADE_STARTS

Severity	informational
Description	System starting an upgrade.
Troubleshooting	N/A

PRE_UPGRADE

Severity	informational
Description	System preparing an upgrade procedure type *type* .
Troubleshooting	N/A

UPGRADE_IS_OVER

Severity	informational
Description	System went up after an upgrade.
Troubleshooting	N/A

IOS_RESTORED_AFTER_HOT_UPGRADE

Severity	informational
Description	System is able to perform I/Os after a hot upgrade.
Troubleshooting	N/A

UPGRADE_NO_NEW_FILES_FOR_UPGRADE

Severity	warning
Description	Repository version does not contain any new files. current version *current_version* new version is *new_version*
Troubleshooting	Contact support

UPGRADE_DOWNLOAD_REPOSITORY_COPY

Severity	critical
Description	Mirroring needed files from repository failed. Mirroring module is *mirroring_module* error is *error*
Troubleshooting	Contact support

UPGRADE_LOCAL_VERSION_DOWNLOAD_FAILED

Severity	critical
Description	Failure to distribute new sofware internally. Error code is *error* .

Troubleshooting	Contact support

UPGRADE_WAS_CANCELLED

Severity	informational
Description	Upgrade was cancelled with reason *reason* .
Troubleshooting	Contact support

HOT_UPGRADE_ABORTED

Severity	critical
Description	Hot upgrade aborted with reason *reason*.
Troubleshooting	Contact support

HOT_UPGRADE_HAS_FAILED

Severity	critical
Description	Hot upgrade failed while *errorneous_state*.
Troubleshooting	Contact support

PRE_UPGRADE_SCRIPT_INVOCATION_FAILED

Severity	critical
Description	Invocation of pre-upgrade script failed with error *error*.
Troubleshooting	Contact support

POST_UPGRADE_SCRIPT_INVOCATION_FAILED

Severity	critical
Description	Invocation of post-upgrade script failed with error *error*.
Troubleshooting	Contact support

UPGRADE_IS_NOT_ALLOWED

Severity	critical
Description	One or more of the pre-upgrade validations failed.
Troubleshooting	Fix the problems pointed out it previous events and revalidate.

PRE_UPGRADE_VALIDATION_FAILED

Severity	critical
Description	One of the pre-upgrade validations failed with status *error*.
Troubleshooting	Contact support

UPGRADE_IS_ALLOWED

Severity	informational
Description	All of the pre-upgrade validations passed successfully.
Troubleshooting	N/A

POST_UPGRADE_SCRIPT_STARTED

Severity	informational
Description	Post-upgrade script started.
Troubleshooting	N/A

POST_UPGRADE_SCRIPT_FINISHED

Severity	informational
Description	Post-upgrade script finished successfully.
Troubleshooting	N/A

PRE_UPGRADE_SCRIPT_DISAPPROVES

Severity	critical
Description	Upgrade cannot commence because some of the validations in the pre-upgrade script failed. Explanation: *explanation*.
Troubleshooting	Correct the system state according to the explanation and try again

POST_UPGRADE_SCRIPT_REPORTED_FAILURE

Severity	critical
Description	Post upgrade script reported failure. Script output: *explanation*.
Troubleshooting	Correct the system state according to the explanation and try again

FILE_TOO_LARGE

Severity	critical
Description	File *Filename* with size *Size* is too large for the current system limits, upgrades and installs can fail.
Troubleshooting	If file is not part of the system, delete it and regenerate file list. If it is part of the system, increase the limit.

SHOULD_BE_EMERGENCY_SHUTDOWN

Severity	critical
Description	An emergency shutdown has been detected, but UPS control is disabled. Shutdown reason: *Shutdown Reason*.

Troubleshooting	Solve the UPS problem immediately or shut the system down using 'shutdown -y' and contact support.

UPS_PROBLEM_CAUSING_MAINTENANCE_MODE

Severity	informational
Description	UPSes state causing system to enter maintenance mode.
Troubleshooting	N/A

ADMINISTRATOR_PROCESS_FAILURE

Severity	warning
Description	Administrator process *Process ID* on *Module* failed with error *Error Code*. The last command was *Command Type* (ID: *Command ID*, in progress: *Command in Progress*).
Troubleshooting	Please contact support

ADMINISTRATOR_PROCESS_UNAVAILABLE

Severity	warning
Description	Command dispatch to administrator failed with timeout. Command was *Command Type* (ID: *Command ID*).
Troubleshooting	Please contact support

SSL_SETTINGS_CHANGED

Severity	informational
Description	Admin server SSL settings were changed. SSLv2 enabled: *SSLv2 Enabled*, cipher list: *Cipher List*. Change succeeded on *Module*? *Change Succeeded*.
Troubleshooting	N/A

METADATA_SET

Severity	warning
Description	*Object type* with name '*Object name*' has new metadata value.
Troubleshooting	N/A

METADATA_DELETE

Severity	warning
Description	Metadata object deleted for *Object type* with name '*Object name*'.
Troubleshooting	N/A

LOCAL_STORAGE_IS_CLEAR

Severity	informational
Description	Local storage is clear.
Troubleshooting	N/A

LOCAL_STORAGE_CLEAR_FAILED

Severity	warning
Description	Local storage clear failed on *module*.
Troubleshooting	N/A

REMOTE_SUPPORT_KEY_CREATED

Severity	informational
Description	A remote support key has been created.
Troubleshooting	N/A

REMOTE_SUPPORT_KEY_CLEARED

Severity	informational
Description	The remote support key has been cleared.
Troubleshooting	N/A

PATCH_SCRIPT_ADDED

Severity	informational
Description	Added patch *Patch Name*.
Troubleshooting	Was patch supposed to have been added.

PATCH_SCRIPT_UPDATED

Severity	informational
Description	Updated patch *Patch Name*.
Troubleshooting	N/A

PATCH_SCRIPT_DELETED

Severity	informational
Description	Deleted patch *Patch Name*.
Troubleshooting	N/A

MODULE_FAILED_TO_FETCH_PATCH_SCRIPT

Severity	warning
Description	Module *Module* failed to fetch patch script *Patch Name*.
Troubleshooting	N/A

PATCH_SCRIPT_FAILED_TO_EXECUTE

Severity	informational
Description	Patch script *Patch Name* execution failed on module *Module*
Troubleshooting	N/A

PATCH_SCRIPT_EXECUTION_STARTED

Severity	informational
Description	Patch script *Patch Name* execution on module *Module* started with pid *Process ID*
Troubleshooting	N/A

PATCH_SCRIPT_EXECUTION_ENDED

Severity	informational
Description	Patch script *Patch Name* execution on module *Module* with pid *Process ID* ended with return code *Return Code*
Troubleshooting	N/A

DOMAIN_CREATED

Severity	informational
Description	Domain *domain_name* has been created.
Troubleshooting	N/A

DOMAIN_UPDATED

Severity	informational
Description	Domain *domain_name* has been updated.
Troubleshooting	N/A

DOMAIN_RENAMED

Severity	informational
Description	Domain *old_name* has been renamed to *domain_name*.
Troubleshooting	N/A

DOMAIN_DELETED

Severity	informational
Description	Domain *domain_name* has been deleted.
Troubleshooting	N/A

POOL_ADDED_TO_DOMAIN

Severity	informational

Description	Pool *pool_name* has been added to domain *domain_name*.
Troubleshooting	N/A

POOL_REMOVED_FROM_DOMAIN

Severity	informational
Description	Pool *pool_name* has been removed from domain *domain_name*.
Troubleshooting	N/A

POOL_MOVED_BETWEEN_DOMAINS

Severity	informational
Description	Pool *pool_name* has been moved from domain *domain_name* to domain *domain_name*.
Troubleshooting	N/A

GROUPED_POOL_MOVED_BETWEEN_DOMAINS

Severity	informational
Description	Grouped Pool *gp_name* has been moved from domain *domain_name* to domain *domain_name*.
Troubleshooting	N/A

DOMAINS_AUTO_SHIFT_RESOURCES

Severity	informational
Description	Resources from domain *domain_name* to domain *domain_name* have been auto shifted.
Troubleshooting	N/A

OBJECT_ATTACHED_TO_DOMAIN

Severity	informational
Description	Object *object_name* of type *object_type* has been added to domain *domain_name*.
Troubleshooting	N/A

OBJECT_REMOVED_FROM_DOMAIN

Severity	informational
Description	Object *object_name* of type *object_type* has been removed from domain *domain_name*.
Troubleshooting	N/A

DOMAIN_MANAGED_ATTRIBUTE_SET

Severity	informational
Description	Domain *domain_name* managed attribute was set to *managed_attribute*.

Troubleshooting	N/A

REMOTE_SUPPORT_CONNECTED

Severity	informational
Description	System connected to remote support center *Destination*.

UNABLE_TO_CONNECT_TO_REMOTE_SUPPORT

Severity	minor
Description	System is unable to connect to any remote support center.

REMOTE_SUPPORT_CONNECTION_LOST

Severity	variable
Description	Connection to remote support center *Destination* failed while the connection was in state *Disconnected Session State*.

REMOTE_SUPPORT_TIMEOUT

Severity	variable
Description	Connection to remote support center *Destination* timed out while the connection was in state *Disconnected Session State*.

REMOTE_SUPPORT_IMMINENT_TIMEOUT

Severity	minor
Description	System is about to disconnect busy connection to remote support center *Destination*.

REMOTE_SUPPORT_DEFINED

Severity	informational
Description	Defined remote support center *Name* with IP address *Address* and port *Port*.

REMOTE_SUPPORT_DELETED

Severity	informational
Description	Deleted remote support center *Name*.

REMOTE_SUPPORT_DISCONNECTED

Severity	variable
Description	System disconnected from remote support center *Destination* while the connection was in state *Disconnected Session State*.

REMOTE_SUPPORT_CLIENT_MOVED

Severity	informational
Description	The remote support client moved from *Old Module* to *New Module*.

REMOTE_SUPPORT_CLIENT_NO_AVAILABLE_MODULES

Severity	minor
Description	No live modules with *Port Type* ports are available to run the remote support client.

TIMEZONE_SET

Severity	informational
Description	Timezone of the system was set to *Timezone*.
Troubleshooting	N/A

MANAGER_OPERATION_BLOCKED

Severity	critical
Description	The Manager is blocked.
Troubleshooting	Please escalate to IBM XIV support.

MANAGER_OPERATION_RESUMED

Severity	informational
Description	The Manager is no longer blocked.
Troubleshooting	N/A

ELICENSE_ACCEPTED

Severity	informational
Description	Electronic license was accepted by '*Approver Name*'.
Troubleshooting	N/A

ELICENSE_VIOLATION

Severity	warning
Description	Latest version of the electronic license was not approved.
Troubleshooting	Please approve the electronic license.

AUDIT_ENABLED

Severity	informational
Description	CLI command auditing activated.
Troubleshooting	N/A

AUDIT_DISABLED

Severity	warning
Description	CLI command auditing deactivated.
Troubleshooting	N/A

MASTER_SM_CHOSEN

Severity	informational
Description	Subnet manager on module '*Component ID*' becomes master.
Troubleshooting	N/A

MODULE_IB_PORTS_DOWN

Severity	warning
Description	SM: all infiniband ports on module '*Component ID*' are down.
Troubleshooting	N/A

MODULE_SM_PRIO_CHANGED

Severity	informational
Description	SM: SM priority changed on module '*Component ID*' from '*Priority*' to '*Priority*'. Change reason: '*Change Reason*'.
Troubleshooting	N/A

MASTER_SM_RESCAN

Severity	informational
Description	Master SM on module '*Component ID*' has reloaded configuration and rescans network.
Troubleshooting	N/A

IB_MODULE_MISWIRE

Severity	warning
Description	Infiniband miswire: Port '*Port Number*' of module *Component ID*' should be connected to '*Component ID*'. Disallowed GUID '*GUID of IB Device* (*Switch Port*)' is connected instead.
Troubleshooting	N/A

IB_SWITCH_MISWIRE

Severity	warning
Description	Infiniband miswire: '*Switch ID*' with GUID '*Switch GUID*' should be connected to '*Switch Port*'. Disallowed GUID '*GUID of IB Device* (*Component ID*)' is connected instead.
Troubleshooting	N/A

IB_LINK_UP

Severity	informational
Description	Link on '*Component ID* (*Component ID*)' is up.
Troubleshooting	N/A

IB_LINK_DOWN

Severity	warning
Description	Link on '*Component ID* (*Component ID*)' is down.
Troubleshooting	N/A

IB_MISSING_LINK

Severity	warning
Description	Link on '*Component ID* (*Component ID*)' is missing.
Troubleshooting	N/A

IB_MODULE_PORT_BAD_GUID_FORMAT

Severity	warning
Description	Module port#*Port Number*, connected to switch port '*Component ID*' has GUID:'*Port GUID*' which is not xiv-GUID or its serial is not compatible with the machine.
Troubleshooting	N/A

IB_BAD_CONFIGURATION

Severity	major
Description	Bad IB configuration values found. Given values are '*IB component ID*'. Max values are '*IB component ID*'. Min values are '*IB component ID*'.
Troubleshooting	N/A

IB_BAD_PORT_PERFORMANCE

Severity	variable
Description	Bad Port Performance: too many errors of type '*Counter Name*' on '*Component ID*'. Action taken: '*Action Taken*' Recommendation: '*Recommendation*'.
Troubleshooting	N/A

IB_PORT_SHUTDOWN

Severity	warning
Description	Port '*Component ID* is going to be shutdown. Reason: number of *Shutdown Reason* exceeded threshold.'
Troubleshooting	N/A

IB_BAD_LINK_PERFORMANCE

Severity	warning
Description	Bad Link Performance: link width is '*Link Width*' link speed is '*Link Speed*' on '*Component ID*'
Troubleshooting	N/A

IB_SWITCH_MALFUNCTION

Severity	major
Description	Found a malfunction in switch '*Component ID*'. Will shutdown the switch when possible (when redundant link will be available).
Troubleshooting	N/A

IB_SWITCH_IS_MISSING

Severity	warning
Description	An Infiniband switch is missing '*Component ID*'.
Troubleshooting	N/A

IB_MISSING_SWITCH_FOUND

Severity	informational
Description	An Infiniband switch '*Component ID*' which was missing is now found.
Troubleshooting	N/A

IB_PORT_FORCE_DOWN_SUCCESS

Severity	critical
Description	IB port '*HCA Port*' on module '*Module*' was powered off.
Troubleshooting	Contact Support.

IB_PORT_FORCE_DOWN_FAILED

Severity	critical
Description	Failed to power off IB port '*HCA Port*' on module '*Module*'.
Troubleshooting	Contact Support.

IB_PORT_FORCE_UP_SUCCESS

Severity	informational
Description	IB port '*HCA Port*' on module '*Module*' was powered on.
Troubleshooting	Contact Support.

IB_PORT_FORCE_UP_FAILED

Severity	warning
Description	Failed to power on IB port '*HCA Port*' on module '*Module*'.
Troubleshooting	Contact Support.

INFINIBAND_ERROR

Severity	major
Description	Failed to load infiniband stack on module *Module ID*. Error is: *Error description*.
Troubleshooting	Possible physical problem with module. Contact support.

INFINIBAND_PORT_ERROR

Severity	major
Description	Failed to bring up Infiniband port *HCA Port Number* on module *Module ID*. Error is: *Error description*.
Troubleshooting	Possible physical problem with module. Contact support.

COMPONENT_REQUIRES_SERVICING

Severity	major
Description	Component *Component ID* requires service: *Component Required Service*, due to: *Component Service Reason*. The urgency of this service is *Maintenance Urgency*

COMPONENT_REQUIRES_IMMEDIATE_SERVICING

Severity	major
Description	Component *Component ID* which previously had it's service deferred now requires immediate service: *Component Required Service*, due to: *Component Service Reason*

COMPONENT_REQUIRED_SERVICE_CLEARED

Severity	informational
Description	Component *Component ID* does NOT require service anymore

ENDURANCE_NOTIFICATION_THRESHOLD_CHANGED

Severity	informational
Description	SSD endurance notification thresholds were changed.

PERF_CLASS_MAX_IO_RATE_UPDATED

Severity	informational
Description	Performance Class *name* max IO rate was changed to *IO rate*

PERF_CLASS_MAX_BW_RATE_UPDATED

Severity	informational
Description	Performance Class *name* max BW rate was changed to *BW rate*

PERF_CLASS_CREATE

Severity	informational
Description	Performance Class with name '*name*' was created

PERF_CLASS_DELETE

Severity	informational
Description	Performance Class with name '*name*' was deleted

PERF_CLASS_ADD_HOST

Severity	informational
Description	Host with name '*host_name*' was added to Performance Class with name '*name*'

PERF_CLASS_REMOVE_HOST

Severity	informational
Description	Host with name '*host_name*' was removed from Performance Class with name '*name*'

PERF_CLASS_ADD_POOL

Severity	informational
Description	Pool with name '*pool.name*' was added to Performance Class with name '*pool.perf_class*'

PERF_CLASS_REMOVE_POOL

Severity	informational
Description	Pool with name '*pool.name*' was removed from Performance Class with name '*name*'

PERF_CLASS_ADD_DOMAIN

Severity	informational
Description	Domain *domain_name* was added to Performance Class *name*

PERF_CLASS_REMOVE_DOMAIN

Severity	informational
Description	Domain *domain_name* was removed from Performance Class *name*

VOLUME_MODIFIED_DURING_IO_PAUSE

Severity	warning
Description	Volume '*vol_name*' of CG '*cg_name*' was modified during Pause IO with token '*token*'
Troubleshooting	Retry after completing CG changes.

CONS_GROUP_MODIFIED_DURING_IO_PAUSE

Severity	warning
Description	CG '*cg_name*' was modified during Pause IO with token '*token*'
Troubleshooting	Retry after completing CG changes.

IO_PAUSED_FOR_CONS_GROUP

Severity	Informational
Description	Pause IO on CG with name '*cg_name*' was started with *timeout*ms timeout . Token is '*token*'.

IO_RESUMED_FOR_CONS_GROUP_EXPLICITLY

Severity	Informational
Description	Pause IO on CG with name '*cg_name*' and token '*token*' was resumed by user request.

IO_RESUMED_FOR_CONS_GROUP_AUTOMATICALLY

Severity	Informational
Description	Pause IO on CG with name '*cg_name*' and token '*token*' was resumed after snapgroup creation.

IO_RESUMED_FOR_CONS_GROUP_UPON_SYSTEM_ERROR

Severity	warning
Description	Pause IO on CG with name '*cg_name*' and token '*token*' was resumed after system error.

IO_RESUMED_FOR_CONS_GROUP_UPON_TIMEOUT_EXPIRATION

Severity	warning
Description	Pause IO on CG with name '*cg_name*' and token '*token*' was canceled after timeout.
Troubleshooting	Use longer timeout value or require less time for performing action.

ISYNC_RPC_TIMEOUT

Severity	major
Description	ISync RPC '*rpc_uid*' on volume '*vol_uid*' from initiator uid '*init_uid*' is delayed for more than *timeout* seconds.

HOST_PROFILE_SET

Severity	informational
Description	Host profile value has been set for host *host_name*.
Troubleshooting	N/A

HOST_PROFILE_SET_REJECTED

Severity	warning
Description	Host profile setting was rejected because the host attempted to set the profile of host *host_name* more than once in the last *min_set_interval* minutes.
Troubleshooting	N/A

HOST_PROFILE_CLEARED

Severity	informational
Description	Host profile value has been cleared for host *host_name*.
Troubleshooting	N/A

SYMON_COMPONENT_FAILURE_RECOMMENDED

Severity	informational
Description	Symptomatic monitoring recommends failing *Component*.
Troubleshooting	N/A

SYMON_COMPONENT_FAILURE_WOULD_HAVE_BEEN_RECOMMENDED

Severity	informational
Description	Symptomatic monitoring would have recommended failing *Component*.
Troubleshooting	N/A

SYMON_INODES_ARE_DISTRESSED

Severity	informational
Description	Symptomatic monitoring detected that some interface nodes are distressed.
Troubleshooting	N/A

MEDIUM_ERROR_RECOVERED

Severity	informational
Description	Medium error on volume=*Volume*, logical-partition=*Logical Partition Number*, offsetted-logical-partition=*Offsetted Logical Partition Number* was recovered.
Troubleshooting	N/A

MEDIUM_ERROR_NOT_RECOVERED

Severity	critical
Description	Medium error on volume=*Volume*, logical-partition=*Logical Partition Number*, offsetted-logical-partition=*Offsetted Logical Partition Number* could not be recovered due to *Reason*.
Troubleshooting	N/A

ALU_CREATE

Severity	informational
Description	ALU was defined with name '*ALU name*' associated with host '*ALU host name*' lun '*ALU lun*'.

ALU_DELETE

Severity	informational
Description	ALU with name '*ALU name*' associated with host '*ALU host name*' lun '*ALU lun*' was deleted.

ALU_UNBOUND_ALL

Severity	informational
Description	All SLUs of ALU with name '*ALU name*' were unbound.

BANDWIDTH_HAS_BEEN_REDUCED

Severity	major
Description	Bandwidth between module *Source Module ID* and module *Destination Module ID* is low (*Last measurement Bandwidth*), threshold (*Configured Threshold*)
Troubleshooting	N/A

BANDWIDTH_IS_BACK_TO_NORMAL

Severity	informational
Description	Bandwidth between module *Source Module ID* and module *Destination Module ID* is back to normal (*Last measurement Bandwidth*)
Troubleshooting	N/A

INTERCONNECT_RTT_IS_VERY_HIGH

Severity	major
Description	Round Trip Time between module *Source Module ID* and module *Destination Module ID* is very high (*Last measurement RTT*), threshold (*Configured Threshold*)
Troubleshooting	N/A

INTERCONNECT_RTT_IS_HIGH

Severity	minor
Description	Round Trip Time between module *Source Module ID* and module *Destination Module ID* is high (*Last measurement RTT*), threshold (*Configured Threshold*)
Troubleshooting	N/A

INTERCONNECT_RTT_IS_BACK_TO_NORMAL

Severity	informational
Description	Round Trip Time between module *Source Module ID* and module *Destination Module ID* is back to normal (*Last measurement RTT*)
Troubleshooting	N/A

INTERCONNECT_LOSS_RATE_IS_HIGH

Severity	major
Description	Loss rate between module *Source Module ID* and module *Destination Module ID* is high (*Last measurement Loss*), threshold (*Configured Threshold*)
Troubleshooting	N/A

INTERCONNECT_LOSS_RATE_IS_BACK_TO_NORMAL

Severity	informational
Description	Loss rate between module *Source Module ID* and module *Destination Module ID* is back to normal (*Last measurement Loss*)
Troubleshooting	N/A

INTERCONNECT_RETRANSMIT_RATE_IS_HIGH

Severity	major
Description	TCP Retransmission rate on module *Source Module ID* is high (*Last measurement Retransmission*), threshold (*Configured Threshold*)
Troubleshooting	N/A

INTERCONNECT_RETRANSMIT_RATE_IS_BACK_TO_NORMAL

Severity	informational

Description	TCP Retransmission rate on module *Source Module ID* is back to normal (*Last measurement Retransmission*)
Troubleshooting	N/A

INTERCONNECT_MTU_SIZE_IS_SMALL

Severity	major
Description	Max transmission unit (MTU) between module *Source Module ID* and module *Destination Module ID* is low (*Last measurement MTU*), threshold (*Configured Threshold*)
Troubleshooting	N/A

INTERCONNECT_MTU_SIZE_IS_OK

Severity	informational
Description	Max transmission unit (MTU) between module *Source Module ID* and module *Destination Module ID* is back to normal (*Last measurement MTU*)
Troubleshooting	N/A

Chapter 25. Return codes

This section contains descriptions of CLI return codes.

Return Code	Error Description
0	Success.
1	Command execution failed.
2	No connection to the system.
3	Password is required.
4	Password does not match system password.
7	Command not allowed from this client.
8	Bad XCLI option.
9	Internal XCLI error.

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