

IBM DS8000 Series
9.3.2

Command-Line Interface User's Guide



Note

Before using this information and the product it supports, read the information in the [“Notices” on page 573](#) section.

This edition applies to version 9, release 3, modification 2 of the *IBM DS8000 Series Command-Line Interface User's Guide* and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this book

This book describes information about the DS8000® series command-line interface. The first chapter provides an overview of the DS8000 series. Subsequent chapters describe installing, upgrading, removing, and running the DS CLI to configure and run your storage systems.

Who should use this book

This book is intended for system administrators or others who use the DS CLI to install and manage the IBM® DS8000 storage systems.

Syntax diagram conventions

A syntax diagram uses symbols to represent the elements of a command and to specify the rules for using these elements.

The following table displays the conventions that are used in the command syntax for the product.

| Syntax convention | Description | Example |
|-------------------|--|---|
| Command | A command is the first word or set of consecutive characters. | help |
| Option | An option is a character, set of consecutive characters, or a word that follows the command and any arguments. | [on] |
| Variable | A variable is any set of consecutive characters or word that follows an option. Variables are in <i>italic</i> typeface and can use capitalized letters in the character string to aid in reading comprehension. | <i>timeout_in_sec</i> |
| Vertical bar () | Mutually exclusive options are separated by a vertical bar (). | [on off] |
| Ellipsis (...) | An ellipsis (...) indicates that the previous option can be repeated multiple times with different values. It can be used inside or outside of brackets. | source1:target1 [,source2:target2][,...] |

Publications and related information

Product guides, other IBM publications, and websites contain information that relates to the IBM DS8000 series.

To view a PDF file, you need Adobe Reader. You can download it at no charge from the [Adobe website \(get.adobe.com/reader/\)](http://get.adobe.com/reader/).

Online documentation

Go to IBM Documentation (www.ibm.com/docs) to find the most current information.

Publications

You can order or download individual publications (including previous versions) that have an order number from the IBM Publications Center website (www.ibm.com/resources/publications). Publications without an order number are available on the documentation CD or can be downloaded here.

| Title | Description | Order number |
|--|---|--|
| <i>IBM DS8900F Introduction and Planning Guide</i> | This publication provides an overview of the new DS8900F, the most current storage system in the DS8000 series. The DS8900F provides two system types: DS8910F Flexibility Class models 993 and 994, DS8950F Agility Class models 996 and E96, and DS8980F Analytic Class models 998 and E96. | V9.3.2 SC27-9560-07 V9.3.0 SC27-9560-06 V9.2.0 SC27-9560-05 V9.1.0 SC27-9560-04 V9.0.2 SC27-9560-03 V9.0.0 SC27-9560-02 |
| <i>IBM DS8882F Introduction and Planning Guide</i> | This publication provides an overview of the DS8882F, the most current storage system in the DS8000 series. The DS8882F provides the new model 983. This publication provides an overview of the product and technical concepts for DS8882F. | V8.5.3 GC27-9259-02 V8.5.1 GC27-9259-01 V8.5.0 GC27-9259-00 |
| <i>IBM DS8880 Introduction and Planning Guide</i> | This publication provides an overview of the product and technical concepts for DS8880. It also describes the ordering features and how to plan for an installation and initial configuration of the storage system. | V8.5.3 GC27-8525-18 V8.5.1 GC27-8525-17 V8.5.0 GC27-8525-16 V8.4.0 GC27-8525-15 V8.3.3 GC27-8525-14 V8.3.1 GC27-8525-13 V8.3.0 GC27-8525-12 V8.2.3 GC27-8525-11 V8.2.1 GC27-8525-09 V8.2.0 GC27-8525-07 V8.1.1 GC27-8525-06 V8.1.0 GC27-8525-05 V8.0.1 GC27-8525-04 GC27-8525-03 V8.0.0 GC27-8525-02 |
| <i>IBM DS8870 Introduction and Planning Guide</i> | This publication provides an overview of the product and technical concepts for DS8870. It also describes the ordering features and how to plan for an installation and initial configuration of the storage system. | V7.5.0 GC27-4209-11 V7.4.0 GC27-4209-10 V7.3.0 GC27-4209-09 V7.2.0 GC27-4209-08 V7.1.0 GC27-4209-05 V7.0.0 GC27-4209-02 |

Table 2. DS8000 series product publications (continued)

| Title | Description | Order number |
|---|--|--|
| <i>IBM DS8000 Command-Line Interface User's Guide</i> | This publication describes how to use the DS8000 command-line interface (DS CLI) to manage DS8000 configuration and Copy Services relationships, and write customized scripts for a host system. It also includes a complete list of CLI commands with descriptions and example usage. | V9.3.2 SC27-9562-06 V9.2.1 SC27-9562-05 V9.2.0 SC27-9562-04 V9.1.1 SC27-9562-03 V9.1.0 SC27-9562-02 V9.0.2 SC27-9562-01 V9.0.0 SC27-9562-00 V8.5.4 SC27-8526-11 V8.5.1 SC27-8526-10 V8.5.0 SC27-8526-09 V8.3.3 SC27-8526-08 V8.3.1 SC27-8526-07 V8.3.0 SC27-8526-06 V8.2.3 SC27-8526-05 V8.2.2 SC27-8526-04 V8.2.0 SC27-8526-03 V8.1.1 SC27-8526-02 V8.1.0 SC27-8526-01 V8.0.0 SC27-8526-00 V7.5.0 GC27-4212-06 V7.4.0 GC27-4212-04 V7.3.0 GC27-4212-03 V7.2.0 GC27-4212-02 V7.1.0 GC27-4212-01 V7.0.0 GC27-4212-00 V6.3.0 GC53-1127-07 |
| <i>IBM DS8000 Host Systems Attachment Guide</i> | This publication provides information about attaching hosts to the storage system. You can use various host attachments to consolidate storage capacity and workloads for open systems and IBM Z hosts. | V9.1.0 SC27-9563-01 V9.0.0 SC27-9563-00 V8.0.0 SC27-8527-00 V7.5.0 GC27-4210-04 V7.4.0 GC27-4210-03 V7.2.0 GC27-4210-02 V7.1.0 GC27-4210-01 V7.0.0 GC27-4210-00 V6.3.0 GC27-2298-02 |
| <i>IBM DS8900F/DS8880 RESTful API Guide</i> | This publication provides an overview of the Representational State Transfer (RESTful) API, which provides a platform independent means by which to initiate create, read, update, and delete operations in the DS8000 and supporting storage devices. | V4.0 SC27-9823-00 |
| <i>IBM DS8800/DS8700 RESTful API Guide</i> | This publication provides an overview of the Representational State Transfer (RESTful) API, which provides a platform independent means by which to initiate create, read, update, and delete operations in the DS8000 and supporting storage devices. | V1.3 SC27-9235-00 V1.2 SC27-8502-02 V1.1 SC27-8502-01 V1.0 SC27-8502-00 |

| <i>Table 3. DS8000 series warranty, notices, and licensing publications</i> | |
|---|---|
| Title | Location |
| <i>IBM Warranty Information for DS8000 series</i> | IBM Support Portal website |
| <i>IBM Safety Notices</i> | IBM Systems Safety Notices |
| <i>IBM Systems Environmental Notices</i> | IBM Systems Safety Notices |
| <i>International Agreement for Acquisition of Software Maintenance (Not all software will offer Software Maintenance under this agreement.)</i> | IBM Support Portal website |
| <i>IBM License Agreement for Machine Code</i> | https://www.ibm.com/support/pages/node/631363 |

See the Agreements and License Information CD that was included with the DS8000 series for the following documents:

- License Information
- Notices and Information
- Supplemental Notices and Information

Related websites

View the websites in the following table to get more information about DS8000 series.

| <i>Table 4. DS8000 series related websites</i> | |
|--|---|
| Title | Description |
| IBM Support Portal website | Find support-related information such as downloads, documentation, troubleshooting, and service requests and PMRs. |
| IBM Directory of Worldwide Contacts website (www.ibm.com/planetwide) | Find contact information for general inquiries, technical support, and hardware and software support by country. |
| IBM DS8000 series website (www.ibm.com/servers/storage/disk/ds8000) | Find product overviews, details, resources, and reviews for the DS8000 series. |
| IBM Redbooks® (www.redbooks.ibm.com/) | Find technical information developed and published by IBM International Technical Support Organization (ITSO). |
| IBM System Storage® Interoperation Center (SSIC) website(www-03.ibm.com/systems/support/storage/ssic/interoperability.was) | Find information about host system models, operating systems, adapters, and switches that are supported by the DS8000 series. |
| IBM Data storage feature activation (DSFA) website (www.ibm.com/storage/dsfa) | Download licensed machine code (LMC) feature keys that you ordered for your DS8000 storage systems. |

Table 4. DS8000 series related websites (continued)

| Title | Description |
|---|--|
| IBM Fix Central (www-933.ibm.com/support/fixcentral) | Download utilities such as the IBM Easy Tier® Heat Map Transfer utility. |
| IBM Java™ SE (JRE) (www.ibm.com/developerworks/java/jdk) | Download IBM versions of the Java SE Runtime Environment (JRE), which is often required for IBM products. |
| IBM Security Guardium Key Lifecycle Manager online product documentation (www.ibm.com/docs/en/sgklm) | This online documentation provides information about IBM Security Guardium Key Lifecycle Manager, which you can use to manage encryption keys and certificates. |
| IBM Spectrum Control online product documentation in IBM Documentation (www.ibm.com/docs/spectrum-control) | This online documentation provides information about IBM Spectrum Control, which you can use to centralize, automate, and simplify the management of complex and heterogeneous storage environments including DS8000 storage systems and other components of your data storage infrastructure. |
| DS8900F Code Bundle Information website (www.ibm.com/support/docview.wss?uid=ibm11072022) | Find information about code bundles for DS8900F. The version of the currently active installed code bundle displays with the DS CLI <code>ver</code> command when you specify the <code>-l</code> parameter. |

Sending comments

Your feedback is important in helping to provide the most accurate and highest quality information.

Procedure

To submit any comments about this publication or any other IBM storage product documentation:

- Send your comments by email to ibmdocs@us.ibm.com. Be sure to include the following information:
 - Exact publication title and version
 - Publication form number (for example, GA32-1234-00)
 - Page, table, or illustration numbers that you are commenting on
 - A detailed description of any information that should be changed

Summary of Changes

DS8000 series introduces the following enhancements. For DS8000 series information, see the *IBM DS8000 Introduction and Planning Guide* for your specific model.

Version 9, Release 3, Modification 2

This table provides the current technical changes to the DS8000 series.

| Function | Description |
|-------------------|---|
| Modified commands | <ul style="list-style-type: none">• The commands lsauthpol, mkauthpol, and testauthpol are now updated to support Multi-factor authentication (MFA) policies. New MFA authentication policies with policy types of RSA and RSA+LDAP support RSA SecurID Authentication Manager. For more information, see “lsauthpol” on page 286, “mkauthpol” on page 293, and “testauthpol” on page 328.• The output of the command showauthpol is enhanced to display the attributes related to communicating with an MFA server for new authentication policies of type RSA and RSA+LDAP. For more information, see “showauthpol” on page 316.• The command setauthpol is enhanced to support configuring attributes required for communicating with an MFA server for new authentication policies of type RSA and RSA+LDAP. For more information, see “setauthpol” on page 298. |

Chapter 1. Installing, upgrading, and uninstalling the DS CLI

Before you decide to install the DS CLI on your system, familiarize yourself with the operating systems that support this application. Consider the tasks that are involved in upgrading your system. Keep in mind the operational limitations that are associated with the DS CLI.

Note: You can install the DS CLI using the DS CLI installation CD by using the procedures described in the following sections. The DS8000 Storage Management GUI enhancement features an Embedded DS CLI window that you can use to conveniently enter DS CLI commands. You can use the window to enter commands or scripts for the DS CLI. You do not have to install the DS CLI to access and process DS CLI commands.

The DS CLI installation CD comes with the release bundle documentation. The installation CD ISO image files are also available online. See "Release notes" in the [IBM Documentation](#).

Operating systems that support the DS CLI

The DS command-line interface (CLI) can be installed on a variety of operating systems. Refer to the list of operating systems to ensure that your operating system software and its version can support the installation of the DS CLI.

You can install the DS CLI on machines that use one of the following operating systems:

- AIX® 7.1, 7.2
- IBM i 7.2
- Linux®, Red Hat® Enterprise Linux [RHEL] 7
- Linux, SUSE Linux, Enterprise Server (SLES) 12
- Microsoft Windows 8, 8.1, 10
- Oracle Solaris 11
- VMware ESX 6 Console
- z/OS® 1.13, 2.1, 2.2, 2.3

Note: z/OS is supported on Copy Services Manager. You can install the DS CLI along with Copy Services Manager on z/OS installations.

Installing the DS CLI

On most systems you can install the DS CLI using a silent mode, console mode, or by using a GUI application mode.

Requirements

The DS CLI can be used by open systems hosts to start and manage FlashCopy® and Metro and Global Mirror functions through batch processes and scripts. This information provides key considerations for a DS CLI installation on various supported operating systems.

General preinstallation specifics for supported operating systems

The following list provides information for installing the DS CLI on one of the supported operating systems. This information includes the location of the installers for each supported operating system. The installers are installed in the images\HMC\Disk1\InstData directory, and sorted into folders by operating system.

- The following table provides the installation file location, by operating system. See the additional instructions that follow this table.

| <i>Table 5. Installation file location by operating system</i> | |
|--|---|
| Supported host systems | Installation file location |
| IBM AIX 7.1, 7.2 | images/ HMC\Disk1\InstData\AIX\NoVM\dsclisetup.bin |
| Linux Red Hat Enterprise Server, RHEL 7 | images/ HMC\Disk1\InstData\Linux\NoVM\dsclisetup.bin |
| Linux, SUSE Linux Enterprise Server (SLES) 12 | images/ HMC\Disk1\InstData\Linux\NoVM\dsclisetup.bin |
| Oracle Solaris 11 | images/ HMC\Disk1\InstData\Solaris\NoVM\dsclisetup.bin |
| IBM i 7.2 | images/ HMC\Disk1\InstData\Windows\NoVM\dsclisetup.exe |
| VMware ESX 6 Console | images/ HMC\Disk1\InstData\Linux\NoVM\dsclisetup.bin |
| Microsoft Windows 8, 8.1, 10 | images/ HMC\Disk1\InstData\Windows\NoVM\dsclisetup.exe |

- Java Platform (Java 8 or later) must be installed on your system. The installation program checks for this requirement during installation and does not install the DS CLI if you do not have Java Platform, Enterprise Edition (Java 8 or later).
- AIX installation considerations.
 - The LIBPATH environment variable can interfere with the installation of the DS CLI and can result in the display of the Java Virtual Machine Not Found Error. To avoid this interference, you must disable the LIBPATH environment variable before you install the DS CLI. After the installation of the DS CLI, you must enable the LIBPATH environment variable so that it can be used with other applications.
 - Run the following commands to sequentially disable the LIBPATH environment variable, install the DS CLI, and restore the LIBPATH environment variable:

```
export LIBSAVE=$LIBPATH
unset LIBPATH
AIX/NoVM/dsclisetup.bin LAX_VM /opt/ibm-Java-whatever/java/bin/java
export LIBPATH=$LIBSAVE
unset LIBSAVE
```

- Windows installation considerations.
 - The User Access Control (UAC) settings for Windows 8 and later, or Windows Server 2012 and later, might not allow for exporting files (by using the **offloadfile** command) to a directory that requires elevated privileges. Unfortunately, the Windows operating system returns success in exporting the files and the **offloadfile** command, but the files do not exist in the specified directory. To work around this problem, complete the following steps:
 - Select a different directory that does not require elevated privileges to create a file.
 - Right-click the DSCLI desktop shortcut and select **Run as Administrator**.
- IBM i model installation considerations.

Note: The installation of DS CLI on an IBM i model is done remotely from a Windows platform. You cannot run the DS CLI installer directly on an IBM i model.

The IBM i model and i5/OS must meet the following requirements before the DS CLI can be installed:

- Prerequisites include

- The latest Java group program temporary fixes (PTF)
- i5/OS 5722-SS1 option 34 - Digital certificate manager
- If you are installing onto an IBM i model, ensure that the workstation from which you are installing is network-attached to the iSeries server.
- During the installation of the DS CLI onto an IBM i model, provide the following information:
 - The name of the IBM i server to which you are installing the DS CLI.
 - The user name and password that are used to access the designated IBM i server.
- The IBM i TCP attributes for FTP must be set to the library format (the default) when you install the DS CLI. Use the following steps to ensure that the files can be moved to the IBM i partition during the installation:
 - Collect the current attributes for NAMEFMT, CURDIR (listed on the CHGFTPA command).
 - Enter the following command: CHGFTPA NAMEFMT(*LIB) CURDIR(*CURLIB)
 - Restart the FTP server on the IBM i partition.
 - Install the DS CLI.
 - Restore the attributes for NAMEFMT, CURDIR collected in step 1 with the CHGFTPA command.
 - Restart the FTP server again.
- When you install the DS CLI onto an IBM i model, a `_uninst` folder is created on the Windows desktop. Save this folder for uninstallation in the future.
- The installation process installs the DS CLI in the following default directories:

AIX

`/opt/ibm/dscli`

Linux

`/opt/ibm/dscli`

Oracle Solaris

`/opt/ibm/dscli`

Windows, 32-bit system

`C:\Program Files\IBM\dscli`

Windows, 64-bit system

`C:\Program Files (x86)\IBM\dscli`

IBM i

`/ibm/dscli`

VMware

`/opt/ibm/dscli`

z/OS

`/opt/IBM/CSMDSCLI/dscli`

- z/OS is supported on CSM Version 6.1.4 and later. You can install the DS CLI along with Copy Services Manager on z/OS installations. The DS CLI runs under UNIX Services for z/OS and has a separate function modification identifier (FMID) HIWN61K.

You can also install the DS CLI separately from Copy Services Manager. For more information, see the *IBM DSCLI on z/OS Program Directory* for more information. Use the order number (GI13-3563) to search for the publication from the IBM Publications Center website (<https://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>)

- Regardless of the operating system and DS series that you use, activate your license activation codes (part of the DS Storage Management GUI postinstallation instructions). Then, you can use the CLI commands that are associated with Copy Services functions.

Overview of installation methods

The following information provides an overview of the installation methods that are supported and how to access them.

You can install the DS CLI by using one of several methods.

- Graphical mode
- Console mode
- Unattended (silent mode)

Requirements and restrictions

Note the following requirements before you install the DS CLI:

- You must have a version of Java 1.8 or later that is installed on your system in a standard directory. The DS CLI installer checks the standard directories to determine whether a version of Java 1.8 or later exists on your system. If this version is not found in the standard directories, the installation fails.

Note: Ensure that you use Java 1.8 or later.

- If the DS CLI is installed on your client or host system, you must end any active sessions of the DS CLI before you run the DS CLI installation CD.
- IBM and i5/OS installations have the following requirements:
 - The latest Java group program temporary fixes (PTF)
 - The i5/OS 5722-SS1 option 34 - Digital certificate manager
 - The workstation that you are installing from must be connected to the i5/OS through an IP connection.
- You can use the `-i` parameter to specify any user interface mode when you install the DS CLI: **-i [gui | console | silent]**. You do not have to specify the mode in the command unless you want to use something other than the default mode.
 - The default mode for installing Windows is **gui**.
 - The default for UNIX and Linux is **console** mode.
- While in console mode, you can type `back` to return to the previous screen, or `quit` to exit the installation.

Graphical mode

To install the DS CLI by using the graphical mode, start the setup file that is appropriate for your operating system and proceed through the installation panels.

You can find the setup file on the installation CD by navigating to `images/HMC/Disk1/InstData`, and then selecting your platform to find the appropriate setup file. For example, in Windows, the path would be `images/HMC/Disk1/InstData/Windows/NoVM/dsclisetup.exe`.

Console mode

The console mode is primarily used for installations on a Linux operating system or on a UNIX operating system without an X display. You can run the installer from a command prompt on a Windows operating system.

Complete the following steps to install the DS CLI by using the console mode:

1. Insert the DS CLI Installation CD into the CD drive.
2. Open a command prompt and navigate to the location of the `dsclisetup` file on the DS CLI CD. You can find the setup file by navigating to `images/HMC/Disk1/InstData`, and then selecting your platform to find the appropriate setup file. For example, in Windows the path would be `images/HMC/Disk1/InstData/Windows/NoVM/dsclisetup.exe`.

3. Type the following on the command line: **dsclisetup<.exe | .bin> -i console**
 - For Windows, type: `dsclisetup.exe -i console`
 - For Linux, type: `dsclisetup.bin -i console`
 - For an installation onto an IBM i system from a Windows operating system, type: `setupwin32console.exe -os400`
4. Proceed through the rest of the installation windows.

Unattended (silent mode)

Using the unattended (silent) mode of installation, you can install the DS CLI from the command line using default selections without prompts or feedback. You can create a configuration file and use a text editor to change the default installation selections.

To install the DS CLI in unattended (silent mode), complete the following steps:

1. Log on to your system as an administrator.
2. Insert the DS CLI installation CD into the CD drive.
3. Open a command prompt and navigate to the location of the `dsclisetup` file on the DS CLI CD. You can find the setup file by navigating to `images/HMC/Disk1\InstData`, and then selecting your platform to find the appropriate setup file. For example, in Windows the path would be `images/HMC/Disk1\InstData\Windows\NoVM\dsclisetup.exe`.
4. Issue the following command at the command prompt: **dsclisetup.exe -i silent**. Press the **Enter** key on your keyboard to start the installation process in unattended (silent) mode.

The silent installation process applies all the default options to your installation. If you want to modify the default options, go to the next step.

Note: Initially the DS CLI installer checks your standard directories for the correct version of Java. If the correct version of Java is not found, you receive the following message:

- If you are using Windows, the following message is displayed:

```
LaunchAnywhere Error: Could not find a valid Java virtual
machine to load.
```

You may need to reinstall a supported Java virtual machine.

- If you are using UNIX or Linux, the following message is displayed:

```
No Java virtual machine could be found from your PATH
environment variable. You must install a VM prior to
running this program.
```

If you receive this message, see [“Correcting the Java virtual machine not found error”](#) on page 6.

5. Optionally, you can generate a configuration file in a non-silent mode, then use this file in subsequent silent installs. For example:
 - a. Execute the following command to install a sample instance of dscli. **dsclisetup.exe -r "c:\install.properties"** The resulting file, `install.properties`, will contain all of the install settings.
 - b. Modify the settings in `install.properties` if needed.
 - c. You can use this generated configuration file in silent installs with the following command: **dsclisetup.exe -i silent -f "c:\install.properties"**

Post-installation notes

Notes:

1. The DS CLI is installed in the following two places in i5/OS:
 - IFS directory `IBM/DS_CLI`. This directory contains the profiles, .EXE files, Java .JAR files, readme files, and so on.

- The QDSCLI library. This library contains executable code.

Note: Beginning in Version 6 Release 1, the QDSCLI library output is stored in the output file that you specified in the DS CLI. Errors will be stored in a file of the same name with `.error` appended to it. If you programmed anything using the output, update your programs to look in both the specified file and the `.error` file to get a complete view of the results.

2. Before you can start the DS CLI from the i5/OS, you must add the QDSCLI library to the i5/OS library list.
3. You can check the following directories to verify that the DS CLI has been installed for your operating system:

AIX

`/optibm/dscli`

Linux

`/optibm/dscli`

Oracle Solaris

`/optibm/dscli`

Windows

(32-bit) `C:\Program Files\IBM\dscli`

(64-bit) `C:\Program Files (x86)\IBM\dscli`

IBM i

`/ibm/dscli`

z/OS

`/opt/IBM/CSMDSCLI/dscli`

Correcting the Java virtual machine not found error

Complete this task to correct the Java Virtual Machine Not Found error.

About this task

The Java Virtual Machine Not Found error occurs when the DS CLI installer cannot find the correct version of Java in the standard directories of your system. You must have Java 8 or later on your system for the DS CLI to work.

Notes:

1. This error might also occur if you are installing the DS CLI on an AIX system. The LIBPATH environment variable can interfere with the installation of the DS CLI and can result in the display of the Java Virtual Machine Not Found error. To prevent this error, disable the LIBPATH environment variable before you install the DS CLI. After the installation of the DS CLI, enable the LIBPATH environment variable so that it can be used with other applications.

If Java 8 or later is not found during the initial check, the following message is displayed:

- If you are using Windows, the following message is displayed:

LaunchAnywhere Error: Could not find a valid Java virtual machine to load.

You may need to reinstall a supported Java virtual machine.

- If you are using UNIX or Linux, the following message is displayed:

No Java virtual machine could be found from your PATH environment variable. You must install a VM prior to running this program.

After you ensure that Java 8 or later is installed, complete one of the following actions to correct the Java Virtual Machine Not Found error:

- Run the DS CLI installer again from the console, and provide the path to the JVM using the LAX_VM option. The following examples represent paths to the correct version of Java:

- For a Windows system, specify the following path:

```
dsclissetup.exe LAX_VM "C:\Program Files\java-whatever\jre\bin\java.exe"
```

Note: Due to a space in the Program Files directory name, you are required to add quotation marks around the directory name.

- For a UNIX or Linux system, specify the following path:

```
dsclissetup.bin LAX_VM /opt/ibm-Java-whatever/java/bin/java
```

Note: If you use the LAX_VM argument, the installer attempts to use whatever JVM that you specify, even if it is an unsupported version. If an unsupported version is specified, the installation might complete successfully, but the DS CLI might not run and return an `Unsupported Class Version Error` message. You must ensure that you specify a supported version.

- Continue with the installation of the DS CLI.

- (For UNIX or Linux) Add the Java virtual machine location to your PATH environment variable by running the following command:

```
export PATH=$PATH:/opt/ibm-Java-whatever/java/bin
```

Then, run the dsclissetup.bin program to install the DS CLI.

- (AIX only) Run the following commands to sequentially disable the LIBPATH environment variable, install the DS CLI, and restore the LIBPATH environment variable:

```
export LIBSAVE=$LIBPATH
unset LIBPATH
dsclissetup.bin LAX_VM/opt/ibm-Java-whatever/java/bin/java
export LIBPATH=$LIBSAVE
unset LIBSAVE
```

Upgrading the DS CLI on your system

You can upgrade the DS CLI on your system by following the removal and installation procedures.

There are considerations and preparation that you must make before you make this upgrade.

Notes:

1. The DS CLI installation program changed from the InstallShield MultiPlatform installer to the InstallAnywhere installer, which reduced many restrictions.
2. Installations of multiple DS CLIs using the InstallShield MultiPlatform installer are not supported.
3. Installations of multiple DS CLIs using the InstallAnywhere installer (with up to one DS CLI using the ISMP installer is supported).
4. As a result of supporting multiple DS CLI installations, the DS CLI location is no longer added to the Windows PATH environment variable. This might cause any existing shell scripts to fail if they rely on the DS CLI program location being in the PATH variable. To fix this problem, you can choose from one of the following solutions:
 - You can set the default DS CLI location by manually adding it to the PATH environment variable.
 - You can use the full DS CLI path name in all of the DS CLI scripts that you use.
 - You can write a script to change to a specific DS CLI location, then run the rest of your scripts by using that DS CLI location.
 - You can change the PATH environment variable so it is using the correct DS CLI location before calling each script.

As part of your upgrade preparation, consider the following items:

- If the DS CLI was previously installed with the InstallShield MultiPlatform installer, an upgrade requires that you remove the existing DS CLI and that you install the upgraded DS CLI. This method is the most certain way to ensure that you receive an error-free installation. However, this removal and installation process can be a concern where you have customized the system profile file. A reinstallation can most likely overwrite your current system profile file. If you want to keep your current system profile file, complete the following tasks:

1. Make a copy of your current system profile file and save it in a convenient place.
2. Merge the saved system profile file into the new system profile file in the DS CLI installation directory after the installation completes. Therefore, you can keep any customized variables, and retain any new variables in the system profile file that was installed with the upgraded DS CLI.

Note: Personal profiles that are not saved under the DS CLI installation directory are not affected by the upgrade process.

Uninstalling the DS CLI

You can uninstall the DS CLI by using the same modes that are allowed by the operating systems during the installation process. For example, you can use the graphical (swing) mode, unattended (silent) mode, or console mode to install this interface. Conversely, you can remove this interface by using the graphical (swing) mode, unattended (silent) mode, or console mode.

The following topics describe the steps that are required to successfully remove the DS command-line interface.

Overview of uninstallation methods

The following information provides an overview of the uninstallation methods that are supported and how to access them.

Uninstalling the DS CLI by using the graphical mode

Complete the following steps to uninstall the DS CLI from your system when the DS CLI is installed on a Windows or UNIX system.

Note: If you do not want to create a new profile when you reinstall the CLI, select to not delete the DS CLI profile as you complete this task, or copy the profile file to a safe place before you uninstall the CLI.

1. Navigate to the location where the DS CLI was installed. For example, on Windows the path might be C:\Program Files\ibm\dscli. On UNIX or Linux systems, the location might be /opt/ibm/dscli.
2. Open the `_uninst` directory to access the uninstaller. (On Windows, C:\Program Files\ibm\dscli_uninst\uninstaller.exe; on UNIX or Linux systems, /opt/ibm/dscli/_uninst/uninstaller.)
3. From the command prompt, specify the `-i swing` parameter to open the uninstaller in graphical mode. The Uninstall Storage Command Line Interface window is displayed. Click **Uninstall** to complete the uninstallation process, or **Cancel** to cancel the uninstallation.

Alternately, you can use the Add/Remove Programs facility of the Windows operating system to uninstall the DS CLI from your system.

Uninstalling the DS CLI by using unattended (silent) mode

Use the unattended (silent) mode to uninstall the DS CLI through the command line if the DS CLI is installed on any system other than IBM i i5/OS.

Open a command prompt and type: `<install_directory_path>/_uninst/uninstaller -i silent`. Then press **Enter** to remove the DS CLI.

Uninstalling the DS CLI by using the console mode

Use the console mode to uninstall the DS CLI when the DS CLI is installed on a UNIX system that does not have an X display.

Open a command prompt and type: `<install_directory_path>/_uninst/uninstaller -i console`. Then press **Enter** to display the Uninstall Storage Command Line Interface page. Press **Enter** again to complete the uninstallation.

Uninstalling the DS CLI from an IBM i model

Because the DS CLI is installed on an IBM i model from a remote system, it is not possible to use the conventional DS CLI removal methods that you use with other systems.

When the DS CLI was installed onto your IBM i model, you used a remote system for the installation (for example, Windows, UNIX or AIX). Part of the installation process is the creation of an uninstaller. However, because you were using another system to do your installation, the uninstaller that was created was for the system that you installed from and not for the IBM i model. This uninstaller cannot be used to uninstall the DS CLI.

When you want to uninstall the DS CLI, you can use one of the following two methods:

- Uninstall directly from your i5/OS IBM i model by completing the following steps:
 1. Delete the library by using DLTLIB QDSCLI.
 2. Run the command, EDTF 'DSCLI_INSTALL_PARENT', where 'DSCLI_INSTALL_PARENT' is the parent directory of the DS CLI installation. The default parent directory is /ibm.
 3. Insert a 9 (recursive delete) beside the DS CLI directory to remove all DS CLI java code.

You might use this method if you are not planning to upgrade the DS CLI and you want to totally uninstall the DS CLI from your IBM i model.

- Uninstall by using a remote system.

You might use this method when you are upgrading the DS CLI, because after the removal, you can use this remote system to install the upgraded DS CLI.

Uninstalling the DS CLI using your IBM i model directly

Note: The i5/OS direct removal method requires that you use the i5/OS console mode and that you use an i5/OS command. The following steps presume that you are logged in to the i5/OS and have the authority to remove applications.

To uninstall the DS CLI using your IBM i model directly, enter the following command from your i5/OS application:

```
RUNJAVA CLASS(run) PARM('-console')  
CLASSPATH('/Q IBM/ProdData/Java400/jt400ntv.jar:/yourdir/_uninst  
/uninstall.jar')
```

Substitute your uninstall directory for *yourdir*.

Uninstalling the DS CLI from your IBM i model using the remote method

To remove the DS CLI from your IBM i model using the remote method, go to the _uninst folder on the Windows desktop and run the uninstaller.exe file.

Running and configuring the DS CLI

Complete these tasks to set up the DS CLI so that you can use the DS CLI to configure your storage system.

Before you begin

You must install the DS CLI before you complete these postinstallation tasks. See [Chapter 2, “Running the DS CLI,”](#) on [page 25](#) for information about running the DS CLI, obtaining help, and interpreting exit codes.

About this task

Note: Before you can use the DS CLI with the i5/OS, if you are using external load source, you must set up the initial configuration of your storage system. After the initial configuration, you can do a D-mode IPL

and begin using the DS CLI directly from the i5/OS. In the meantime, you can follow the list below as a guide for your initial configuration.

Procedure

Complete these tasks to complete the installation of the DS CLI:

1. Set your DS CLI default configuration settings.
 - If this is a new installation, complete the rest of this procedure.
 - If this is not a new installation, do not complete the following steps.
2. Initiate the DS CLI to begin using it in either single-shot, script, or interactive command mode.
3. Set up your required user accounts and passwords.
4. Activate your licensed functions. This includes obtaining your feature activation codes and applying the feature activation codes to your storage unit.
5. Use the DS CLI to enable SNMP traps for Copy Services events and storage complex events on your storage unit.
6. Optionally, configure encryption on your encryption-capable storage unit.
7. Configure new fixed block or CKD storage.

Use the DS CLI to create and modify fixed block extent pools, arrays, ranks, volumes, and volume groups. You can also configure host ports and connections.

Creating a default CLI profile

You can specify default settings for the CLI by defining one or more profiles on the system. For example, you can specify the default output format for list commands, the primary and secondary storage manager IP addresses for the storage system, or the storage image ID that is required by many commands.

If a user enters a value with a command that is different from a value in the profile, the command overrides the profile.

The following options are available for profile files:

- You can modify the default profile. The default profile, `dscli.profile`, is installed in the profile directory with the software. For example, `c:\Program Files (x86)\IBM\dscli` is the directory path for operating systems Windows 7 and later. The directory path for operating systems UNIX and Linux is `/opt/ibm/dscli/profile/dscli.profile`.

Note: Changing the default profile changes the DS CLI default settings for all users. If you do not want to change the DS CLI default settings for all users, consider creating a personal default profile instead.
- You can create a personal default profile by making a copy of the system default profile as `<user_home>/dscli/profile/dscli.profile`.
- You can create a profile for a specific storage system by making a copy of the system default profile and specifying the primary and secondary management console IP addresses and the storage image ID. For example:

```
<user_home>\dscli\profile\DS8000_name1
<user_home>\dscli\profile\DS8000_name2
```
- You can create a profile for the storage unit operations, typically for Copy Services commands, by starting with a specific storage system profile and then adding the remote storage image ID. For example:

```
<user_home>\dscli\profile\operation_name1
<user_home>\dscli\profile\operation_name2
```

These profile files can be specified using the DS CLI command parameter **-cfg <profile_name>**. Profile names are not required to use the `.profile` file name extension or any extension. However, the `-cfg profile_name` parameter must be a complete file name, including the extension if one is specified. Also, if the profile is stored in the user's personal profile directory at `<user_home>\dscli\profile`, you need

to specify only the file name. If the profile is stored in any other directory, the *<profile_name>* must also include the full path name. If the `-cfg` profile file is not specified, the user's default profile file is used. If a user's profile file does not exist, the system default profile file is used.

The home directory *<user_home>* is defined by the Java system property named `user.home`. The location of your home directory is determined by your operating system. The following examples are home directories in different operating systems:

Windows 7 and later operating systems

For Windows 7 and later operating systems, the property value defaults to the environment variable **%USERPROFILE%** in a directory called `c:\Users\Administrator`.

UNIX or Linux operating systems

For a UNIX or Linux operating system, the property value defaults to the environment variable **\$HOME**. As a result, your personal profile is `~/dscli/profile/dscli.profile`.

When you install the DS CLI, the default profile is installed in the profile directory with the software. The file name is `dscli.profile`; for example, `c:\Program Files (x86)\IBM\dscli\profile\dscli.profile`.

The following steps provide a Windows example of the process you can use to modify key items in the profile file:

1. Click the DSCLI icon on your desktop. A command prompt window is displayed.
2. Enter `cd profile` at the command prompt to move to the system default profile directory.
3. Edit the profile file with a text editor such as NotePad or WordPad.
4. Scroll down to the number (#) sign in front of `hmc1:` and remove the # sign.
5. Enter the correct IP address of your management console.
6. If this is a dual HMC storage system, perform steps 4 and 5 for `hmc2`.
7. Scroll down to the # sign in front of `devid` and remove the # sign.
8. Enter the serial number of your machine type (include the values for manufacture, machine type, and serial number). For example, `IBM.2107-75YZ881`.
9. Save the file.
10. Enter `cd . .` at your command prompt.
11. Enter DSCLI at your command prompt and the DS CLI starts. You are asked to provide only your user ID and password and not the address of your management consoles.

Table 6 on page 11 provides the list of profile variables that you can use to create the profile.

Table 6. Profile variables

| Variable | Description |
|-----------------------------------|--|
| <code>username: string</code> | Specifies your user name for entering DS CLI commands. This variable is equivalent to option -user . |
| <code>password: string</code> | Specifies the password to authenticate when you start a CLI session. This parameter is not required nor recommended. If you use this method to designate your password, the password is displayed on the screen. Another option is to specify a password file (<code>pwfile</code>) that is used when you start the DS CLI. This variable is equivalent to option -passwd . |
| <code>pwfile: passwordfile</code> | Specifies a password file containing your password as an alternative to the variable <code>password</code> . This variable is equivalent to option -pwfile . |
| <code>banner: on off</code> | Enables or disables the banner that appears before the command output. This variable is equivalent to the command option -bnr . The command option -bnr overrides this default value. |

Table 6. Profile variables (continued)

| Variable | Description |
|-------------------------------------|---|
| delim: <i>character</i> | Specifies a delimiter character for the format: delim variable. The default character is a comma. This variable is equivalent to the command option -delim . The command option -delim overrides this default value. |
| devid: <i>string</i> | Specifies the storage image ID that is the target for the command. This value is equivalent to the command option -dev . The command option -dev overrides this default value. |
| echo: on off | Specifies whether the command is printed before it is executed. Specify one of the following formats: <ul style="list-style-type: none"> • on: Specifies that the command is printed before it is executed. • off: Specifies that the command is not printed before it is executed. |
| echoprefix: <i>prefix</i> none | Specifies the command prefix to print before a command is executed. <ul style="list-style-type: none"> • echoprefix: Specifies the prefix to print before a command is executed. If echo is on and echoprefix is specified, then its value is to be printed on the line before the echoed command. • none: Specifies that no prefix is to be printed before an echoed command. |
| format: <i>option</i> | Specifies the output format for list commands. Specify one of the following formats: <ul style="list-style-type: none"> • default: Specifies default output. • xml: Specifies XML format. • delim: Specifies columnar format. Columns are delimited with the character that you must specify with the delim variable. • stanza: Specifies a vertical table. This variable is equivalent to the command option -fmt . The command option -fmt overrides this default value. |
| fullid: on off | Specifies that IDs display in fully qualified format, which includes the storage image ID. |
| header: on off | Enables or disables the headers that display with the columns of data in the list commands. This variable is equivalent to the command option -hdr . The command option -hdr overrides this default value. |
| hmc1: <i>string</i> | Specifies the primary Storage Manager IP address. This variable is equivalent to the command option -hmc1 . The command option -hmc1 overrides this default value. |
| hmc2: <i>string</i> | Specifies the secondary Storage Manager IP address. This variable is equivalent to the command option -hmc2 . The command option -hmc2 overrides this default value. |

Table 6. Profile variables (continued)

| Variable | Description |
|---------------------|---|
| locale: <i>code</i> | Specifies the language for the output on the local computer. <ul style="list-style-type: none">• ar: Arabic• be: Byelorussian• bg: Bulgarian• ca: Catalan• cs: Czech• da: Danish• de: German• el: Greek• en: English• es: Spanish• et: Estonian• fi: Finnish• fr: French• gu: Gujarati• hi: Hindi• hr: Croatian• hu: Hungarian• in: Indonesian• is: Icelandic• it: Italian• iw: Hebrew• ja: Japanese• kk: Kazakh• kn: Kannada• ko: Korean• lt: Lithuanian• lv: Latvian (Lettish)• mk: Macedonian• mr: Marathi• ms: Malay |

Table 6. Profile variables (continued)

| Variable | Description |
|------------------------------|---|
| locale: <i>code</i> | <ul style="list-style-type: none">• nl: Dutch• no: Norwegian• pa: Punjabi• pl: Polish• pt: Portuguese• ro: Romanian• ru: Russian• sa: Sanskrit• sh: Serbo-Croatian• sk: Slovak• sl: Slovenian• sq: Albanian• sr: Serbian• sv: Swedish• ta: Tamil• te: Telugu• th: Thai• tr: Turkish• uk: Ukrainian• vi: Vietnamese• zh: Chinese |
| maxNumReports: <i>number</i> | <p>Sets the maximum number of records (lines) for an I/O Performance Manager performance report.</p> <p>Note: The default maximum number of records for a performance report is 256. The value for maxNumReports is recommended to be no larger than 3000. If the target is a DA pair, the recommended value is to be no larger than 1500.</p> |

Table 6. Profile variables (continued)

| Variable | Description |
|-----------------------------------|---|
| port: 1718 1750 1751 | <p>Specifies the port that the DS CLI should use when connecting to the storage system. If the port is not specified, the DS CLI first attempts to connect using port 1751 with a NIST-compliant certificate. If that connection attempt fails, it attempts to connect to the existing storage system port 1750 with the legacy certificate. If the second attempt fails, the DS CLI attempts to connect to port 1718 with the legacy certificate used by ESS 2105 machines. This default behavior means that the DS CLI will connect to any ESS 2105 or this storage system. This default behavior means that the DS CLI will connect to any ESS 2105 or storage system. However, checking multiple ports can cause a connection delay when a Release 7.2 or later DS CLI attempts to connect to a storage system or ESS 2105 machine that does not listen on the 1751 port. To prevent the additional delay, you can use this variable to specify a single attempt on the specified port.</p> <p>1718 Attempt to connect using only port 1718 (ESS 2105 with legacy certificate).</p> <p>1750 Attempt to connect using only port 1750 (prior to Release 7.2 with legacy certificate).</p> <p>1751 Attempt to connect using only port 1751 (Release 7.2 and later with NIST SP 800-131a-compliant certificate).</p> |
| paging: on off | <p>Controls the display of output. If paging is enabled, a limited number of lines of output displays when a command is issued. The lines do not scroll. You must set the number of lines per page with the rows variable. This variable is equivalent to command option -p. The command option -p overrides this default value.</p> |
| timeout: <i>number</i> | <p>Sets the timeout value of client/server synchronous communication. The unit of the value is seconds. The default value is 900 seconds. You can set this timeout if the processing of a command ends by timeout due to network or client or server performance issue.</p> <p>Note: The command timeout value can be longer than this value because one command can consist of multiple client/server requests.</p> |
| timeout.connection: <i>number</i> | <p>Sets the timeout value to establish client or server connection. The unit of this value is seconds. The timeout value must be greater than zero. System-default socket timeout value is used if the value is set to zero. The default value is 20 seconds.</p> <p>Notes:</p> <ol style="list-style-type: none">1. If the DS CLI returns a connection error, check for the following conditions:<ul style="list-style-type: none">• Is there a secure physical connection between the client and server?• Is the default timeout value too short to establish a connection?2. Setting a connection timeout value that is too short can cause unexpected connection problems. |

Table 6. Profile variables (continued)

| Variable | Description |
|----------------------------|---|
| remotedevid: <i>string</i> | Specifies the remote storage image ID. This variable is equivalent to the command option -remotedev . The command option -remotedev overrides this default value. |
| rows: <i>number</i> | Specifies the number of rows per page of output if the paging variable is enabled. This variable is equivalent to command option -r . The command option -r overrides this default value. |
| verbose: on off | Enables or disables verbose output. This variable is equivalent to the command option -v . The command option -v overrides this default value. |

Example

```
#
# DS CLI Profile
#

#
# Management Console/Node IP Address(es)
# hmc1 and hmc2 are equivalent to -hmc1 and -hmc2 command options.
#hmc1: 127.0.0.1
#hmc2: 127.0.0.1

#
# Default target Storage Image ID
# "devid" and "remotedevid" are equivalent to
# "-dev storage_image_ID" and "-remotedev storage_image_ID" command options,
# respectively.
#devid: IBM.2107-AZ12341
#remotedevid: IBM.2107-AZ12341

# pwfile
# Specifies a password file containing your password as an alternative
# to the variable of password.
# pwfile is equivalent to command option -pwfile
# Example: pwfile:c:/mydir/75CNF11/pwfile.txt
#
# locale
# Default locale is based on user environment.
#locale: en

# Timeout value of client/server synchronous communication in second.
# DSCLI command timeout value may be longer than client/server communication
# timeout value since multiple requests may be made by one DSCLI command
# The number of the requests made to server depends on DSCLI commands.
# The default timeout value is 900 seconds.
#timeout: 900

# Socket connection timeout value in seconds.
# The timeout value must be greater than zero.
# System default socket timeout value is used if timeout value is set to zero.
# The default connection timeout value is 20 seconds.
#timeout.connection: 20

# Output settings
#
# ID format of objects:
# on: fully qualified format
# off: short format
fullid: off

# Paging and Rows per page.
# paging enables/disables paging the output per line numbers specified by "rows".
# "paging" is equivalent to "-p on|off" option.
# on : Stop scrolling per output lines defined by "rows".
# off : No paging. (default)
# "rows" is equivalent to "-r #" option.
paging: off
#rows: 24

# Output format type for ls commands, which can take one of the following values:
# default: Default output
# xml : XML format
```

```

# delim : delimit columns using a character specified by "delim"
# stanza : Horizontal table format
# "format" is equivalent to option "-fmt default|xml|delim|stanza".
#format:      default

# delimiter character for ls commands.
#delim:      |
# Display banner message. "banner" is equivalent to option "-bnr on|off".
# on : Banner messages are displayed. (default)
# off : No Banner messages are displayed.
banner:      on

#
# Display table header for ls commands. "header" is equivalent
# to option "-hdr on|off".
# on : Table headers are displayed. (default)
# off : No table headers are displayed.
header:      on

#
# Display verbose information. "verbose" is equivalent to option "-v on|off".
# on : Display verbose information.
# off : No verbose information.
verbose:     off

# Echo each dscli command.
# on : Echo commands to standard out prior to execution. Passwords within
command line arguments will be hidden.
# off : No command echo. (default)
#echo:on

# If echo is on and echoprefix is specified, its value will be printed on the
line before the echoed command.
#echoprefix:dscli>

# The max number of records for performance report.
# The default max number of records for performance report is 256.
# The value for it is suggested to be
# not larger than 3000. If the target is dapair, the value is
# suggested to be not larger than 1500.
#maxNumReports: 256

# Connection port number used when connecting to the DS8000.
# This is equivalent to -port 1718 | 1750 | 1751
# on the command line. If not specified,
# the DSCLI first attempts to connect using the new port 1751
# with a NIST-compliant certificate, and if that fails, it attempts to connect to existing
# DS8000 port 1750 with the legacy certificate. If the second attempt also fails, the DSCLI
# attempts to connect to port
# 1718 with the legacy certificate used by ESS 2105 machines. While this default
# behavior means that the R7.2+ DSCLI will connect to any ESS 2105 or DS8000, checking multiple
# ports can cause a connection delay when a R7.2+ DSCLI attempts to connect to a DS8000 or ESS
# 2105 that does not listen on the 1751 port. To prevent this additional delay, this variable
# may be used to specify a single attempt on the specified port.

# 1718 : Only attempt to connect using port 1718 (ESS 2105 with legacy certificate).
# 1750 : Only attempt to connect using port 1750 (DS8000 prior to R7.2 with legacy certificate).
# 1751 : Only attempt to connect using port 1751 (DS8000 R7.2+ with NIST compliant certificate).
#port:      1750

# End of Profile

```

Setting up user accounts by using the DS CLI

This task describes how to set up a user account. You must have administrator authority to enable this function.

Before you begin

The default administrator and security administrator accounts are set up automatically at the time of installation. To access the storage administrator account, use the user name *admin* and the default password *admin*. To access the security administrator account, use the user name *secadmin* and the default password *secadmin*. These passwords are temporary and expire after their initial use. You must change the password before you can use any of the other functions. The storage administrator can assign a user to one or more user roles, except for the security administrator role. Only the security administrator

can assign a user to the security administrator role. The user roles and the associated functions that are allowed by the assignment are as follows:

admin (Administrator)

All users that you assign to the storage administrator user role have access to all storage image resources except those that are reserved for security administrator users.

ibm_engineering (Engineering)

This user role is typically assigned to IBM support personnel that perform all service functions and other functions that might be needed. This role does not have access to the logical configuration or data on the storage system.

ibm_service (Service)

This user role is typically assigned to IBM support personnel that service the hardware (install, remote, or repair) and update firmware. This role does not have access to the logical configuration or data on the storage system. Users in this role cannot be assigned to any other role, and users in any other role cannot be assigned to this role.

op_volume (Logical Operator)

The logical operator user role allows access to service methods and resources that relate to logical volumes, hosts, host ports, logical subsystems, logical volumes, and volume groups, excluding security methods. In addition, this user role inherits all authority of the monitor user role.

op_storage (Physical Operator)

The physical operator user role allows access to physical configuration service methods and resources, including storage complex, storage image, array, rank, and extent pool objects. This user role inherits all the authority of the Copy Services operator and logical operator user roles, excluding security methods.

op_copy_services (Copy Services Operator)

The Copy Services operator user role allows access to all Copy Services service methods and resources, excluding security methods. In addition, this user role inherits all authority of the monitor user role.

monitor (Monitor)

The monitor user role allows access to list and show commands. It provides access to all read-only, nonsecurity management console-server service methods and resources.

no_access (No Access)

The no_access user role does not allow access to any service methods or storage image resources. By default, this user role is assigned to any user account in the security repository that is not associated with any other user role.

secadmin (Security Administrator)

All users that you assign to the security administrator user role can initiate recovery key operations, and add other users to this role. Users in this role can not be assigned to any other user role, and users in any other user role can not be assigned to this role.

Table 7. Permissions for roles

| Permission | Admin- istrator | Copy operato r | IBM Engineerin g | IBM Service | Logical operato r | Logical and copy operato r | Physica l operato r | Securit y admin- istrator |
|--------------------------------|--------------------|----------------------|------------------------|----------------|-------------------------|--|------------------------------|------------------------------------|
| Arrays and Pools | | | | | | | | |
| Create pools and assign arrays | X | | | | | | X | |
| Manage pools and arrays | X | | | | | | X | |

Table 7. Permissions for roles (continued)

| Permission | Admin- istrator | Copy operator | IBM Engineerin g | IBM Service | Logical operator | Logical and copy operator | Physica l operator | Securit y admin- istrator |
|---|--------------------|------------------|------------------------|----------------|---------------------|------------------------------------|--------------------------|------------------------------------|
| Delete pools and unassign arrays | X | | | | | | X | |
| IBM Z® Volumes and LSSs | | | | | | | | |
| Configure IBM Z volumes and LSSs | X | | | | X | X | X | |
| Manage IBM Z volumes and LSSs | X | | | | X | X | X | |
| Delete and reinitialize IBM Z volumes | X | | | | X | X | X | |
| Open System Volumes | | | | | | | | |
| Configure open system volumes | X | | | | X | X | X | |
| Manage open system configuration | X | | | | X | X | X | |
| Delete open system configuration | X | | | | X | X | X | |
| IBM i Volumes and LSSs | | | | | | | | |
| Configure IBM i configuration | X | | | | X | X | X | |
| Manage IBM i configuration | X | | | | X | X | X | |
| Delete and reinitialize IBM i configuration | X | | | | X | X | X | |
| Local and Remote Access Management | | | | | | | | |
| Manage security administrators | | | | | | | | X |
| Manage local user accounts | X | | | | | | | |

Table 7. Permissions for roles (continued)

| Permission | Administrator | Copy operator | IBM Engineering | IBM Service | Logical operator | Logical and copy operator | Physical operator | Security administrator |
|---|---------------|---------------|-----------------|-------------|------------------|---------------------------|-------------------|------------------------|
| Manage user roles | X | | | | | | | |
| Manage remote authentication | X | | | | | | | |
| Manage network security | X | | X | X | | | X | |
| Notifications and Monitoring | | | | | | | | |
| Manage SNMP trap notifications | X | | | | | | | |
| Manage system events | X | | | | | | | |
| Offload audit log | X | | | | | | | |
| Manage call home | X | | | | | | | |
| Manage syslog settings | X | | X | X | | | | |
| Remote Support | | | | | | | | |
| Manage Remote Support Center (RSC) connection | X | | | | | | | |
| Manage Assist On-Site (AoS) connection | X | | X | X | | | | |
| Change HMC access settings | X | | X | X | | | X | |
| Troubleshooting | X | | X | X | | | | |
| System Settings | | | | | | | | |
| Manage Fibre Channel port settings | X | | X | X | | | X | |

Table 7. Permissions for roles (continued)

| Permission | Admin- istrator | Copy operator | IBM Engineerin g | IBM Service | Logical operator | Logical and copy operator | Physica l operator | Securit y admin- istrator |
|--|--------------------|------------------|------------------------|----------------|---------------------|------------------------------------|--------------------------|------------------------------------|
| Manage Fibre Channel port security | X | | | | | | | |
| Manage system settings | X | | X | X | | | X | |
| Install software | X | | | | | | | |
| Power off system | X | | X | X | X | X | X | |
| Encryption | | | | | | | | |
| Manage data at rest encryption | X | | X | | | | | |
| Create data at rest recovery key | | | | | | | | X |
| Manage Fibre Channel Port Endpoint Security | X | | X | | | | | |
| Feature Settings | | | | | | | | |
| Modify Ethernet settings | X | | X | X | | | | |
| Modify Easy Tier settings | X | | X | | | | X | |
| Modify zHyperLink settings Note: Not available on DS8882F systems. | X | | | | | | | |
| Manage resource group settings | X | | X | X | | | X | |
| Manage performance group settings | X | | | | | | | |

| Table 7. Permissions for roles (continued) | | | | | | | | |
|--|--------------------|------------------|------------------------|----------------|---------------------|------------------------------------|--------------------------|------------------------------------|
| Permission | Admin- istrator | Copy operator | IBM Engineerin g | IBM Service | Logical operator | Logical and copy operator | Physica l operator | Securit y admin- istrator |
| Manage cloud settings | X | | | | | | | |
| FlashCopy | | | | | | | | |
| Manage FlashCopy relationships | X | X | | | | X | | |
| Manage remote FlashCopy relationships | X | X | | | | X | | |
| Mirroring and Paths | | | | | | X | | |
| Manage mirroring paths | X | X | | | | X | | |
| Manage mirroring relationships | X | X | | | | X | | |
| Modify LSS CS settings | X | X | | | | X | | |

In addition to assigning users to one or more user roles, you also must assign a default password to each user. When you notify users of their role assignment and default password, indicate that the default password is only good for the initial logon. Users must change the password at the time of their initial logon. Also, remind all users to record their password in a safe place because there is no way that the administrator or the application can retrieve a password.

Note: You must change the default password for an account, including the administrator account, to be able to use any CLI command other than the one to change the password. See the **chuser** command for more information.

About this task

Use the **mkuser** DS CLI command to create new user accounts with specific roles (user role or roles) and an initial password. If you assign multiple roles to an account, ensure that you separate the different roles with a comma. For example, `op_volume, op_storage`. See the **mkuser** command description for more details.

Procedure

1. Log in to the DS CLI in interactive command mode.
2. Type the following command from the `dscli` command prompt to assign a user to an account with a default password: `dscli> mkuser -pw AB9cdefg -group service,op_copy_services -pol my_policy1 testuser`
3. Press **Enter** and observe the processing result. A successful process returns the following display:
User Name testuser with my_policy1 successfully created.

Activating your machine and feature licenses by using the DS CLI

Use the steps that are described in this task to activate your license activation codes. These codes must be activated before any configuration can be applied to your DS8000 network.

Before you begin

See the *IBM DS8880 Introduction and Planning Guide* (GC27-8525) for information.

Multiple codes are associated with these features. For a complete list of activation codes, see the IBM Disk Storage Feature Activation (DSFA) website at: [Data storage feature activation \(www.ibm.com/storage/dsfa/\)](http://www.ibm.com/storage/dsfa/)

On the website, enter your machine type, serial number, and machine signature. If you need to acquire the information to complete these fields, issue the DS CLI **showsu** command to show the machine type and serial number, and the **shows** command to show the machine signature.

After the activation codes are available, download the codes in XML format onto a CD or USB drive. You can then import the codes from the XML file when you process the DS CLI **applykey** command.

Notes:

1. For DS8000, in most situations, the DSFA application can locate your 283x license authorization record when you enter the DS8000 (2107) serial number and signature. However, if the 2244 license authorization record is not attached to the 2107 record, you must assign it to the 2107 record in the DSFA application. In this situation, you must have the 283x serial number (which you can find on the License Function Authorization document).

About this task

The DS CLI **applykey** command activates the licenses for your storage unit. The DS CLI **lskey** command verifies which type of licensed features are activated for your storage unit.

Complete the following steps to activate your license activation codes:

Procedure

1. Log in to the DS CLI in interactive command mode.
2. Issue the DS CLI **applykey** command at the dscli command prompt as follows. (This example presumes that your XML file is named "keys.xml" and it resides on a CD or USB drive):
dscli> applykey -file a:\keys.xml -dev IBM.2107-75FA120
3. Press **Enter**. When the process completes, the following message is displayed:
Licensed Machine Code key xxxx, key xxxx successfully applied.
4. Verify that the keys are activated for your storage unit by issuing the DS CLI **lskey** command as follows: lskey -dev IBM.2107-75FA120
5. Press **Enter** and the following type of report is displayed:

| Activation key | Authorization level (TB) | Scope |
|------------------------------|--------------------------|-------|
| Operating environment (OEL) | 45 | All |
| Remote mirror and copy (RMC) | 25 | All |
| Metro mirror (MM) | 25 | All |
| Global mirror (GM) | 25 | All |
| Metro/global mirror (MGM) | 25 | All |
| Remote mirror for z/OS (RMZ) | 25 | CKD |

| Activation key | Authorization level (TB) | Scope |
|-------------------------------|---------------------------------|--------------|
| Point in time copy (PTC) | 25 | All |
| Parallel access volumes (PAV) | 100 | CKD |
| IBM HyperPAV | On | CKD |
| IBM FlashCopy SE | 105 | All |

Chapter 2. Running the DS CLI

You can use the DS CLI in three different command modes.

The following command modes are available:

- Single-shot
- Interactive
- Script

Note: DS CLI logs are created on the system running the DS CLI. The location of the logs is under the user home directory at `dscli/log/`. This location cannot be changed. For example, on Windows the logs for the administrator user are created under the directory `C:\Documents and Settings\Administrator\dscli\log`. On UNIX, the logs are created under the directory `~/dscli/log`.

Logging in to the DS CLI

You must log in to the DS CLI to use any of the command modes.

Before you begin

You must ensure that you are in the directory where you installed the DS CLI, or use the full path name of the DS CLI. The following list provides the location of the default directory for each operating system:

AIX

`/opt/ibm/dscli`

Linux

`/opt/ibm/dscli`

Oracle Solaris

`/opt/ibm/dscli`

Windows

(32-bit) `C:\Program Files\IBM\dscli`

(64-bit) `C:\Program Files (x86)\IBM\dscli`

IBM i

`/ibm/dscli`

z/OS

`/opt/IBM/CSMDCLI/dscli`

About this task

To log in to the DS CLI, open a command prompt and enter `dscli` with the following information:

HMC1

Specify the primary management console.

Note: If you are using a 2105 machine type as part of your network and are going to use the Copy Services functions, you must specify the IP address of the primary or secondary domain control server where you installed the DS CLI.

User Name

Specify the name of the user account. The default user names for the first logins are *admin* and *secadmin*.

Password

Specify the user password. The default password for the administrator account is *admin* and the default password for the security administrator account is *secadmin*. However, these passwords are only good for the first login.

Note: Because the passwords for the administrator and security administrator accounts expire after you log in for the first time, you must change the password before you can perform any other DS CLI command function. Use the **chuser** command to change your password.

Each time you log in to the DS CLI, you can specify this information by using either of the following three methods:

- You can log in to the DS CLI without specifying any of this information on the command line and the application prompts you to enter the information interactively. For example: `/opt/ibm/dscli/dscli`.
- You can log in to the DS CLI by specifying this information on the command line. For example: `dscli -hmc1 mtc032h.storage.tucson.nnn.com -user admin -passwd topn0t`.
- You can log in to the DS CLI by specifying this information on the command line, except for the password, by using the **-pwfile** parameter instead of the **-passwd** parameter. For example: `dscli -hmc1 9.1.12.123 -user admin -pwfile /home/ming/dscli/security.dat`, where "ming" is the user ID used to log in to the operating system. The security.dat file was created by using the DS CLI command **managepwfile**. See the DS CLI command **managepwfile** for more details.

Notes:

1. Entering a DS CLI command at the **dscli** command prompt requires that you continue entering all the parameters and values until the command is complete. This can result in an automatic line wrap if your command has many parameters and values.
2. You cannot force a line break or wrap by pressing the Enter key and then typing the rest of the command on a second line. The DS CLI interprets the use of the Enter key as an end to the function and begins to process whatever is contained on the line, ignoring the second line.
3. The DS CLI command examples are often shown with line wraps that would not occur during your input. These examples are displayed for clarity and other formatting considerations.

Using the DS CLI single-shot command mode

Use the DS CLI single-shot command mode if you want to enter an occasional command but do not want to keep a history of the commands that you entered previously.

About this task

You must supply the login information and enter the command that you want to process at the same time.

Complete the following steps to use the single-shot mode:

Procedure

1. Use the following command format to start a DS CLI session (Windows operating system):

```
dscli -hmc1 192.168.30.15 -user admin -passwd my_password lssi -s -fullid  
-hdr off
```

An example of this same command in IBM i without the report delimiters:

```
DSCLI SCRIPT(*NONE) HMC1('192.168.30.15') USER(admin) PASSWORD(my_password)  
DSCLI(lssi)
```

This command demonstrates the use of the **lssi** command with the **-s** parameter. Use this command to view the storage image IDs for your storage complex. The storage image ID consists of the manufacturer name (IBM), the machine type (2107 or 1750) and the serial number.

Notes:

- a. The command example uses the **-fullid** DS CLI command parameter. The **-fullid** command parameter generates fully qualified IDs, which include the storage image ID, for every ID that is displayed in the command output.
- b. The command example also uses the **-hdr off** command parameter, which turns off the header that is associated with the report that is generated from the **lssi** command.

- c. Almost every DS CLI command requires the use of the storage image ID. You can set it as an environment variable by setting *devid* in the profile file, or by setting *devid* by using the **setenv** command. If you choose not to set it, a default *devid* is used on systems where the management console is aware of only one storage image. If you provide the **-dev** (*storage_image_ID*) parameter in commands, the value that you type takes priority over the *devid* environment variable. If you specify a full ID that contains the storage image ID, the storage image ID that you specify takes priority over the value from the **-dev** (*storage_image_ID*) parameter and over the *devid* environment variable.
2. Wait for the command to process. The following type of report is generated to list the storage image IDs that are associated with the storage complex.
 - IBM.2107-75FA111
 - IBM.2107-75FA112

Using the DS CLI script command mode

Use the DS CLI script command mode if you want to enter a sequence of DS CLI commands. Administrators can use this mode to create automated processes. For example, this mode can be used to establish remote mirror and copy relationships for volume pairs.

Before you begin

Consider the following requirements when you use the DS CLI script command mode:

- The DS CLI script can contain only DS CLI commands. Use of shell commands results in a process failure.
- You can add comments to the scripts. Comments must be prefixed by the number sign (#). For example, `# This script contains PPRC Path establish procedures.`
- Set the *echo* environment variable by using the `dscli` profile file or use the **setenv** command to specify that the `dscli` command name is displayed before the command output.

Note: An example script is displayed for your use as a guide.

About this task

You can enter the DS CLI script from the command prompt at the same time that you provide your login information.

Procedure

1. Enter the script name at the command prompt by using the following format:

```
dscli -hmc1 9.1.23.45 -user admin -passwd password
-script ~/bin/mkpprcpairs
```

Note: If you are using IBM i and logged on to the DS CLI, you start the script mode by using the following format:

```
DSCLI SCRIPT('/myscript') USER(admin) OUTPUT('/outfile')
```

2. Wait for the script to provide success or failure of the process.

Example

The following example shows a script that is used to establish remote mirror and copy relationships for volume pairs for the storage system:

```
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type mmir 1000-103F:2300-233F
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type gcp 1100-113F:2340-237F
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type mmir 1800-187F:2800-287F
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type gcp 1200-127F:2500-257F
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type mmir 1040-1054:2700-2714
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type gcp 1055-107F:2400-242A
mkpprc -dev IBM.2107-1303561 -remotedev IBM.2107-7504491 -type mmir 1140-117F:2600-263F
```

Using the DS CLI interactive command mode (history and reports)

Use the DS CLI interactive command mode when you must process multiple transactions that cannot be incorporated into a script. The interactive command mode provides a history function that makes repeating or checking prior command usage easy to do.

About this task

In addition to being able to enter DS CLI commands at the DS CLI command prompt, a history function provides a view of the last DS CLI commands that you used. You can also repeat any of the last commands more quickly than having to type out the entire command. The example at the end of this process shows how the history function works.

The Windows platform allows the user to retrieve prior commands by using the up arrow, but this is a feature of the Windows platform and is not built into the DS CLI. While other platforms might not allow the up arrow feature, all of the supported platforms have the history function described here.

Note: Many of the DS CLI commands have a feature that allows you to specify a dash (-) for the parameter and the specified value is read from standard input. However, you cannot use the dash (-) while in the DS CLI interactive command mode.

Complete the following steps to use the DS CLI in the interactive command mode:

Procedure

1. Log on to the DS CLI at the directory where it is installed.
2. Provide the information that is requested by the information prompts. The information prompts might not appear if you have provided this information in your profile file. The command prompt switches to a `dscli` command prompt.
3. Begin using the DS CLI commands and parameters. You are not required to begin each command with `dscli` because this prefix is provided by the `dscli` command prompt.

Tip: Issue the `setenv` command to control how the reports that are generated by the `ls` commands are displayed on your computer. You can set or display command output format options by using the `setenv` command. For example, you can specify that the reports be displayed in one of the following formats:

delim

Displays output in a table format and sets the column delimiter to a single character.

xml

Displays output in XML format.

stanza

Displays output in stanza (vertical table) format.

See the `setenv` command for more details.

Example

To use the DS CLI history function that is associated with the interactive command mode, complete the following steps:

1. Issue an exclamation mark (!) to display CLI commands that you used in the current session. For example: `dscli> !` results in a list of commands such as the following example:

```
[4] lsarraysite -dev IBM.2107-1300771
[3] lsarray -dev IBM.2107-1300771
[2] lsextpool -dev IBM.2107-1300771
[1] lsextpool -dev IBM.2107-1300771
```

2. Issue `dscli> !1` to reissue the last command. Or, issue `dscli> !3` to reissue command [3].

Obtaining the serial (storage image ID) number by using the DS CLI

Almost every DS CLI command requires the use of the storage image ID. If you add your target storage image ID into your profile file under the *deviid* designation, you are not required to provide the storage image ID when you issue each command.

About this task

Use the **lssi** DS CLI command to list the storage image IDs that are associated with your storage complex. The storage image ID consists of the manufacture name (IBM), the machine type (2107 or 1750), and the serial number. You can record the target storage image ID in your profile file. The **lssi** command can save you input time when you must process many transactions that cannot be part of a script.

To obtain a list of the storage image ID numbers, complete the following steps:

Procedure

1. Log in to the DS CLI in interactive command mode.
2. Enter the following command format at the dscli command prompt to obtain the storage image IDs:
dscli> lssi -s
3. Wait for the command to process. The following type of report is generated, which lists the storage image IDs that are associated with the storage complex.
 - IBM.2107-75FA111
 - IBM.2107-75FA112

DS CLI command help

You can view online help for each CLI command. To view the help, type the word **help** and the command name at the dscli command prompt.

The **help** command contains parameters that influence the type of help information that you can receive:

| Command | Description |
|---|---|
| help | Displays a list of all the DS CLI commands that are available for use. |
| help -s | Displays a list of commands with brief descriptions. |
| help -l | Displays a list of commands with their associated syntax. |
| help -match <string> | Displays a list of commands that contain the specified string. This parameter cannot be used with any other parameters. |
| command_name -h command_name -help command_name -? help command_name | Displays the reference page (man page) for the command name. |
| help -s command_name | Displays the brief description for the command name. |
| help -l command_name | Displays the usage statement for the command name. |

Notes:

- You cannot use the **-s** and **-l** parameters with the following help command parameters: **-h**, **-help**, and **-?**.
- Much of the information that is associated with the **help** command is displayed in list format. You can include the page (-p on) and row (-r *number*) controls; for example, `dscli> help -p on -r 20`. This command pauses your page listing after 20 entries and prompts you to press any key to continue.

Example

```
dscli> help -match flash
```

The resulting output

```
reverseflash  
commitflash  
rmflash  
lsremoteflash  
resyncremoteflash  
resyncflash  
mkremoteflash  
setflashrevertible  
revertflash  
unfreezeflash  
revertremoteflash  
rmremoteflash  
commitremoteflash  
mkflash  
lsflash  
setremoteflashrevertible
```

Obtaining and interpreting DS CLI exit codes

Complete this task to obtain and interpret DS CLI exit codes.

About this task

Whenever you complete a transaction using the DS CLI single-shot mode or the script mode, an exit code is generated. However, no exit codes are generated when you use the DS CLI interactive mode, because you never leave the DS CLI session.

When you use the single-shot mode, an exit code is generated after each DS CLI command is fully processed. When you use the script mode, exit codes are only generated when the script exits the session. In script mode, you must interpret output for the status.

DS CLI exit codes provide more general reasons (than the error messages provide) why a CLI command transaction has failed. The following table lists the exit codes and their meanings.

Note: The operating system might generate other exit codes not listed in Table 9 on page 30 if the DS CLI is stopped by another process. For example, code 143 for the Windows operating system.

| Code | Category | Description |
|------|------------------|--|
| 0 | Success | Specifies that the command is successfully processed. |
| 2 | Syntax error | Specifies that there is an error in the way that the command is presented (misaligned or wrong parameters) for processing. |
| 3 | Connection error | Specifies that there is a connectivity or protocol error. |

Table 9. DS CLI exit codes (continued)

| Code | Category | Description |
|------|----------------------|---|
| 4 | Server error | Specifies that an error occurs during a function call to the application server. |
| 5 | Authentication error | Specifies that an error occurs during the authentication process. |
| 6 | Application error | Specifies that an error occurs due to a MetaProvider client application specific process. |
| 63 | Configuration error | Specifies that the CLI.CFG file is not found or accessible. |
| 64 | Configuration error | Specifies that the javaInstall variable was not provided in CLI.cfg. |
| 65 | Configuration error | Specifies that the javaClasspath variable was not provided in CLI.cfg. |
| 66 | Configuration error | Specifies that the format of the configuration file is not correct. |

Complete the following steps to view, interpret, and use the DS CLI exit codes.

Procedure

1. (Script mode) Retrieve the most recent exit code. For a Windows operating system, use %ERRORLEVEL% to retrieve the most recent exit code. For a UNIX or Linux operating system, use \$? to retrieve the most recent exit code.

The following examples demonstrate the retrieval commands. The first part of the example shows the command that failed and the second part of the example shows the code to obtain the DS CLI exit code.

Windows operating system

```
C:\Program Files\ess\cli>dscli test
CMMCI9013E Command: test was not found.
Tip: Enter "help" for a list of available commands.
C:\Program Files\ess\cli>echo %ERRORLEVEL%
2
```

UNIX or Linux operating system

```
aix23 ->dscli test
CMMCI9013E Command: test was not found.
Tip: Enter "help" for a list of available commands.
echo $?
2
```

2. Use the previous table to interpret the value that is associated with the code and correct the command according to the exit code description.

Results

Processing that determines your next course of action

Based on the interpretation of the exit code value and the following processing description that is associated with a failed DS CLI transaction, you can determine your next course of action.

Single-shot mode

The following processing is associated with a single-shot mode transaction:

- All operations of the DS CLI transaction that can be processed are processed even though an error has occurred with one or more of the processed parameters that are associated with the transaction.
- A report on all successful completions is generated.
- A report on all failures is generated.

Script mode

The following processing is associated with a script mode transaction:

1. A DS CLI failure exit code is issued.
2. The script mode is automatically exited with no additional processing.

DS CLI operational limitations

Certain operational limitations are associated with the use of the DS CLI.

These limitations are described as follows:

- Volumes in the same volume space, logical subsystem (LSS), logical control unit (LCU), or address group cannot be of mixed type. They are either fixed block or count key data (CKD). The volume space is called an extent pool. An extent pool contains one or more ranks of a common storage type (fixed block or CKD).
- Logical subsystems cannot be created using the DS CLI. A fixed block LSS is automatically created when your first fixed block volume is assigned to the LSS address space. A fixed block LSS is automatically deleted when the last fixed block volume is removed from an LSS address space.

Note: You can use DS CLI commands to create, modify, and delete LCUs, which are the CKD volume equivalent of a fixed block LSS.

- You must not start more than 100 DS CLI sessions simultaneously. Starting more than 100 DS CLI sessions simultaneously can result in connection problems.
- The maximum number of simultaneous DS CLI sessions is dependent on several execution environment factors such as the host hardware configuration, the vendor and version of the host OS, the vendor and version of the Java used by the DS CLI, the type and mix of DS CLI commands, LAN congestion, and the capacity, configuration, and current workload of your system. It is unlikely that you will experience problems using multiple DS CLI sessions, but under high stress conditions, you might be required to reduce the number of simultaneous DS CLI sessions on each host and the total number of DS CLI sessions to your system.
- The DS CLI is available from the HMC console with the following restrictions:
 - The DS CLI is only available in interactive mode from the fluxbox menu.
 - You cannot upgrade the DS CLI on the HMC except through newer releases of HMC software.
 - You cannot edit the existing DS CLI profile, or specify a different profile.
 - You cannot use commands that upload or download files, for example:
 - **offloadauditlog**
 - **offloadfile**
 - **applykey** cannot be used with the -file parameter
 - **setauthpol** cannot be used with the -action value of settruststore

Messages in the CLI and management console server

When you use the command-line interface and the management console, the applications provide messages regarding the application processes, status, and errors.

The user interfaces and the supporting software issue three types of messages. When you need to see the details about a DS CLI message, use the **helpmsg** command.

Informational messages

These messages are identified by the letter "I" at the end of the message identifier. They provide information about system activities as they take place. For example, an informational message might report that a volume was successfully created. No user action is necessary.

Warning messages

These messages are identified by the letter "W" at the end of the message identifier. They warn that user activated activities might have consequences that you do not anticipate. Warning messages normally provide the opportunity to continue an activity or to cancel it.

Error messages

These messages are identified by the letter "E" at the end of the message identifier. They indicate that an error has occurred. Refer to the explanations and recommended actions in this document to resolve the problem.

Chapter 3. CLI commands

About CLI commands

A description of the components and structure of a command-line interface command.

A command-line interface command consists of the following types of components, arranged in the following order:

1. The **command name**.
2. The **command flags** and **flag parameters**.
3. One or more **command parameters**, each followed by any **sub parameters** it might require.

The **command name** specifies the task that the command-line interface is to complete. For example, **lsarraysite** tells the command-line interface to list array sites, and **mk1cu** tells the command-line interface to create a logical control unit.

Flags modify the command. They provide additional information that directs the command-line interface to complete the command task in a specific way. For example, the **-h** flag tells the command-line interface to display the reference page for the command. Some flags can be used with every command-line interface command. Others are specific to a command and are invalid when used with other commands. Flags are preceded by a hyphen (-), and can be followed immediately by a space and a flag parameter.

Flag parameters provide information that is required to implement the command modification that is specified by a flag. For example, the **-user** flag requires a *user_name* parameter, and the **-passwd** flag requires a *password* parameter. Flag parameters are variables, their value changes to meet your needs. Every user has a different user name and password. Not all flags require parameters. In this case, the flag itself provides all the information that is necessary. Some flag parameters are optional and might allow the use of multiple values. These values must be separated with a comma and no white space between the values. If you do not provide a parameter, then a default value is assumed. For example, you can specify *-v on*, or *-v off* to turn verbose mode on or off; but specifying *-v* only, results in an error.

The **command parameter** provides basic information that is necessary to complete the command task. When a command parameter is required, it is always the last component of the command; and it is not preceded by a flag. Some commands permit multiple command parameters with each parameter that is separated by a white space and not a comma (unlike flag parameters that allow multiple values). Some commands, like **lsuser**, do not require a command parameter because a default value of *all* is always assumed. For some commands, like **lsarraysite**, the command parameter is optional. If no value is provided, then a default value of *all* is assumed. If a value is provided, then the command-line interface lists information only about the array site or sites that are provided in the command parameter string.

In the following example, **lsrank** is the command name. **-dev** and **-l** are command parameters. *IBM.2107-75FA120* is the sub parameter for the **-dev** parameter, and *R1*, *R2*, and *R3* are a list of command parameters. Note that the banner is not listed for all examples provided in this document.

Example

```
dscli> lsrank -dev IBM.2107-75FA120 -l R1 R2 R3
```

Output

Note: The example output of some command topics are shown in table format to provide clarity. Actual command output does not display as tables in the command-line interface.

For example, [a | b] indicates that you can choose a, b, or nothing. Similarly, { a | b } indicates that you must choose either a or b.

... ellipsis

An ellipsis signifies the values that can be repeated on the command line or multiple values or arguments.

- dash

A dash indicates that, as an alternative to entering the parameter, a value or values are supplied from stdin. stdin varies depending on your settings and is available when you are using single-shot or script mode. This option is not available when using interactive mode.

Common command flags

You can use these flags with any command-line interface command.

| Parameters | Description |
|-------------------------------------|---|
| -p on off | <p>Turns paging on or off. Displays 24 rows at a time unless used with the -x flag. The default is off in single-shot mode and on in interactive mode. You can page up or down by pressing any key. You can specify -p on or -p off to turn the paging on or off; but if you specify only -p, you get an error.</p> <p>Note: You can only use this flag with the ls type (for example, lsuser, lskey, lsserver) commands and the help (setoutput) command.</p> |
| -x number | <p>Specifies the number of rows (1 - 100) per page. This flag is valid only when the -p flag is set to on. The default value is 24 rows.</p> <p>Note: You can only use this flag with the ls type (for example, lsuser, lskey, lsserver) commands and the help (setoutput) command.</p> |
| -fmt xml stanza delim default | <p>xml Sets the output format to XML.</p> <p>Note: You can use this option only with list (for example, lsuser, lskey, lsserver) commands</p> <p>stanza Sets the output format to stanza.</p> <p>Note: You can use this option only with list (for example, lsuser, lskey, lsserver) commands</p> <p>delim Sets the output format to a table. You must set the column delimiter to a single character with the -delim flag.</p> <p>Note: You can use this option only with list (for example, lsuser, lskey, lsserver) commands</p> <p>default Sets the output to a space-separated plain text table.</p> <p>Note: You can use this option only with list (for example, lsuser, lskey, lsserver) commands</p> |

| Parameters | Description |
|--------------------|--|
| -delim <i>char</i> | Sets the output to delimited output and the delimiter to the single character <i>char</i> . You must enclose <i>char</i> in single or double quotation marks if the character is a shell metacharacter (such as * or \t). If <i>char</i> is not specified, the CLI program returns a syntax error. A blank space, even when it is enclosed within quotation marks, is not a valid character as a delimiter. Note: You can use this option only with list (for example, lsuser, lskey, lsserver) commands |
| -hdr on off | Turns the header on or off. The default is on. You can specify <i>-hdr on</i> or <i>-hdr off</i> to turn the header on or off; but if you specify only <i>-hdr</i> , you get an error. |
| -bnr on off | Turns the banner on or off. The default is on. You can specify <i>-bnr on</i> or <i>-bnr off</i> to turn the banner on or off; but if you specify only <i>-bnr</i> , you get an error. |
| -v on off | Turns verbose mode on or off. The default is off. You can specify <i>-v on</i> or <i>-v off</i> to turn verbose mode on or off; but if you specify only <i>-v</i> , you get an error. |
| -fullid | Provides fully qualified IDs, which include the storage image ID, for every ID that is displayed in the command output. Note: You can use this command flag only with the list (for example, lsioport, lskey) and show (for example, showsu, showlss) commands. |
| -help -h -? | Displays a detailed description of the specified command, including syntax, parameter descriptions, and examples. If you specify a help option, all other command options are ignored. |
| -s | Displays the short output for the command, which is usually a single column of the resource IDs of the objects specified by the command. For detailed information, see the -s parameter for that command. Notes: 1. You can only use this flag with the help (setoutput) command and the ls type (for example, lsuser, lsserver) commands, except for lskey. 2. You cannot use the -s and -l parameters together. |
| -l | Displays the long output for the command, which is the default output plus additional columns of data to the right of the default columns. For detailed information for a specific command, see the -l parameter for that command. Notes: 1. You can only use this flag with the help (setoutput) command and the ls type (for example, lsuser, lsserver) commands, except for lskey. 2. You cannot use the -s and -l parameters together. |

Application key commands

Application key commands activate and query the licenses on your storage system.

The following application key commands are available:

applykey

Activates the licenses on your storage system.

lskey

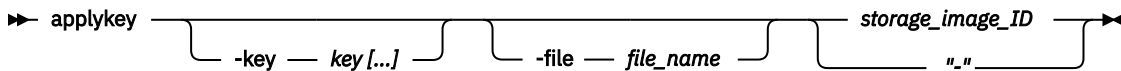
Generates a report that displays the type of license keys that are installed and are available for use by the specified storage system.

applykey

The **applykey** command applies the licensed machine code (LMC) activation keys for a storage server.

You can enter the LMC keys manually, or you can import the keys from an XML file, which you must download.

Note: The **applykey** command cannot be run from the **Embedded DS CLI** window.



Parameters

-key key [...]

(Optional) The LMC key. The optional ellipsis (...) signifies that you can specify multiple keys. To specify multiple keys, enter a comma between each key. Do not include a blank space between each key.

This parameter is required if the **-file** parameter is not specified.

-file file_name

(Optional) The file name of the LMC activation key file.

This parameter is required if the **-key** parameter is not specified.

storage_image_ID | -

(Required) The storage image ID where the LMC activation key file is imported. The ID includes manufacturer, machine type, and serial number.

If you use the dash (-), the specified value is read from standard input.

Example 1

Applying the license machine code key by importing the key.

```
dsccli> applykey -file keys.xml IBM.2107-75FA120
```

Example 2

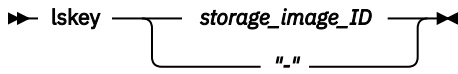
Applying the license machine code key by manually entering the key

```
dsccli> applykey -key DA67-7D5C-4B98-2E1B-C7FA-8F85-BD8A-31AD  
IBM.2107-75FA120
```

lskey

The **lskey** command displays the type of LMC activation keys that are installed and are available for use by the storage system.

The **lskey** command displays only the keys that are installed. Refer to the *IBM DS8000 Introduction and Planning Guide* for more information on how to choose which keys are needed and how to acquire them.



Parameters

storage_image_ID | -

(Required) The storage image ID for which to view a list of activated features. The ID includes manufacturer, type, and serial number.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive command mode.

Example

For this command and all other DS CLI list commands, the results are shown in table format for clarity. The actual reports do not display as tables.

The following table shows example activation keys. Some activation keys are not listed in the example. The **lskey** command displays only the keys that are installed.

Displaying a list of the installed LMC activation keys.

```
dsccli> lskey IBM.2107-75FA120
```

Output

| Activation key | Authorization level (TB) | Scope |
|--|--------------------------|-------|
| Parallel access volumes (PAV) | On | CKD |
| Point in time copy (PTC) | On | All |
| Global Mirror (GM) | 25 | All |
| HyperPAV | On | CKD |
| Metro/Global Mirror (MGM) | 25 | All |
| Metro Mirror (MM) | 25 | All |
| Remote mirror and copy (RMC) | 25 | All |
| Remote mirror for z/OS (RMZ) | 25.1 | CKD |
| Operating Environment (OEL) | 45 | All |
| IBM Easy Tier | On | All |
| IBM FlashCopy SE | 25 | All |
| High Performance FICON for System z (zHPF) | On | CKD |
| RMZ Resync | 25 | CKD |
| Local Data-at-Rest Encryption | On | All |

Output definitions

Activation key

The type of LMC activation key that is activated for the storage image.

Authorization Level (TB)

The capacity of the specified license feature. The quantity is displayed in terabytes (TB). One of the following values is displayed:

- Value in terabytes

- **On** if the license is for the maximum capacity, or **Off** if the license is for zero capacity

Scope

The storage type for the designated license: fixed block (FB), count key data (CKD), or All. Parallel access volumes, Remote Mirror for z/OS, and HyperPAV display only the values CKD or All.

Cloud commands

Cloud server commands are available to help manage system resources.

lscloudserver

Displays a list of cloud server resources on the storage system.

mkcloudserver

Creates a configuration entry for a cloud server provider.

rmcloudserver

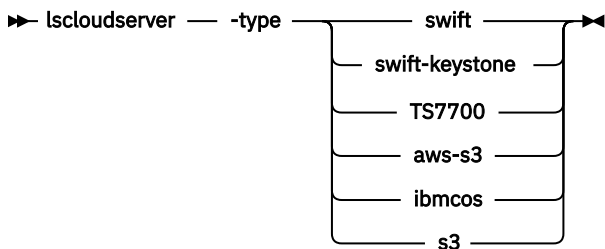
Removes a cloud server that is running on the storage system.

managecloudserver

Manages cloud servers that are running on the storage system.

lscloudserver

The **lscloudserver** command displays a list of clouds on the storage system.



Parameters

-type swift | swift-keystone | TS7700 | aws-s3 | ibmcos | s3

(Required) Displays the type of cloud. The following options are supported:

swift

Specifies that the storage system uses OpenStack Swift cloud computing system to encrypt authentication credentials and connect to a cloud storage target.

swift-keystone

The storage system uses Swift-Keystone to encrypt authentication credentials and connect to a cloud storage target. Authentication is done by using root or system certificates with either Secure Sockets Layer or Transport Layer Security, SSL/TLS.

TS7700

The storage system authenticates and stores data directly on the TS7700 system. Authentication credentials such as a user name, password, or certificate are not required. Instead, the storage system uses primary and alternate IP addresses to authenticate and verify connection to the TS7700 system.

aws-s3

The Amazon Simple Storage Service (Amazon S3) is to allow the storage system to authenticate and connect to S3 storage.

ibmcos

The IBM Cloud Object Storage (COS) for data protection through backup and recovery.

s3

Specifies that s3 allows the storage system to authenticate and store data on any other s3 compatible cloud storage target.

Example

```
dscli> lscloudserver -l
```

Output

| name | node | type | tenant | location | user | endpoint | IP address | nossl | State |
|----------|------|-------|----------|----------|-----------|------------------------|------------|-------|-------|
| ibmcloud | 0 | swift | mytest04 | - | mrproduct | https://hostname:port/ | - | false | - |
| ibmcloud | 1 | swift | mytest04 | - | mrproduct | https://hostname:port/ | - | false | - |

Output definitions

name*

Displays the cloud name.

node

Displays the node that is associated with the cloud.

type

Displays the cloud type.

tenant

Displays the tenant name of the cloud.

location

Displays the location for the cloud.

user+

Displays the user name of the cloud.

endpoint

Displays the address of the cloud.

IP address

Displays the IPv4 address of the cloud for type TS7700 only.

nossl+

Displays the setting (true or false) of this parameter. If the value is true, the SSL protocol is not used when transparent cloud tiering communicates with the specified cloud. Otherwise, the SSL protocol is used.

State

Displays the state of a cloud, which can be "Activation Pending", "Remove Pending" or "Active".

Note:

- "Activation Pending" state indicates that the cloud was created, but it has not been activated.
- "Remove Pending" state indicates that the cloud was deleted, but it has not been deactivated.
- "Active" state indicates that the cloud is activated.

Key:

*

Displayed when the **-s** parameter is specified.

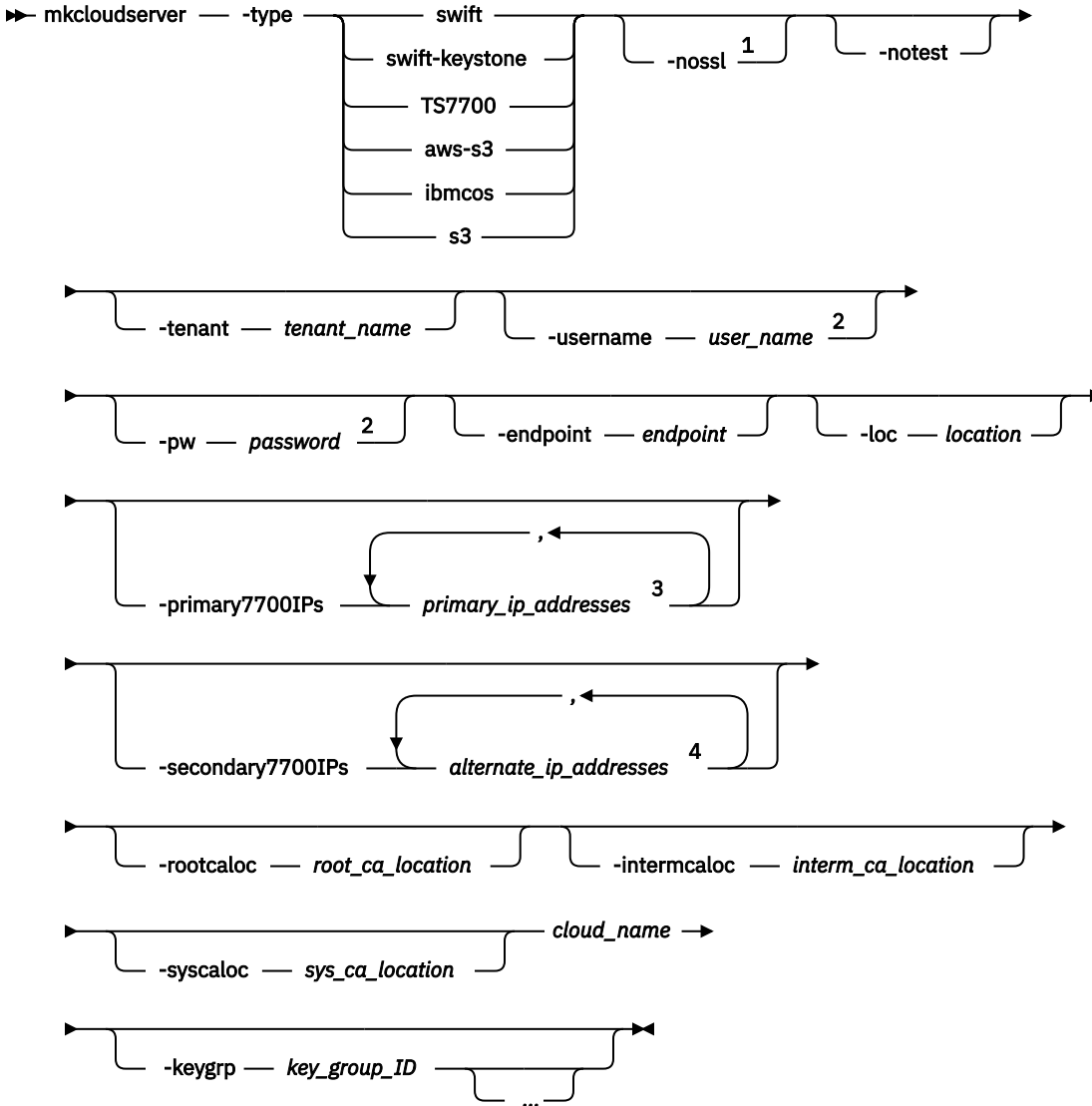
+

Displayed only when the **-l** parameter is specified.

mkcloudserver

The **mkcloudserver** command creates a configuration entry for a cloud.

Note: The storage system supports up to eight clouds. The first cloud created on the system will be automatically activated. All the clouds created after the first cloud will have to be manually activated using **managecloudserver** command.



Notes:

- 1 The **noss1** parameter is required when the **-type** is **swift**.
- 2 The parameters **tenant**, **username**, **pw**, **endpoint**, **rootcaloc**, **intermcaloc**, and **syscaloc** cannot be used when the cloud **-type** is **TS7700**.
- 3 The **primary7700IPs** parameter is required with **-type TS7700**.
- 4 The **secondary7700IPs** parameter is required with **-type TS7700**.

Parameters

-type swift | swift-keystone | TS7700 | aws-s3 | ibmcos | s3

(Required) Displays the type of cloud. The following options are supported:

swift

Specifies that the storage system uses OpenStack Swift cloud computing system to encrypt authentication credentials and connect to a cloud storage target.

swift-keystone

Specifies that the storage system uses Swift-Keystone to encrypt authentication credentials and connect to a cloud storage target. Authentication is done using root or system certificates with either Secure Sockets Layer or Transport Layer Security, SSL/TLS.

TS7700

Specifies that the storage system authenticates and stores data directly on the IBM TS7700 system. Authentication credentials such as a user name, password, or certificate are not required. Instead, the system uses primary and alternate IP addresses to authenticate and verify connection to the IBM TS7700 system.

aws-s3

Specifies that Amazon Simple Storage Service (Amazon S3) is to allow the storage system to authenticate and connect to S3 storage.

ibmcos

Specifies IBM Cloud® Object Storage (COS) for data protection through backup and recovery.

s3

Specifies that s3 allows the storage system to authenticate and store data on any other s3 compatible cloud storage target.

-noss1

(Optional) Specifies that communication between the storage system and the specified cloud does not require the SSL protocol.

For **-type TS7700**, the **-noss1** parameter will prevent data in flight encryption for data that is sent from the storage system to the IBM TS7700 object store.

Note: The **-noss1** parameter is required when you specify **-type swift**.

-notest

(Optional) Specifies that the default cloud connectivity test is not performed. The cloud connectivity test verifies the connection between the storage system and the cloud.

-tenant *tenant_name*

(Optional) The tenant name that you use to connect with the cloud.

-username *user_name*

(Optional) The user name that you use to connect with the cloud.

Note: The **-username** parameter cannot be used with **-type TS7700**.

The **-username** parameter is required when you specify the **-type** parameter with the **swift**, **swift-keystone**, **aws-s3**, **s3**, or **ibmcos** option.

-pw *password*

(Optional) The password that you use to connect with the cloud.

Note: The **-pw** parameter cannot be used with **-type TS7700**.

The **-pw** parameter is required when you specify the **-type** parameter with the **swift**, **swift-keystone**, **aws-s3**, **s3**, or **ibmcos** option.

-endpoint *endpoint*

(Optional) The location, or URL, of the cloud.

Note: The **-endpoint** parameter cannot be used with **-type TS7700**.

The **-endpoint** parameter is required when you specify the **-type** parameter with the **swift**, **swift-keystone**, **aws-s3**, **ibmcos**, or **s3** option.

-loc *location*

(Optional) The detailed location or vault template of the cloud depending on the **-type** parameter.

Note: The **-loc** parameter is valid with **type ibmcos** or **aws-s3**, only.

ibmcos

The location parameter specifies the name of the user generated vault template created on the IBM Cloud Object Storage Manager.

aws-s3

The location parameter specifies the AWS Region as defined by the endpoint of the Amazon S3 service.

-primary7700IPs *primary_ip_address*

(Required for TS7700 only) The primary IP address of the cloud.

Note: You can specify up to four primary IP addresses (IPv4 is supported). Separate the primary IP addresses with a comma.

-secondary7700IPs *alternate_ip_address*

(Optional for TS7700 only) The alternate IP address of the cloud.

Note: You can specify up to four alternate IP addresses (IPv4 is supported). Separate the alternate IP addresses with a comma.

-rootcaloc *root_ca_location*

(Optional) The path of the root certification file on your computer. The certificate determines which protocol (such as Transport Layer Security, TLS) that is used to communicate with the cloud.

Multiple clouds can share the root certificate if a root certificate exists that is defined to the system. (Root and intermediate certificates are currently the same.) If a root certificate does not exist in the storage system, the **-rootcaloc** parameter is required.

-intercaloc *interm_ca_location*

(Optional) The path of the intermediate certification file on your computer.

-syscaloc *sys_ca_location*

(Optional) The path of the system certification file on your computer.

The certificate determines which protocol (such as TLS) to use to communicate with the cloud. Multiple clouds can share root certificate. Each cloud has a respective system certificate.

cloud_name

(Required) The name of the cloud.

Note: Each cloud must have a unique name. Multiple clouds with the same name are not supported.

-keygrp *key_group_ID*

(Optional) Specifies a key group that is configured for encryption of transparent cloud tiering, which ensures that data is encrypted while it is transferred to cloud storage.

Example

```
dscli> mkcloudserver
-type swift -tenant mytest04 -username mrproduct
-pw ProdUct02-endpoint "https://hostname:port/"
-rootcaloc "/tmp/ssl_cacert.pem"
-syscaloc "/tmp/ssl_cert.pem" ibmcloud
```

Note: For the first cloud that is created on the system, Output 1 is displayed. For clouds that are created after the first cloud, Output 2 is displayed.

Output 1

```
CMUC00505I The cloud ibmcloud was successfully created and activated on node 0.
```

```
CMUC00505I The cloud ibmcloud was successfully created and activated on node 1.
```

Output 2

```
CMUC00602W The cloud ibmcloud was successfully created on node 0.
To activate the cloud, run managecloudserver -action applypdgconfig
command.
```


CMUC00602W The cloud ibmcloud was successfully created on node 1.
To activate the cloud, run **managecloudserver -action applypdgconfig**
command.

rmcloudserver

The **rmcloudserver** command removes a cloud that is running on the storage system.

Note: The storage system supports up to eight clouds.

- If the system has only one cloud and that cloud is removed by the user, the cloud will be automatically deactivated.
- If the system has more than one cloud and a cloud is removed by the user, then the cloud that is removed will be marked as "Remove Pending". User will have to manually deactivate such clouds using **managecloudserver** command.

►► **rmcloudserver**  **cloud_name** ►►

Parameters

-quiet

(Optional) Turns off the confirmation prompt for this command.

cloud_name

(Required) The name of the cloud to be deleted.

Example 1

When the system has only one cloud (the cloud is deleted and deactivated):

```
dscli> rmcloudserver ibmcloud
```

The resulting output

```
CMUC00503W Are you sure you want to delete the cloud  
  ibmcloud? [Y/N]  
CMUC00504I The cloud ibmcloud was successfully deleted from node  
0.  
CMUC00504I The cloud ibmcloud was successfully deleted from node  
1.
```

Example 2

When the system has more than one cloud (the cloud changes to "Remove Pending" state):

```
dscli> rmcloudserver ibmcloud
```

The resulting output

```
CMUC00503W Are you sure you want to delete the cloud  
  ibmcloud? [Y/N]  
CMUC00603W The cloud ibmcloud was successfully removed from node 0.  
  To update the cloud, run managecloudserver -action applypdgconfig  
command.  
CMUC00603W The cloud ibmcloud was successfully removed from node 1.  
  To update the cloud, run managecloudserver -action applypdgconfig  
command.
```

managecloudserver

The **managecloudserver** command manages cloud servers on the storage system.

► **managecloudserver** — **-action** — **applypndgconfig** — **-quiet** ►

Parameters

-action applypndgconfig

(Required) Activates or deactivates the clouds that are in “Activation Pending” or “Remove Pending” state.

applypndgconfig

Applies the changes to clouds that are in “Activation Pending” or “Remove Pending” state.

Note: The **managecloudserver** command will fail if there are no clouds in “Activation Pending” or “Remove Pending” state.

-quiet

(Optional) Turns off the confirmation prompt for this command.

Example

```
dscli> managecloudserver -action applypndgconfig
```

Note: This action allows all the pending changes to be applied to the clouds. When pending changes are successfully applied, Output 1 is displayed. If there are no pending changes, Output 2 is displayed.

Output 1

```
CMUC00601I managecloudserver: The cloud ibmcloud was successfully updated to Active state on node 0.  
CMUC00601I managecloudserver: The cloud ibmcloud was successfully updated to Active state on node 1.
```

Output 2

```
CMUN81443E managecloudserver: No pending changes to be applied.
```

Cluster commands

Cluster commands are available to help manage a group of host systems called a cluster.

chcluster

Modifies the configuration of a cluster.

lscluster

Displays a list of clusters and status information for each cluster in the list.

mkcluster

Configures a cluster for the storage system.

rmcluster

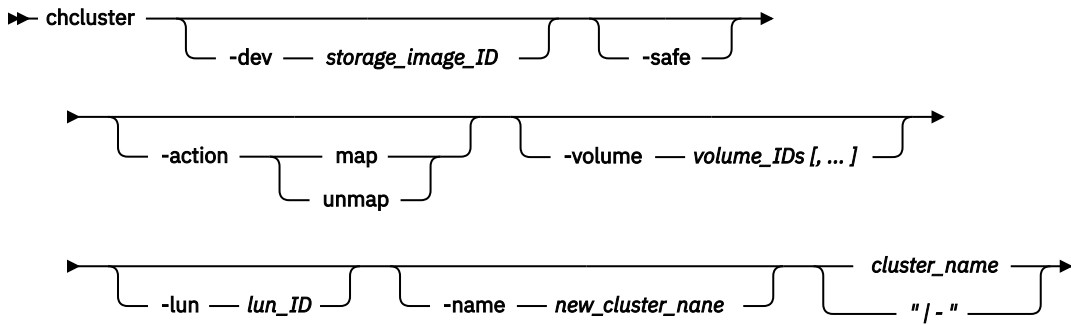
Removes a cluster from a storage system.

showcluster

Displays detailed properties of an individual cluster.

chcluster

The **chcluster** command modifies the configuration of a cluster.



Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-safe

(Optional) Enables checks for the safe removal of one or more specified volumes from the host.

-action

(Optional) Specifies the type of action for the specified volumes.

map

Specifies that the volumes are added to the cluster.

unmap

Specifies that the volumes are removed from the cluster.

Note: The **chcluster** command fails if you specify the **-volume** parameter without the **-action** parameter.

-volume *volume_ID [...]*

(Optional) Specifies an array of one or more volume IDs or volume ID ranges to be added or removed from the specified host. A volume ID range is defined by two volume IDs that are separated by a hyphen. Multiple volume IDs or volume ID ranges must be separated by a comma. The volume IDs are entered as hexadecimal numbers in the range 0x0000-0xFEFF. Example: 0100-010F, 0180-018F, 0120.

Notes:

1. For SCSI MAP 256, the array or ranges cannot exceed 256 volume ID entries. Otherwise, up to 64,384 entries are allowed.
2. The **chcluster** command fails if you specify the **-volume** parameter without the **-action** parameter.

-lun *lun_ID*

(Optional) Specifies the LUN ID in hexadecimal value (00 - FF) that is mapped to the specified volume ID for a SCSI-MAP256 type cluster. If you specify multiple volume IDs with the **-volume** parameter, LUN IDs are assigned consecutively in incremental order.

Note: This parameter is only valid for a SCSI-MAP 256 type cluster. If this parameter is specified for any other type of cluster, the command fails.

-name *new_cluster_name*

(Optional) Specifies the new name you assign to the cluster system. The name is limited to 32-byte or 16-double byte characters. If you assign a new cluster name with a blank space, enclose the name with double quotation marks.

***cluster_name* | -**

(Required) Specifies the cluster name to be modified. If the cluster name you specify includes a blank space, enclose the name with double quotation marks.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example

Invoking the `chcluster`

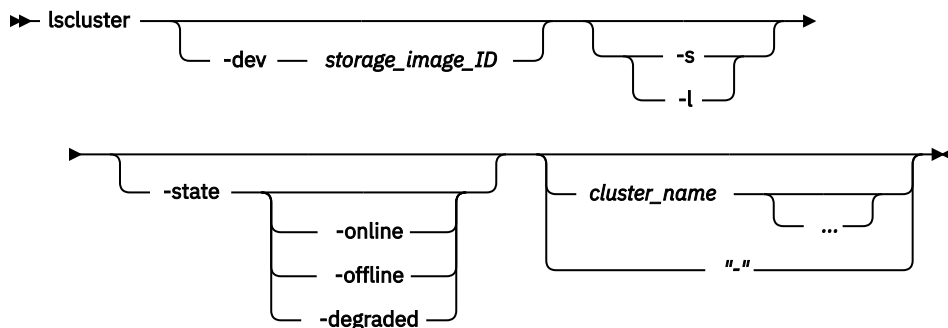
```
dscli> chcluster -dev IBM.2107-75FA120 -name cluster_1 cluster_2
```

The resulting output

```
Cluster cluster_2 successfully modified.
```

lscluster

The **lscluster** command displays a list of cluster and status information for each cluster in the list.



Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host. It is also required if you did not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the `-dev` parameter temporarily overrides any defined value for *dev* for the current command.

-s

(Optional) Displays the cluster name only. You cannot use the `-l` and the `-s` parameters together.

-l

(Optional) Displays the default output and user-defined description for each cluster in the list. You cannot use the `-l` and the `-s` parameters together.

-state

(Optional) Displays all clusters with the following specified state.

online

All hosts that the cluster contains are online.

offline

All hosts that the cluster contains are offline.

degraded

Not all hosts, but at least one, that the cluster contains are online.

cluster_name ... | -

(Optional) Displays the cluster information for one or more cluster names specified. The ellipsis (...) indicates that you can specify multiple values. Multiple names must be separated with a white space between each name or ID. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example

```
dscli> lscluster -dev IBM.2107-75FA120 -1
```

The resulting output

| Name | Type | State | AddrMode | Volumes | Hosts |
|-----------|---------|----------|------------|---------|-------|
| Cluster_1 | Win2003 | Online | VMWare | 8 | 5 |
| Cluster_2 | - | Offline | unknown | 6 | 0 |
| Cluster_3 | Mix | Degraded | scsimap256 | 0 | 8 |

Report field definitions**Name***

Displays the name of the cluster. The name is limited to 32-byte or 16- double-byte characters.

Type

Displays the host type that is defined by the operating system and platform.

If the hosts assigned to the specified cluster have a different host type, the output displays "multiple". If are no hosts are assigned to the specified cluster, the output displays "-".

State

Displays the state of the cluster. One of the following values displays.

online

Indicates that all hosts that the cluster contains are online.

offline

Indicates that all hosts that the cluster contains are offline.

degraded

Indicates that at least one host that the cluster contains is online.

AddrMode+

Indicates the method that is used by the cluster to discover the LUNs that are available to its host ports. One of the following values display.

scsimask

A SCSI mask volume group. This option is available if the host adapter supports 4-byte LUN addresses.

scsimap256

A SCSI-MAP 256 volume group.

os400mask

An OS/400 mask volume group. The IBM i host system typically uses fixed block volumes of 520-byte logical block size. This option is available only if the host adapter supports 4-byte LUN addresses.

unknown

If no host that is associated with the cluster is available, the output displays "unknown".

Volumes+

Indicates the number of public volumes that are mapped to the specified cluster.

Hosts+

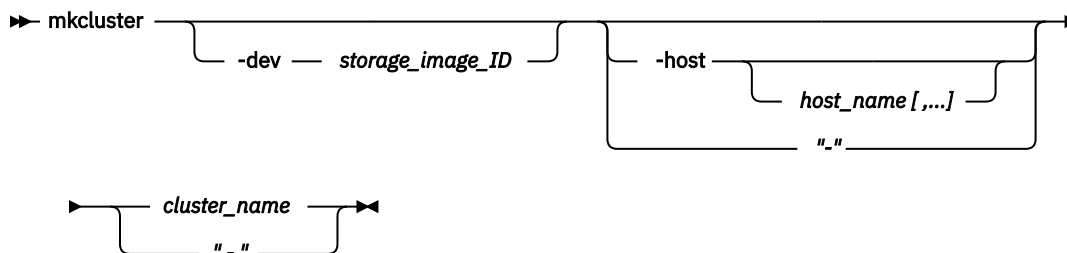
Indicates the number of hosts that are mapped to the specified cluster.

Key:

- * Displayed when the **-s** parameter is specified.
- + Displayed only when the **-l** parameter is specified.

mkcluster

The **mkcluster** command configures a cluster for the storage system. A cluster is defined as a group of host systems associated with the storage system.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-host host_name [...]

(Optional) Specifies one or more host names that are assigned to the cluster. Separate multiple host names by a comma. If the host name includes a blank space, enclose the name with double quotation marks.

cluster_name | -

(Required) Specifies the name that you assigned to the cluster. The name is limited to 32 byte or 16 double byte characters. If the cluster name you specify includes a blank space, enclose the name with double quotation marks.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example

Creating a cluster

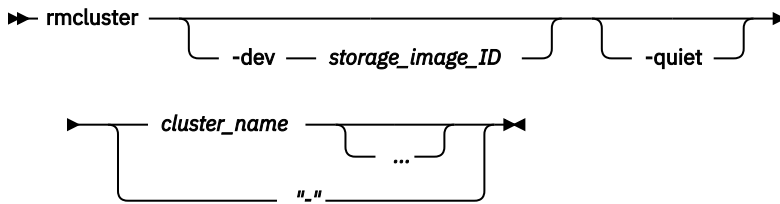
```
dscli> mkcluster cluster_1
```

Output

```
Cluster cluster_1 successfully created.
```

rmcluster

The **rmcluster** command removes a cluster from a storage system.



Parameters

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host. It is also required if you did not set the *dev* variable in your profile, or by issuing the **setenv** command, and the HMC is aware of more than one storage image. When you specify the *-dev* parameter, it temporarily overrides any defined value for *dev* for the current command.

-quiet

(Optional) Turns off the confirmation prompt for this command.

cluster_name ... | -

(Required) The cluster name to be removed. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Removing a cluster from the storage system

```
dscli> rmcluster -dev IBM.2107-75FA120 cluster_1
```

Output

```
Are you sure you want to delete Cluster cluster_1? y/n Y
Cluster cluster_1 successfully deleted.Output
```

showcluster

The **showcluster** command displays detailed properties of an individual cluster.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host. It is also required if you did not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *dev* for the current command.

-volume

(Optional) Displays the volume and LUN ID map for the specified cluster.

-host

(Optional) Displays the host name for the specified cluster.

cluster_name | -

(Required) Displays the name of the cluster. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1

```
dscli> showcluster Cluster_1
```

Output

```
Name           Cluster_1
Type           Win2003
State          online
AddrMode       scsimask
Volumes        3
Hosts          3
```

Output definitions**Name**

Displays the name of the cluster. The name is limited to 32-byte or 16-double-byte characters.

Type

Displays the host type that is defined by the operating system and platform.

If the hosts under the specified cluster have a different host type, the output displays "multiple". If there are no hosts that are associated with the specified cluster, the output displays "-".

State

Displays the state of the cluster. One of the following values displays.

online

Indicates that all hosts that the cluster contains are online.

offline

Indicates that all hosts that the cluster contains are offline.

degraded

Indicates that at least one host that the cluster contains is online.

AddrMode

Displays the method that is used by the cluster to discover the LUNs that are available to its host ports. One of the following values display.

scsimask

A SCSI mask volume group. This option is available if the host adapter supports 4-byte LUN addresses.

scsimap256

A SCSI-MAP 256 volume group.

os400mask

An OS/400® mask volume group. The IBM i host system typically uses fixed block volumes of 520-byte logical block size. This option is available only if the host adapter supports 4-byte LUN addresses.

unknown

If no host is available under the cluster, the output displays "unknown".

Volumes

Displays the number of volumes that are mapped to this cluster.

Host

Displays the number of hosts that are mapped to this cluster.

Example 2

Displaying the cluster with the volume parameter

```
dscli> showcluster -volume Cluster_1
```

Output

```
Name                Cluster_1
Type                Win2003
State              online
AddrMode           scsimask
Volumes            3
Hosts              3
=====Volumes=====
ID                  Lun
=====
000D                8D
000E                8E
000F                8F
```

When you specify the **-volume** parameter, the Volume ID and Lun ID also display.

ID

Displays the ID of the specified volume.

Lun

Displays the Lun ID that is mapped to the volume ID.

Example 3

Displaying the cluster with the host parameter

```
dscli> showcluster -host Cluster_1
```

Output

```
Name                Cluster_1
Type                Win2003
State              Online
AddrMode           scsimask
Volumes            3
Hosts              3
=====Hosts=====
Name
=====
Host_1
Host_2
Host_3
```

Note: When you specify the **-host** parameter, the name parameter also displays.

Name

Displays the name that is assigned to the host.

Copy Services commands

For reference, the various Copy Services commands are listed with descriptions of their functions.

You can use the following Copy Services commands to manage Copy Services tasks.

FlashCopy commands

Commands that are used to configure FlashCopy relationships and to display FlashCopy information are referenced.

The following FlashCopy commands are available:

commitflash

Completes a partially formed Global Mirror consistency group. It is used as part of the recovery from a disaster.

resyncflash

Creates a point-in-time copy of an existing FlashCopy pair that was established with the **-record** and **-persist** parameters. The **resyncflash** command only copies the parts of the volume that have changed since the last point in time copy.

lsflash

Generates a report that displays a list of FlashCopy relationships and the status information for each FlashCopy relationship in the list.

mkflash

Initiates a point-in-time copy from source volumes to target volumes.

reverseflash

Reverses the FlashCopy relationship.

revertflash

Restores the former Global Mirror consistency group from one that is currently forming. It is used as part of the recovery from a disaster.

rmflash

Removes a relationship between FlashCopy volume pairs.

unfreezeflash

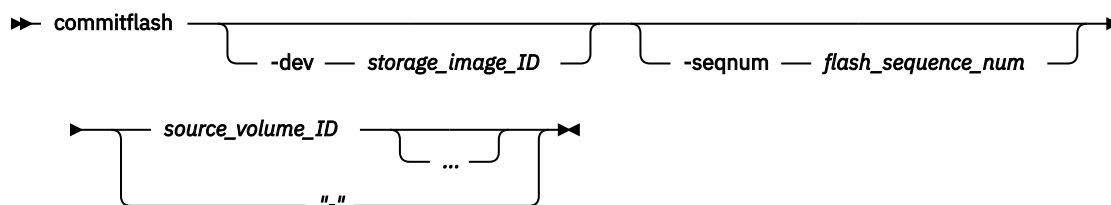
Resets a FlashCopy consistency group that was previously established with the **-freeze** parameter when the **mkflash** or **resyncflash** commands were issued.

setflashrevertible

Modifies a FlashCopy volume pair that is part of a Global Mirror relationship to revertible. The revertible feature allows data to be committed to the target to form a new consistency group, or restored back to the last consistency group.

commitflash

The **commitflash** command is used as part of the recovery from a disaster scenario to complete a partially formed Global Mirror consistency group.



Parameters

The following transactions must be completed before you can issue the **commitflash** command:

1. Issue the **mkflash** command with the **-record** and **-persist** parameters specified to establish the FlashCopy volume pair relationship.
2. Issue the **setflashrevertible** command on the FlashCopy volume pair.

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all source volumes, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-seqnum *flash_sequence_number*

(Optional) When a FlashCopy sequence number is specified, the commit operation is performed only on those relationships that are associated with the specified number.

This parameter is not supported for machine type 2105.

Example: 0010

source_volume_ID ... | -

(Required) The source volumes for which FlashCopy relationships are to be committed. The chosen FlashCopy pair is the one established or modified with the **-record** parameter. This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if either the **-dev** parameter is specified or you specify a value for the *devid* variable in your profile file. You must separate multiple source volume IDs with spaces.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0-F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified volume ID: IBM.2107-75FA120/0001

Example of a shortened version: 0001

Example of multiple IDs: 0001 0003 0008

Example: Committing a FlashCopy volume pair as part of a disaster recovery scenario

```
dscli> commitflash -dev IBM.2107-75FA120 0100
```

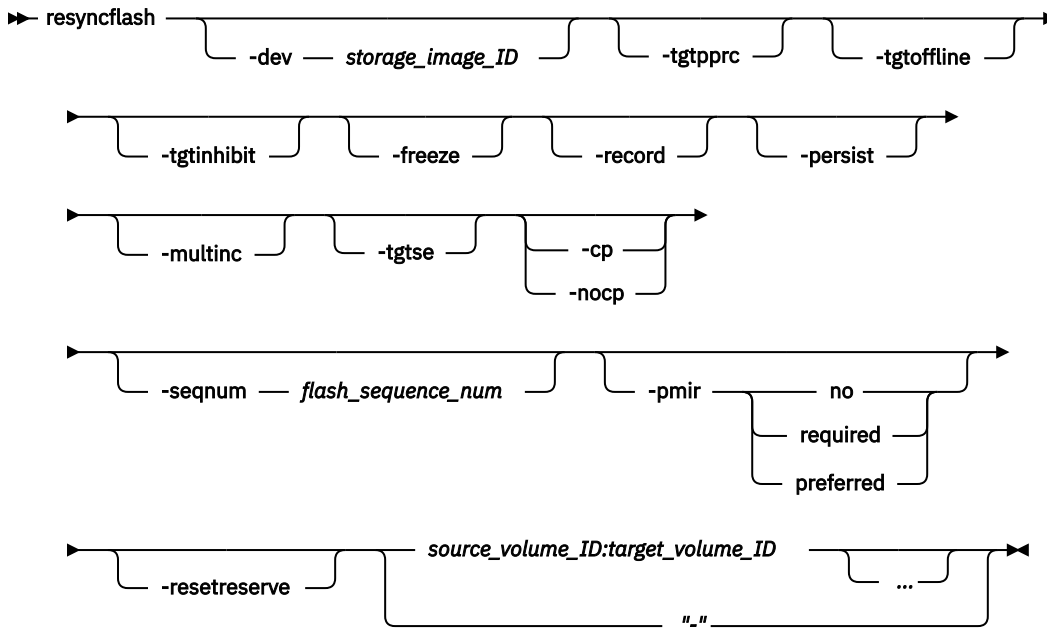
Output

```
FlashCopy volume pair for source 0100 successfully committed.
```

resyncflash

The **resyncflash** command is a point-in-time copy of an existing FlashCopy pair that was established with the **-record** and **-persist** parameters.

The **resyncflash** command copies only the parts of the volume that changed since the last point-in-time copy.



Parameters

When a FlashCopy pair is established with the **-record** and **-persist** parameters, the pair initially synchronizes. A record of all host write operations to the source is maintained in the source volumes. When the **resyncflash** command is specified on the FlashCopy pair, the new data that is written to the source is copied to the target. The parameters that you specify in this command replace the parameters that you previously specified for the existing relationship. To keep the **-record** and **-persist** parameters, you must specify these parameters in the **resyncflash** command.

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source and target volume or do not set the *dev* variable in your profile or through the **setenv** command. The storage image ID is also required if HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-tgtpprc

(Optional) Allows the FlashCopy target volume to be a remote mirror and copy source volume.

-tgtoffline

(Optional) Rejects the **resyncflash** command if the target volume is online for host system access. This parameter applies only to count key data (CKD) volumes.

-tgtinhibit

(Optional) Prevents host system write operations to the target volume while the FlashCopy relationship exists.

-freeze

(Optional) Starts the *queue full* condition for the source volume. During the *queue full* condition, the source volume reports a status of *long busy*. All writes to the source volume are queued by the host and are written after the *queue full* condition is reset. The *queue full* condition is reset by an *extended long busy timeout* condition. The timeout condition affects all FlashCopy source volumes that are contained within a respective logical subsystem and that are established or modified with this parameter.

Note: Use the **ch1ss** and the **ch1cu** commands to modify the extended long busy timeout setting.

-record

(Optional) This parameter, without the **-multinc** parameter, creates a type 1 incremental FlashCopy relationship. The type 1 FlashCopy records data changes on both the source and target volumes of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

Select this parameter when you create an initial FlashCopy relationship that you later want to use with the **resyncflash** or **reverseflash** command. If the **-multinc** parameter is not selected, you can also use the **setflashrevertible** command.

When you select the **-record** parameter, the **-persist** parameter is automatically selected.

-persist

(Optional) Creates a persistent FlashCopy relationship in which the relationship remains after the copy completes and remains indefinitely until you enter a **rmflash** command against the FlashCopy pair. If this parameter is not specified, a normal FlashCopy relationship is created and is automatically removed after the copy completes.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

See the **-record** parameter for a description of a type 1 incremental FlashCopy relationship and the **-multinc** parameter for a description of a type 2 incremental relationship.

When you select either the **-record** or the **-multinc** parameter, the **persist** parameter is automatically selected.

-multinc

(Optional) Creates a type 2 incremental FlashCopy relationship. The type 2 FlashCopy records data changes only on the target volume of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

The type 2 FlashCopy allows for more than one incremental FlashCopy relationship from the same source volume. However, because the change recording is maintained only on the target volume, the type 2 FlashCopy can cause a performance impact as more type 2 FlashCopy relationships are added.

Select this parameter when you create multiple FlashCopy volume pairs with the same source volume that you want to use with the **resyncflash** and **reverseflash** commands. However, FlashCopy pairs that are established with this modified recording method cannot be used with the **setflashrevertible** command.

When you select the **-multinc** parameter, the **-persist** and **-record** parameters are automatically selected.

Note: Incrementing multiple relationships with the same source volume on a single command line (as shown below) is not currently supported:

```
resyncflash -multinc 0000-00ff:0200-02ff 0000-00ff:0400-04ff 0000-00ff:0600-06ff
```

Instead, you must issue the **resyncflash** commands separately. For example:

```
resyncflash -multinc 0000-00ff:0200-02ff
resyncflash -multinc 0000-00ff:0400-04ff
resyncflash -multinc 0000-00ff:0600-06ff
```


-tgtse

(Optional) The target volume that you are designating for a FlashCopy relationship might be a space-efficient logical volume. An error message is generated if the target volume that you are using to create the FlashCopy relationship is a space-efficient volume and you do not specify this parameter.

-nocp

(Optional) Inhibits a background copy. Data is copied from the source volume to the target volume only if a track on the source volume is modified. The FlashCopy volume pair relationship remains indefinitely until it is broken by a **rmflash** command or until all tracks on the source volume are modified.

When the **-tgtse** parameter is specified and the **-cp** or the **-nocp** parameters are specified, the no background copy behavior is the default.

Note: You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-cp

(Optional) Starts a background copy. When the **-tgtse** parameter is not specified and the **-cp** or the **-nocp** parameters are specified, the background copy behavior is the default.

Note: You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relationships that are established with the specified sequence number. You can use this sequence number as an identifier for a relationship or group of relationships. An example sequence number is 00010.

-pmir *no | required | preferred*

The Remote Pair Copy option that you want to use. The Remote Pair Copy option, sometimes called Preserve Mirror, preserves synchronous Metro Mirror pairs when the FlashCopy source and target volumes are both Metro Mirror primary volumes and both Metro Mirror secondary volumes on the same storage system. The FlashCopy operation is completed on both the local site and the remote site.

no

FlashCopy operations are not completed on the remote site. If the target volume is a Metro Mirror primary volume, the remote copy might temporarily change to the duplex pending state. **no** is the default if the **-pmir** parameter is not specified.

required

FlashCopy operations do not change the state of the Metro Mirror primary volume pair to duplex pending. Both the source Metro Mirror volume pair and the target Metro Mirror volume pair must be in the full duplex state.

preferred

Uses the Remote Pair Copy option for FlashCopy operations when possible. The Remote Pair Copy option cannot be used if the configuration is not correct or the state of the volume is not supported by this function.

Notes:

- The **-preferred** parameter is only valid for DS8870 and earlier system types.
- The **-preferred** parameter is not valid for targets which are also PPRC multi-target primaries.

-resetreserve

(Optional) Forcibly clears any SCSI reservation on the target volume and allows establishing of a FlashCopy relationship. The reservation is not restored after the relationship is established.

- When this option is not specified and the target volume is reserved, the command fails.
- This option is ignored if the target is a CKD volume; this option is applicable only for fixed block volumes.

source_volume_ID:target_volume_ID ... | -

(Required) Increments a FlashCopy relationship for the source and target volume pairs with the specified IDs. This parameter accepts fully qualified volume IDs, which include storage image IDs,

or a shortened version without storage image IDs if the **-dev** parameter is specified or you specify a value for the *devId* variable in your profile file. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0–F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID is

IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

An example of a shortened version is 0001:0004

An example of multiple pairs is 0001:0004 0003:00FF 0008:000C

Example: Copying parts of a volume pair that changed since the last point-in-time copy

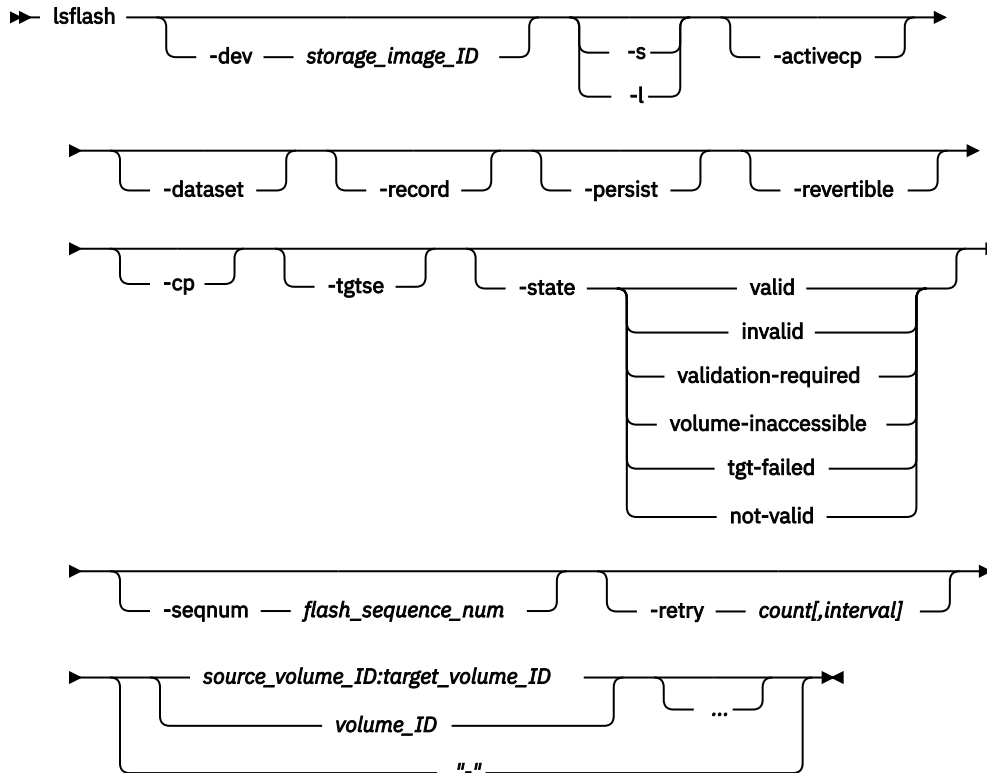
```
dscli> resyncflash -dev IBM.2107-75FA120 -freeze 0100:0200
```

Output

```
Remote FlashCopy volume pair 0100:0200 successfully resynchronized.
```

lsflash

The **lsflash** command displays a list of FlashCopy relationships and status information for each FlashCopy relationship in the list.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source and target volumes, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-s

(Optional) Displays FlashCopy pair IDs. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional) Displays the default output plus additional attributes that are identified as long output. You cannot use the **-s** and the **-l** parameters together.

-activecp

(Optional) Displays the FlashCopy relationships where their background copy process is active.

Note: The background copy process might be inactive for a while before it starts.

-dataset

(Optional) Displays the volumes that are participating in Dataset FlashCopy relationships.

-record

(Optional) Displays only the FlashCopy relationships that were established with the **-record** or **-multinc** option.

-persist

(Optional) Displays the FlashCopy relationships that were established with the **-persist** parameter and will remain until the FlashCopy relationships until they are removed.

-revertible

(Optional) Displays the FlashCopy relationships that were established with the **-revertible** parameter. This parameter determines whether data committed to the target volume forms a new consistency group or reverts to the last consistency group.

-cp

(Optional) Displays the FlashCopy relationships that were established with the **-cp** parameter.

-tgtse

(Optional) Displays the FlashCopy relationships that have a space-efficient target.

-state valid | invalid | validation-required | volume-inaccessible | tgt-failed | not-valid

(Optional) Displays the FlashCopy relationships that are identified by the specific state.

Note: When you specify *not-valid*, all FlashCopy relationships that do not meet the requirements for the *valid* state are displayed.

-seqnum *flash_sequence_number*

(Optional) Displays the FlashCopy relationships that are associated with the specified sequence number. The default is 0000.

-retry *count[,interval]*

(Optional) Displays the number of retries that the system uses to process a validation-required state.

The system currently handles a validation-required state as follows:

- If there are one or more FlashCopy relationships, an immediate retry is initiated. In most cases, the reasons for the validation-required state are cleared by the time that the retry is processed and normal processing continues.
- If the validation-required state still exists after the first retry, the system initiates five wait and retry cycles with a delay of 5 seconds between each cycle. At any time during these cycles, if the reasons for the validation-required state are cleared, normal processing continues.

You can change how the system handles a validation-required state as follows:

- Set the number of retries (count) to 0. When you set the number of retries to 0, it prevents the system from attempting any retries.
- Set the number of retries to 1. The system performs an immediate retry if there are one or more FlashCopy relationships in the validation-required state. The 5-second delay is not initiated.
- Set the number of retries to *N*, with *N* greater than 1. The system performs an immediate retry if there are one or more FlashCopy relationships in the validation-required state, followed by at least one wait and retry loop. The default for *N* is 6. You can change the length of the 5-second default wait delay using the optional interval value.

source_volume_ID:target_volume_ID | volume_ID ... | -

(Required) Displays the FlashCopy relationships for the source and target volume pairs with the specified IDs, or displays the FlashCopy relationships for a single volume ID if the volume ID is specified.

This parameter accepts fully qualified volume IDs, which includes the storage image IDs, or a shortened version without storage image IDs, if the **-dev** parameter is specified or you can specify a value for the *devid* variable in your profile file.

A FlashCopy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0–F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

Separate multiple IDs with spaces. You can specify FlashCopy pair IDs and a range of FlashCopy pair IDs, or you can specify volume IDs and a range of volume IDs. You cannot specify a combination of FlashCopy pair IDs and volumes IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of FlashCopy relationships and status information for each FlashCopy relationship

```
dsccli> lsflash -dev IBM.2107-75FA120 -1 0100:0200 0101:0201 0102:0202 0103:0203
```

Output

| ID | SrcLSS | Sequence Num | Time-out | Active Copy | Recording | Persistent | Revertible |
|-----------|--------|--------------|----------|-------------|-----------|------------|------------|
| 0100:0200 | 01 | 10 | 60 | Disabled | Disabled | Disabled | Disabled |
| 0101:0201 | 01 | 10 | 60 | Disabled | Disabled | Disabled | Disabled |
| 0102:0202 | 01 | 11 | 60 | Disabled | Disabled | Disabled | Disabled |
| 0103:0203 | 01 | 11 | 60 | Disabled | Disabled | Disabled | Disabled |

| Source-Write-Enabled | Target-Write-Enabled | Back-ground-Copy | SGC Recovered | Out-Of-Sync-Tracks | Date-Created | Date-Synced | State | is-TgtSE |
|----------------------|----------------------|------------------|---------------|--------------------|---------------------|---------------------|-------|----------|
| Enabled | Disabled | Disabled | Yes | 0 | 10/01/2007 02:20:00 | 10/01/2007 02:23:47 | Valid | TSE |
| Enabled | Disabled | Disabled | No | 0 | 10/01/2007 02:20:00 | 10/01/2007 02:23:47 | Valid | TSE |
| Enabled | Disabled | Disabled | Yes | 0 | 10/01/2007 02:20:00 | 10/01/2007 02:23:47 | Valid | ESE |
| Enabled | Disabled | Disabled | No | 0 | 10/01/2007 02:20:00 | 10/01/2007 02:23:47 | Valid | ESE |

Output definitions**ID**

The FlashCopy pair ID, which consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. For dataset FlashCopy relationships, the source

volume ID is the same as the target volume ID, which indicates that this volume is participating as a source or a target in a dataset FlashCopy relationship.

SrcLSS

The Consistency Group LSS ID that is associated with the source volume of this FlashCopy relationship.

SequenceNum

The sequence number that is associated with the FlashCopy relationship.

Note: This item is not supported on the 2105.

Timeout

The consistency group Long Busy Timeout setting for the LSS ID that is associated with the source volume of this FlashCopy relationship. This value can be modified using the **chlss** (FB) or the **chlcu** (CKD) command.

ActiveCopy

The background copy process is active for this FlashCopy relationship.

Recording

The FlashCopy relationship was created with one of the change recording options. One of the following values is displayed for each FlashCopy relationship:

| <i>Table 10. Change recording options</i> | |
|---|--|
| Option | Description |
| Disabled | The relationship was created without any of the change recording parameters. |
| Enabled | A type 1 relationship that was created with the -record parameter but without the -multinc parameter. |
| MultInc | A type 2 relationship that was created with the -record and -multinc parameters or with the -multinc parameter, but without -record parameter. |

Persistent

The FlashCopy relationship was established with the persistent option and will remain until it is removed.

Revertible

The FlashCopy relationship was established to allow the FlashCopy relationship target volume to be reverted to the last consistency group.

SourceWriteEnabled

The FlashCopy relationship was established to allow source writes.

TargetWriteEnabled

The FlashCopy relationship was established to allow target writes.

BackgroundCopy

The FlashCopy relationship was established with the run background copy option.

SGCRecovered

The SGCRecovered field indicates whether the volume is in a Safeguarded recovery relationship or not.

OutOfSyncTracks

The number of tracks that are not synchronized for this FlashCopy relationship. The maximum value that can be displayed is dependent on the source volume size. A dash (-) is displayed when the track counter is not available.

DateCreated

The date and the time that the FlashCopy relationship was established.

DateSynced

The date and time that FlashCopy relationship was synchronized, or specifies " - " if the relationship is not synchronized.

State

The state of the FlashCopy relationships. One of the following values is displayed for each FlashCopy relationship:

Note: When a query indicates any state other than valid, the only information that is displayed on the report is the FlashCopy pair ID and the state condition. The rest of the information columns are displayed with a " - " value.

Valid

The FlashCopy relationship is in a normal state, and that it has been queried successfully.

Validation Required

The FlashCopy relationship cannot be queried. The reason that the query is blocked is only temporary. If you issue a new query within several seconds, the problem no longer exists.

Tgt Failed

The FlashCopy relationship is in an error state. The point-in-time copy is lost, and the FlashCopy relationship must be withdrawn. You must issue the **rmflash** command to remove the FlashCopy relationship.

Volume Inaccessible

The volume cannot be accessed and that the query has failed. When this state is displayed, it generally means that the volume is in a fenced condition.

Invalid

A general internal error occurred when the query was processed.

Dataset

The source volume is participating as a source or a target in a dataset, or extent level, FlashCopy relationship.

Note: For dataset FlashCopy relationships, a dash (-) will be listed for all of the fields except the **ID** and the **State**.

isTgtSE

The FlashCopy relationship has a space-efficient target. Valid options include:

No

The target is not space-efficient.

TSE

The target is a track space-efficient volume.

ESE

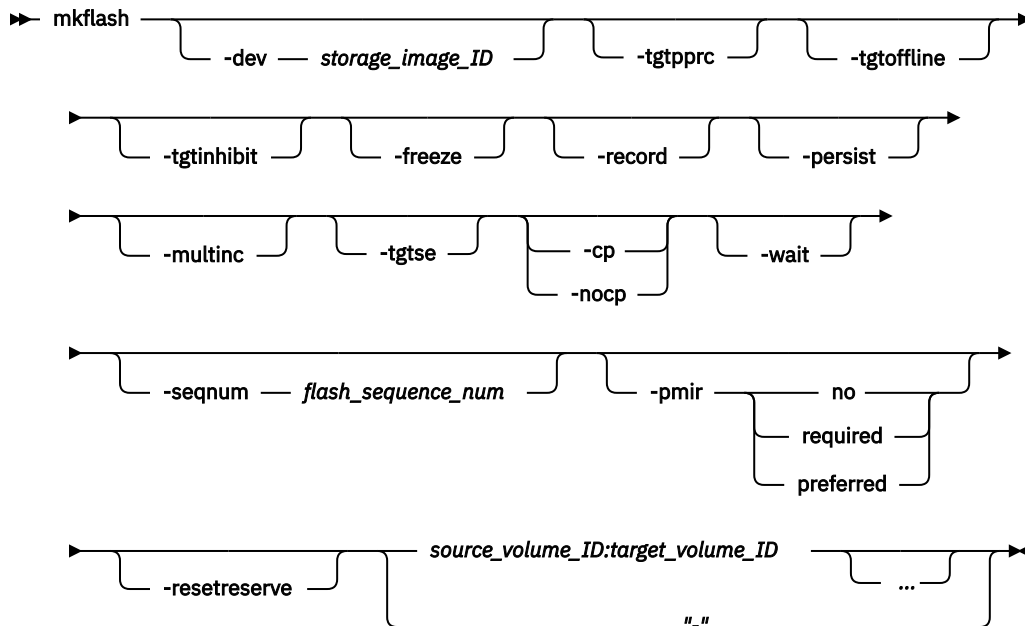
The target is an extent space-efficient (ESE) volume. ESE volumes are used for thin provisioning.

Unknown

The space allocation method of the target is not known.

mkflash

The **mkflash** command starts a point-in-time copy from source volumes to target volumes.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID consists of a manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source and target volumes. It is also not required if you do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current comm. For example, storage system models use IBM.2107-75FA120

-tgtpprc

(Optional) Allows the FlashCopy target volume to be a remote mirror and copy source volume.

-tgtoffline

(Optional) Rejects the **mkflash** command if the target volume is online for host system access. This parameter applies only to count key data (CKD) volumes.

-tgtinhibit

(Optional) Prevents host system write operations to the target volume while the FlashCopy relationship exists.

-freeze

(Optional) Starts the *queue full* condition for the source volume. During the *queue full* condition, the source volume reports a status of *long busy*. All writes to the source volume are queued by the host and are written after the *queue full* condition is reset. The *queue full* condition is reset by an *extended long busy timeout* condition. The timeout condition affects all FlashCopy source volumes that are contained within a respective logical subsystem and that are established or modified with this parameter.

Note: Use the **chlss** and the **chlcu** commands to modify the extended long busy timeout setting.

-record

(Optional) This parameter, without the **-multinc** parameter, creates a type 1 incremental FlashCopy relationship. The type 1 FlashCopy records data changes on both the source and target volumes of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

Select this parameter when you create an initial FlashCopy relationship that you later want to use with the **resyncflash** or **reverseflash** command. If the **-multinc** parameter is not selected, you can also use the **setflashrevertible** command.

When you select the **-record** parameter, the **-persist** parameter is automatically selected.

-persist

(Optional) Creates a persistent FlashCopy relationship in which the relationship remains after the copy completes and remains indefinitely until you enter a **rmflash** command against the FlashCopy pair. If this parameter is not specified, a normal FlashCopy relationship is created and is automatically removed after the copy completes.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

See the **-record** parameter for a description of a type 1 incremental FlashCopy relationship and the **-multinc** parameter for a description of a type 2 incremental relationship.

When you select either the **-record** or the **-multinc** parameter, the **persist** parameter is automatically selected.

-multinc

(Optional) Creates a type 2 incremental FlashCopy relationship. The type 2 FlashCopy records data changes only on the target volume of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

The type 2 FlashCopy allows for more than one incremental FlashCopy relationship from the same source volume. However, because the change recording is maintained only on the target volume, the type 2 FlashCopy can cause a performance impact as more type 2 FlashCopy relationships are added.

Select this parameter when you create multiple FlashCopy volume pairs with the same source volume that you want to use with the **resyncflash** and **reverseflash** commands. However, FlashCopy pairs that are established with this modified recording method cannot be used with the **setflashrevertible** command.

When you select the **-multinc** parameter, the **-persist** and **-record** parameters are automatically selected.

-tgtse

(Optional) The target volume you specify is a space efficient volume.

-nocp

(Optional) Inhibits a background copy. Data is copied from the source volume to the target volume only if a track on the source volume is modified. The FlashCopy volume pair relationship remains indefinitely until it is broken by a **rmflash** command or until all tracks on the source volume are modified.

When the **-tgtse** parameter is specified and neither the **-cp** nor the **-nocp** parameters are specified, the no background copy behavior is the default.

Note: You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-cp

(Optional) Starts a background copy. When the **-tgtse** parameter is not specified and neither the **-cp** nor the **-nocp** parameters are specified, the background copy behavior is the default.

Note: You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-wait

(Optional) Delays the command response until the background copy process is complete.

Notes:

1. You cannot use the **-wait** parameter with either the **-persist** or the **-nocp** parameters.
2. You cannot use the **-wait** parameter when **-tgtse** is specified and neither the **-cp** nor the **-nocp** parameters are specified. No background copy behavior is the default.

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relationships that are established with the specified sequence number. You can use this sequence number as an identifier for a relationship or group of relationships. An example sequence number is 00010.

-pmir *no* | *required* | *preferred*

The Remote Pair Copy option that you want to use. The Remote Pair FlashCopy is also known as Preserve Mirror. The function preserves synchronous Metro Mirror pairs when the FlashCopy source volume and target volume are Metro Mirror primary volumes and the Metro Mirror secondary volumes are on the same storage system. The FlashCopy operation is processed on both the local site and the remote site.

no

FlashCopy operations are not processed on the remote site. If the target volume is a Metro Mirror primary volume, the remote copy might temporarily change to the duplex pending state. The default is *no* if the **-pmir** parameter is not specified.

required

FlashCopy operations do not change the state of the Metro Mirror primary volume pair to duplex pending. Both the source Metro Mirror volume pair and the target Metro Mirror volume pair must be in the full duplex state.

preferred

Uses the Remote Pair Copy option for FlashCopy operations when possible. The Remote Pair Copy option cannot be used if the configuration is not correct or the state of the volume is not supported by this function.

Notes:

- The **-preferred** parameter is only valid for DS8870 and earlier system types.
- The **-preferred** parameter is not valid for targets which are also PPRC multi-target primaries.

-resetreserve

(Optional) Forcibly clears any SCSI reservation on the target volume and allows establishing of a FlashCopy relationship. The reservation is not restored after the relationship is established.

- When this option is not specified and the target volume is reserved, the command fails.
- This option is ignored if the target is a CKD volume; this option is applicable only for fixed block volumes.

***source_volume_ID:target_volume_ID ...* | -**

(Required) Establishes a FlashCopy relationship for the source and target volume pairs with the specified IDs. This parameter accepts fully qualified volume IDs, which consist of storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You can also specify a value for the *dev* variable in your profile file. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

Note: You might receive an error message when the number of relationships have exceeded or when an initial volume format is in progress. This message means that the FlashCopy relationship cannot be established because the maximum number of relationships have already been established. Or, the

volume was recently created and is still being initialized to support FlashCopy processing. You can issue the **mkflash** command to establish the FlashCopy relationship after the initial volume format process is complete.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

An example of a fully qualified FlashCopy pair ID is
 IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

An example of a shortened version is 0001:0004

An example of multiple pairs is 0001:0004 0003:00FF 0008:000C

Example: Starting a point-in-time copy from the specified source volumes to the specified target volumes

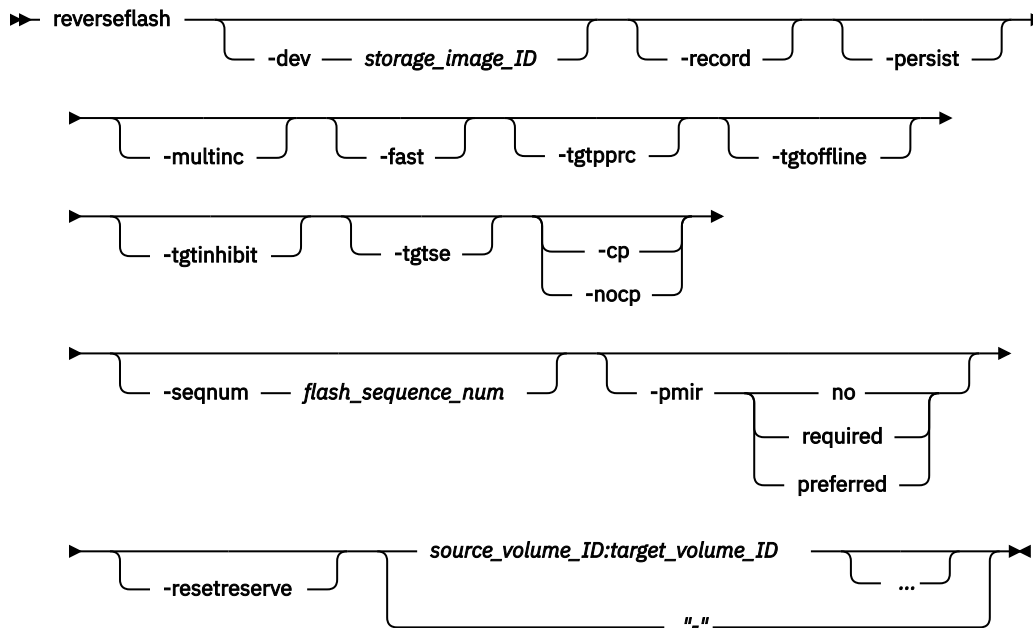
```
dsccli> mkflash -dev IBM.2107-75FA120 -freeze 0100:0200
```

Output

```
FlashCopy pair 0100:0200 successfully created.
```

reverseflash

The **reverseflash** command reverses FlashCopy relationships.



Parameters

You can reverse the direction of a FlashCopy relationship, where the volume that was previously defined as the target becomes the source for the volume that was previously defined as the source. The data that has changed is copied to the volume that was previously defined as the source. For example, you create a FlashCopy relationship between source volume A and target volume B. Data loss occurs on source volume A. To keep applications running, you can reverse the FlashCopy relationship so that volume B is copied to volume A.

After the reversal takes place, ensure that you designate this new relationship when you issue any future commands. Failure to designate this reversed relationship can produce unexpected results. For example, you use the **reverseflash** command to reverse the relationship of source volume 1600 and target volume 1800. The source volume then becomes 1800 and the target volume becomes 1600. All queries and future processing on this relationship must show volume 1800 as the source and volume 1600 as the target.

The following list defines the parameters that are associated with the **reverseflash** command:

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source and target volumes, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command. For example, storage system models use IBM.2107-75FA120

-record

(Optional) This parameter, without the **-multinc** parameter, creates a type 1 incremental FlashCopy relationship. The type 1 FlashCopy records data changes on both the source and target volumes of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

Select this parameter when you create an initial FlashCopy relationship that you later want to use with the **resyncflash** or **reverseflash** command. If the **-multinc** parameter is not selected, you can also use the **setflashrevertible** command.

When you select the **-record** parameter, the **-persist** parameter is automatically selected.

-persist

(Optional) Creates a persistent FlashCopy relationship in which the relationship remains after the copy completes and remains indefinitely until you enter a **rmflash** command against the FlashCopy pair. If this parameter is not specified, a normal FlashCopy relationship is created and is automatically removed after the copy completes.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

See the **-record** parameter for a description of a type 1 incremental FlashCopy relationship and the **-multinc** parameter for a description of a type 2 incremental relationship.

When you select either the **-record** or the **-multinc** parameter, the **persist** parameter is automatically selected.

-multinc

(Optional) Creates a type 2 incremental FlashCopy relationship. The type 2 FlashCopy records data changes only on the target volume of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

The type 2 FlashCopy allows for more than one incremental FlashCopy relationship from the same source volume. However, because the change recording is maintained only on the target volume, the type 2 FlashCopy can cause a performance impact as more type 2 FlashCopy relationships are added.

Select this parameter when you create multiple FlashCopy volume pairs with the same source volume that you want to use with the **resyncflash** and **reverseflash** commands. However, FlashCopy pairs established with this modified recording method cannot be used with the **setflashrevertible** command.

When you select the **-multinc** parameter, the **-persist** and **-record** parameters are automatically selected.

-fast

(Optional) Use this parameter when you want to process the **reverseflash** command before the background copy completes.

Note: To use the fast reverse function, the relationship must be set to target write inhibit. The fast reverse processing function is intended for use as part of Global Mirror recovery process.

At the end of this operation, the original FlashCopy target volume is not usable. Normally, after this command completes the background copy, the new FlashCopy target volume is used as the FlashCopy source volume to restore the original FlashCopy target volume.

-tgtpprc

(Optional) Allows the FlashCopy target volume to be a Remote Mirror and Copy source volume.

-tgtoffline

(Optional) Rejects the **reverseflash** command if the target volume is online for host system access. This parameter applies only to count key data (CKD) volumes.

-tgtinhibit

(Optional) Prevents host system write operations to the target while the FlashCopy relationship exists.

-tgtse

(Optional) The target volume that you are designating for a FlashCopy relationship might be a space-efficient logical volume. An error message is generated if the target volume that you are using to create the FlashCopy relationship is a space-efficient volume and you do not specify this parameter.

-nocp

(Optional) Inhibits a background copy. Data is copied from the source volume to the target volume only if a track on the source volume is modified. The FlashCopy volume pair relationship remains indefinitely until it is broken by a **rmflash** command or until all tracks on the source volume are modified.

If neither the **-cp** nor the **-nocp** parameter are specified, then the default background copy behavior is determined by the **-tgtse** and **-fast** parameters. If the **-tgtse** parameter is specified, and the **-fast** parameter is not specified, then the default behavior is to not perform a background copy. Otherwise, the default behavior is to perform a background copy.

Note: You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-cp

(Optional) Starts a background copy. Data is copied from the source volume to the target volume as a background task and does not require any source volume modifications to trigger the copy.

If neither the **-cp** nor the **-nocp** parameter are specified, then the default background copy behavior is determined by the **-tgtse** and **-fast** parameters. If the **-tgtse** parameter is specified, and the **-fast** parameter is not specified, then the default behavior is to not perform a background copy. Otherwise, the default behavior is to perform a background copy.

Note: You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-seqnum flash_sequence_num

(Optional) Associates the FlashCopy relationships that are established with the specified sequence number. You can use this sequence number as an identifier for a relationship or group of relationships. An example sequence number is 00010.

-pmir no | required | preferred

The Remote Pair Copy option that you want to use. The Remote Pair Copy option, sometimes called Preserve Mirror, preserves synchronous Metro Mirror pairs when the FlashCopy source volume and target volume are Metro Mirror primary volumes and the Metro Mirror secondary volumes are on the same storage system. The FlashCopy operation is performed on both the local site and the remote site.

no

FlashCopy operations are not performed on the remote site. If the target volume is a Metro Mirror primary volume, the remote copy might temporarily change to the duplex pending state. The default is *no* if the **-pmir** parameter is not specified.

required

FlashCopy operations do not change the state of the Metro Mirror primary volume pair to duplex pending. Both the source Metro Mirror volume pair and the target Metro Mirror volume pair must be in the full duplex state.

preferred

Uses the Remote Pair Copy option for FlashCopy operations when possible. The Remote Pair Copy option cannot be used if the configuration is not correct or the state of the volume is not supported with this function.

Notes:

- The **-preferred** parameter is only valid for DS8870 and earlier system types.
- The **-preferred** parameter is not valid for targets which are also PPRC multi-target primaries.

-resetreserve

(Optional) Forcibly clears any SCSI reservation on the target volume and allows establishing of a FlashCopy relationship. The reservation is not restored after the relationship is established.

- When this option is not specified and the target volume is reserved, the command fails.
- This option is ignored if the target is a CKD volume; this option is applicable only for fixed block volumes.

source_volume_ID:target_volume_ID ... | -

(Required) Establishes a FlashCopy relationship for the source and target volume pairs with the specified IDs. This parameter accepts fully qualified volume IDs, which consist of storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You can also specify a value for the *dev* variable in your profile file. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

An example of a fully qualified FlashCopy pair ID is
IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

An example of a shortened version is 0001:0004

An example of multiple pairs is 0001:0004 0003:00FF 0008:000C

Example: Reversing the FlashCopy relationship that is associated volume pair 0100:0200

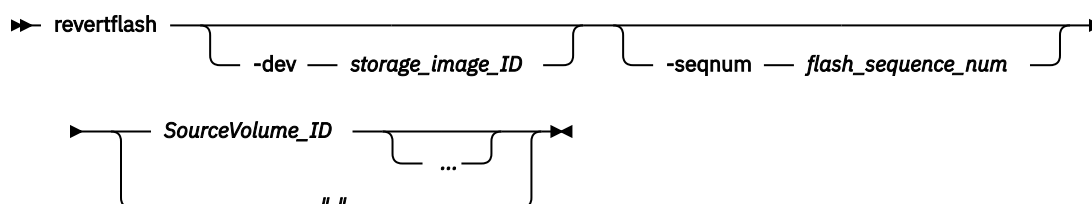
```
dscli> reverseflash -dev IBM.2107-75FA120 0100:0200
```

Output

```
FlashCopy volume pair 0100:0200 successfully reversed.
```

revertflash

The **revertflash** command is used as part of the recovery from a disaster scenario to rollback a Global Mirror consistency group that is in the process of forming. The former Global Mirror consistency group is restored.



Parameters

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source volume, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-seqnum flash_sequence_num

(Optional) The FlashCopy sequence number. When this number is specified, the **revertflash** operation is performed only on those relationships that are associated with the specified number.

Example: 0010

SourceVolumeID ... | -

(Required) The source volume ID for which the FlashCopy relationship is to be reverted. The chosen FlashCopy pair is the one established or modified with the **-record** parameter. This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the **-dev** parameter is specified or you specify a value for the *devid* variable in your profile file. You must separate multiple source volume IDs with spaces.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified volume ID: IBM.2107-75FA120/0001

Example of a shortened version: 0001

Example of multiple IDs: 0001 0003 0008

Example: Reverting the FlashCopy relationship for the specified volume pair

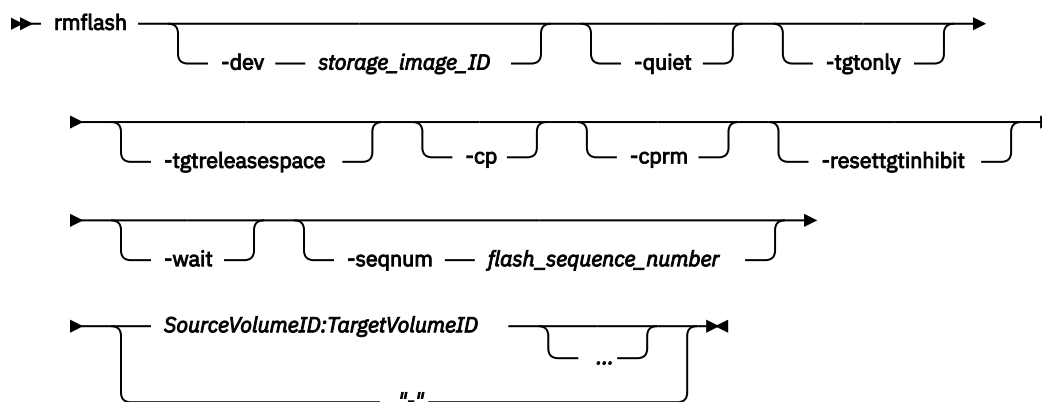
```
dscli> revertflash -dev IBM.2107-75FA120 0100
```

Output

```
FlashCopy pair 0100:0200 successfully reverted.
```

rmflash

The **rmflash** command removes a relationship between FlashCopy volume pairs.



Parameters

Notes:

1. The **rmflash** command will not process Safeguarded Copy relationships.
2. Issuing the **rmflash** command with the **-cp** parameter on a FlashCopy relationship that was previously marked with the **-persist** parameter does not remove the relationship. Instead, the source data is copied to the target.
3. Issuing the **rmflash** command with the **-resettgtinhibit** parameter does not withdraw the relationship, but resets the **-tgtinhibit** parameter if it was previously set.
4. All settings apply to all specified FlashCopy pairs.
5. Do not use the **-wait** parameter on persistent relations.

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source and target volumes. It is also required if you do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-quiet

(Optional) Turns off the FlashCopy pair removal confirmation prompt.

-tgtonly

(Optional) The target volume of the FlashCopy pair to remove the relationship. In addition, the *Copy Indicator* for the target volume is reset.

Note: If you use the **-tgtonly** parameter on CKD volumes, any data set level relationships created by a IBM Z host are removed from the specified target volume.

-tgtreleasespace

(Optional) The storage system releases space (if possible) that has been allocated to a space-efficient logical target volume.

-cp

(Optional) Changes a FlashCopy relationship from *No Copy* to *Copy* and the remaining source volume tracks are copied to the target volume. The relationship is removed when all the data is copied unless the relationship is persistent. When this parameter is specified, the copy takes place for all volume pairs where the source volume ID is identical to the source volume that is specified in the command.

-cprm

(Optional) Changes a FlashCopy relationship from *No Copy* to *Copy* and copies the remaining source volume tracks to the target volume. The relationship is removed after all of the data is copied. If the FlashCopy relationship is a remote relationship established automatically by another establish FlashCopy with the preserve mirror option set to "preferred" or "required", then the **rmflash** command fails if you do not use the **-cprm** parameter.

For non-persistent relationships, a Background Copy is initiated for all of the existing relationships within the specified source and target volumes. The relationships are terminated after the background copy is completed. For persistent relationships, all of the existing relationships within the specified source and target volumes change to non-persistent relationships, and then a Background Copy is initiated. The relationships are terminated after the background copy is completed.

-resettgtinhibit

(Optional) Prevents host system write operations to the target volume while the FlashCopy relationship exists.

Note: Specifying this parameter does not cause the FlashCopy relationship to be withdrawn.

-wait

(Optional) Delays the command response until the background copy process completes.

Notes:

1. Only pairs of source and target volume IDs are allowed when you use the **-wait** parameter.
2. The **-cp** parameter must be used with the **-wait** parameter.
3. Do not use the **-wait** parameter on relationships that are marked **-persist**, an error results from this usage.

-seqnum flash_sequence_num

(Optional) The FlashCopy sequence number. When you specify a number, the **rmflash** command processes only on those relationships that are associated with the specified number.

Example: 0010

SourceVolumeID:TargetVolumeID ... | -

(Required) The source and target volume pairs for which the FlashCopy relationships are removed. This parameter accepts a fully qualified volume ID, which includes storage image IDs, or a shortened version without storage image IDs if the **-dev** parameter is specified or you specify a value for the *dev* variable in your profile file. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

When the **-tgtonly** parameter is specified, you must enter volume IDs. Volume pair IDs are not valid with the **-tgtonly** parameter.

The volume ID is a 32 bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY)

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use this feature if you are using the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID: IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

Example of a shortened version: 0001:0004

Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example: Removing the FlashCopy relationship between the specified volume pairs

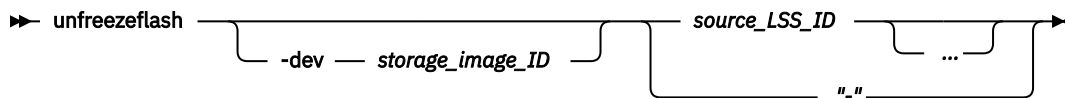
```
dsccli > rmflash -dev IBM.2107-75FA120 -tgtreleasespace 0100:0200
```

Output

```
Are you sure you want to remove the FlashCopy pair 0001:0002? [y/n]: Y  
FlashCopy pair 0100:0200 successfully removed.
```

unfreezeflash

The **unfreezeflash** command resets a FlashCopy consistency group that was previously established with the **-freeze** parameter when the **mkflash** or **resyncflash** commands were issued.



Parameters

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

source_LSS_ID ... | -

(Required) The FlashCopy consistency group is reset for the designated source LSS IDs you specify. The parameter also accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified or you specify a value for the *devid* variable in your profile file.

The fully qualified LSS ID format is *storage_image_ID/XX*. The value for *XX* is 00 - FE.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified LSS ID: IBM.2107-75FA120/00

Example of a shortened version: 00

Example of multiple IDs: 10 20 30

Example: Removing the extended long busy state for all volumes in the specified LSS

```
dsccli> unfreezeflash -dev IBM.2107-75FA120 01
```

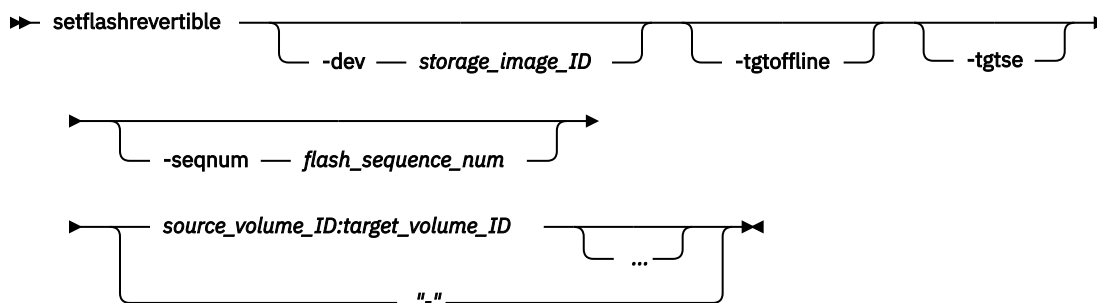
Output

```
FlashCopy consistency group for logical subsystem 01 successfully reset.
```

setflashrevertible

The **setflashrevertible** command modifies a FlashCopy volume pair that is part of a FlashCopy relationship to *revertible*.

The revertible feature allows data to be committed to the target to form a new consistency group or to revert to the last consistency group. This command must be run before the FlashCopy pair can be committed or reverted.



Parameters

Note: The **-nocp**, **-record**, **-persist**, and **-tgtinhibit** (target inhibit) parameters are included automatically when this command processes.

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all source and target volumes, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-tgtoffline

(Optional) Causes an establish FlashCopy volume pair command to be rejected if the target volume is online for host system access. This parameter applies only to CKD volumes.

-tgtse

(Optional) The target volume that you are designating for a FlashCopy relationship might be a space-efficient logical volume. An error message is generated if the target volume is a space-efficient volume and you do not specify this parameter.

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relationships that are changed with the specified sequence number. Only the relationships that are successfully modified by the command are assigned the specified sequence number, leaving the ones that fail with the previous number (if previously specified).

Example: 0010

source_volume_ID:target_volume_ID ... | -

(Required) Modifies FlashCopy relationships for the source and target volume pairs with the IDs specified. This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs, if the **-dev** parameter is specified. Or, you can specify a value for the *dev* variable that resides in your profile file. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32 bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID:IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

Example of a shortened version: 0001:0004

Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example: Reverting the FlashCopy volume pair (0100:0200)

```
dscli> setflashrevertible -dev IBM.2107-75FA120 -tgtse 0100:0200
```

Output

```
FlashCopy volume pair 0100:0200 successfully made revertible.
```

Remote FlashCopy commands

Commands that are used to configure Remote FlashCopy relationships and to display Remote FlashCopy information are referenced. Remote FlashCopy commands are used to process what was formerly known as inband FlashCopy transactions. These types of transactions cannot be handled through the GUI.

A remote flash is a FlashCopy relationship on a machine at a remote site from the local site machine that you are connected to.

The following Remote FlashCopy commands are available:

commitremoteflash

Sends data to a target volume to form a consistency between the remote source and target FlashCopy pair.

resyncremoteflash

Increments an existing remote FlashCopy pair that has been established with the **-record** and **-persist** parameters.

lsremoteflash

Generates a report that displays a list of FlashCopy relationships and the status information for each FlashCopy relationship in the list.

mkremoteflash

Initiates a remote point-in-time copy from source volumes to target volumes through a remote mirror and copy relationship.

revertremoteflash

Restores data on the source volume to its most recent consistency formation.

rmremoteflash

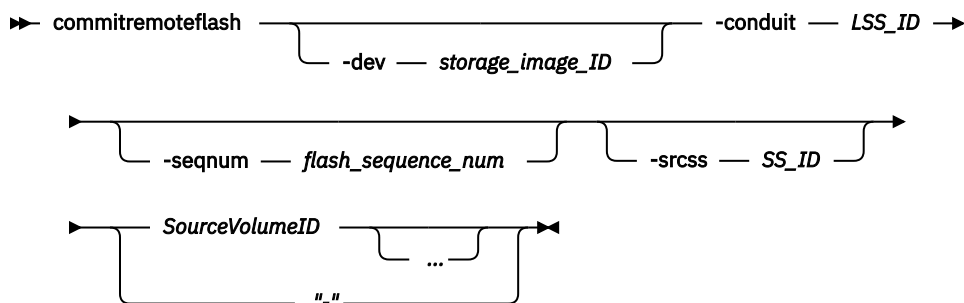
Removes a relationship between remote FlashCopy volume pairs.

setremoteflashrevertible

Modifies the specified remote FlashCopy volume pair that is part of a Global Mirror relationship to a revertible state. This command must be run before the FlashCopy pair can be committed or reverted.

commitremoteflash

The **commitremoteflash** command sends data to a target volume to form consistency between the remote source and target FlashCopy pair.



Parameters

Notes:

1. Establish the pair by issuing either the **mkflash** or **mkremoteflash** command with the **-record** and **-persist** parameters.
2. Issue either the **setflashrevertible** or **setremoteflashrevertible** command against the pair.

Only after you have taken these two steps can you issue the **commitremoteflash** command.

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2107-75FA120

-conduit LSS_ID

(Required) The source logical subsystem (LSS) of an existing remote mirror and copy relationship that is to be used as a means for communicating with the remote storage image. The source volume IDs that are specified in the **SourceVolumeID** parameter must serve as secondary volumes in a remote mirror and copy relationship in which one of the conduit LSS volumes serves as a primary volume.

When you specify this parameter, you must specify a fully qualified LSS ID. The fully qualified LSS ID format is storage_image_ID/XX. The value for the XX is 00 - FE.

-seqnum flash_sequence_number

(Optional) The commit operation is performed only on those source volumes that are associated with the specified sequence number.

This parameter is not supported for machine type 2105.

Example: 0010

-srcss SS_ID

(Optional) The subsystem ID of the source logical subsystem at the remote site. When this parameter is used, all source volumes must be within the same logical subsystem.

This parameter is required only for IBM Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example: FF10

SourceVolumeID ... | -

(Required) Commits remote FlashCopy relationships for the source volumes with the specified IDs. The chosen pair is the one with the enabled **-record** parameter. You must separate multiple source volume IDs with spaces.

This parameter accepts fully qualified volume IDs, which includes the storage image ID, or a shortened version without the storage image ID if either the **-dev** parameter is specified, or you can specify a value for the *devid* variable in your profile file.

The volume ID is a 32 bit number that can be represented as 4 hexadecimal digits in the form of XYZZ, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified volume ID: IBM.2107-75FA120/0001

Example of a shortened version: 0001

Example of IDs: 0001 0003 0008

Example: Committing data to form consistency between the specified remote source and target FlashCopy pair

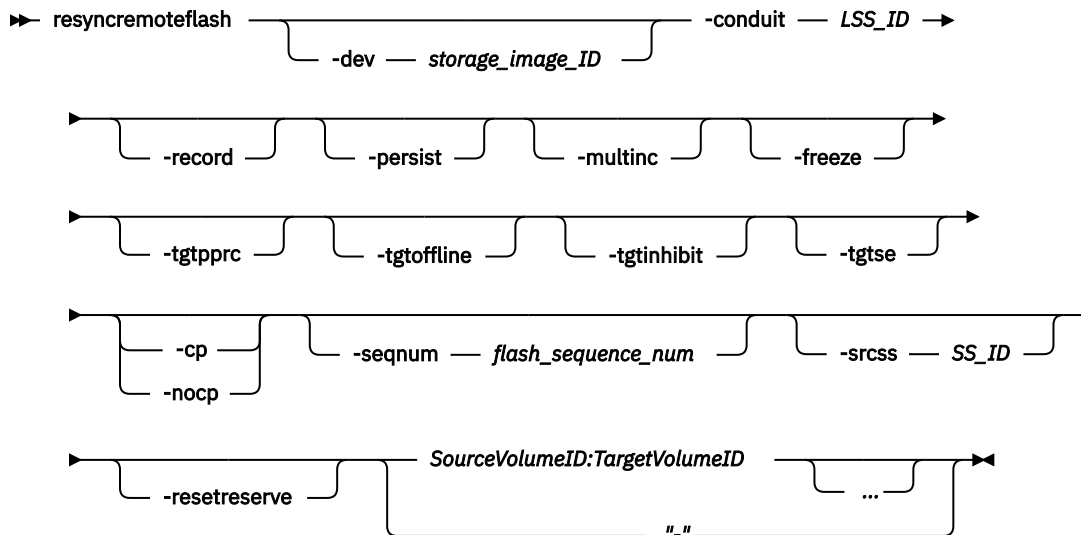
```
dsccli> commitremoteflash -dev IBM.2107-75FA120 -conduit IBM.2107-75FA150/10 0100
```

Output

```
FlashCopy pair 0100:0200 successfully committed.
```

resyncremoteflash

The **resyncremoteflash** command (formerly called the **incremoteflash** command and associated with the incremental FlashCopy process) increments an existing remote FlashCopy pair that has been established with the **-record** and **-persist** parameters.



Parameters

Note: When a pair is established with the **-record** and **-persist** parameters, the pair initially synchronizes and then a record of all data that is written from the host to the source is maintained in the source volumes. When the **resyncremoteflash** command is issued on the pair, the new data that is written to the source is copied to the target. The specified parameters in this command replace the parameters in the existing relationship. To keep the initial **-record** and **-persist** parameter values, the **-record** and **-persist** parameters must be specified using the **resyncremoteflash** command.

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-conduit *LSS_ID*

(Required) The source logical subsystem (LSS) of an existing remote mirror and copy relationship that is to be used as a means for communicating with the remote storage image. The source volume IDs that are specified in the **SourceVolumeID:TargetVolumeID** parameter, must serve as secondary volumes in a remote mirror and copy relationship in which one of the conduit LSS volumes serves as a primary volume.

When you use this parameter, you must specify a fully qualified LSS ID. The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

Example: IBM.2107-75FA120/00

-record

(Optional) This parameter, without the **-multinc** parameter, creates a type 1 incremental FlashCopy relationship. The type 1 FlashCopy records data changes on both the source and target volumes of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

Select this parameter when you create an initial FlashCopy relationship that you later want to use with the **resyncflash** or **reverseflash** command. If the **-multinc** parameter is not selected, you can also use the **setflashrevertible** command.

When you select the **-record** parameter, the **-persist** parameter is automatically selected.

-persist

(Optional) Creates a persistent FlashCopy relationship in which the relationship remains after the copy completes and remains indefinitely until you enter a **rmflash** command against the FlashCopy pair. If this parameter is not specified, a normal FlashCopy relationship is created and is automatically removed after the copy completes.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

See the **-record** parameter for a description of a type 1 incremental FlashCopy relationship and the **-multinc** parameter for a description of a type 2 incremental relationship.

When you select either the **-record** or the **-multinc** parameter, the **persist** parameter is automatically selected.

-multinc

(Optional) Creates a type 2 incremental FlashCopy relationship. The type 2 FlashCopy records data changes only on the target volume of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

The type 2 FlashCopy allows for more than one incremental FlashCopy relationship from the same source volume. However, because the change recording is maintained only on the target volume, the type 2 FlashCopy can cause a performance impact as more type 2 FlashCopy relationships are added.

Select this parameter when you create multiple FlashCopy volume pairs with the same source volume that you want to use with the **resyncflash** and **reverseflash** commands. However, FlashCopy pairs established with this modified recording method cannot be used with the **setflashrevertible** command.

When you select the **-multinc** parameter, the **-persist** and **-record** parameters are automatically selected.

-freeze

(Optional) The Freeze Consistency Group condition. This parameter causes the source volume to be busy (Queue Full status on Open Systems) to all host I/O operations until a FlashCopy Consistency Group Created command is received. All writes to the source volume are queued by the host and are written after the Consistency Group Created command is complete.

During the busy condition, the source volume reports Queue Full for fixed block volumes and busy status for CKD volumes.

The busy condition can also be reset by an *extended long busy timeout* (default 120 seconds). The timeout condition affects all FlashCopy source volumes that are contained within a respective logical subsystem and that are established or modified with the **-freeze** parameter.

Note: This parameter is used with other processing steps for purposes such as backups, testing, or recovery solutions. The use of this parameter ensures that volumes on the target LSSs are consistent with the source LSSs volumes.

-tgtpprc

(Optional) Allows the FlashCopy target volume to be a remote mirror and copy source volume.

-tgtoffline

(Optional) Causes the **resyncremoteflash** command to be rejected if the target volume is online for host system access.

Note: This parameter applies only to count key data volumes.

-tgtinhibit

(Optional) Prevents host system write operations to the target while the FlashCopy relationship exists.

-tgtse

(Optional) The target volume you specify as a space-efficient logical volume. An error message is generated if the target volume is a space-efficient volume and you do not specify this parameter.

-nocp

(Optional) Inhibits the background copy. Data is copied from the source volume to the target volume only if a track on the source volume is modified. The FlashCopy volume pair relationship remains indefinitely until it is broken by a **rmflash** command, or until all tracks on the source volume are modified.

When **-tgtse** is specified and the **-cp** and **-nocp** parameters are not specified, the no background copy behavior is the default.

You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-cp

(Optional) Starts a background copy. When **-tgtse** is not specified and the **-cp** and **-nocp** parameters are not specified, the background copy behavior is the default.

You cannot use the **-cp** parameter with the **-nocp** parameter in the same command.

-seqnum flash_sequence_num

(Optional) Associates the FlashCopy relationships that are established with the specified sequence number. You can use this sequence number as an identifier for a relationship or group of relationships. Only the relationships that are modified successfully by the **resyncremoteflash** command are assigned the specified sequence number, leaving the ones that fail with the previous one (if they were previously specified).

Example: 0010

-srcss SS_ID

(Optional) The subsystem ID of the source logical subsystem at the remote site. The subsystem ID is a four-digit hexadecimal number in the range (0001 - FFFF). When this parameter is used, all source volumes must be designated within the same logical subsystem.

This parameter is required for IBM Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example: FF10

-resetreserve

(Optional) Forcibly clears any SCSI reservation on the target volume and allows establishing of a FlashCopy relationship. The reservation is not restored after the relationship is established.

- When this option is not specified and the target volume is reserved, the command fails.
- This option is ignored if the target is a CKD volume; this option is applicable only for fixed block volumes.

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote FlashCopy relationship for the source and target volume pairs be incremented with the designated IDs. This parameter accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified,

A FlashCopy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID: IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

Example of a shortened version: 0001:0004

Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example. Resynchronizing the Remote FlashCopy volume pair 0100:0200

```
dsccli> resyncremoteflash -dev IBM.2107-75FA120 -conduit IBM.2107-75FA150/10 0100:0200
```

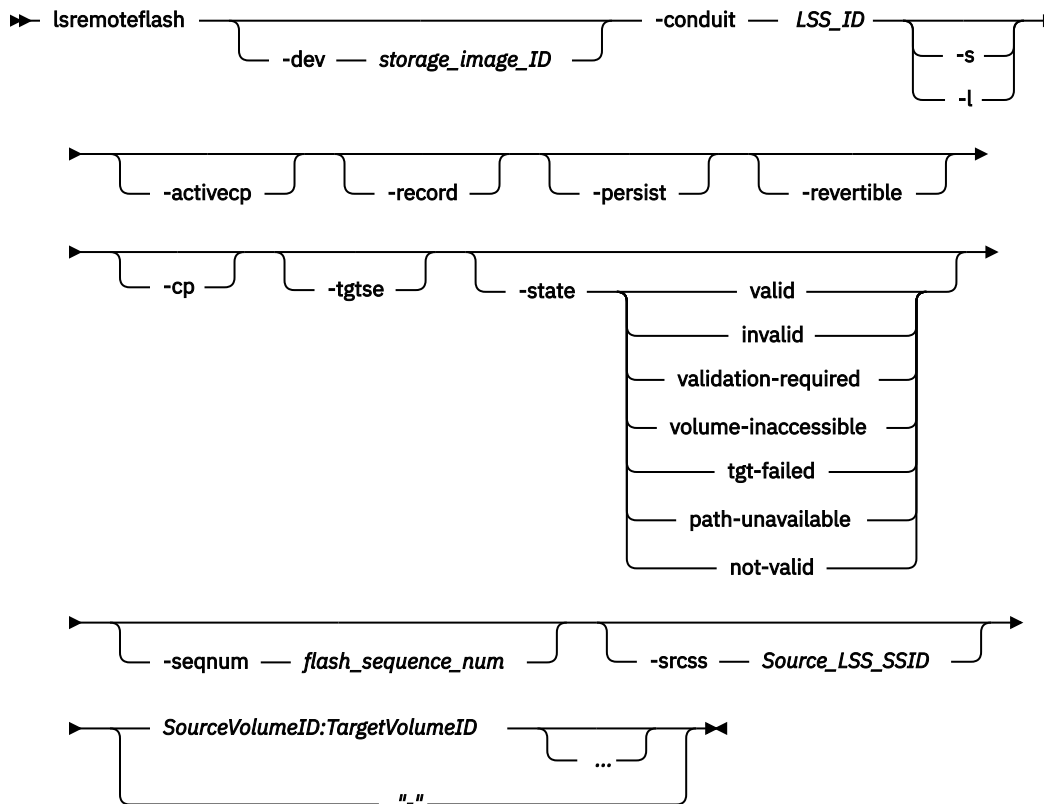
Output

```
Remote FlashCopy volume pair 0100:0200 successfully resynchronized.  
Use the lsremoteflash command to determine copy completion.
```

Note: This message is returned before the copy completes.

lsremoteflash

The **lsremoteflash** command displays a list of remote FlashCopy relationships and status information for each FlashCopy relationship in the list. Remote FlashCopy relationships exist on a remote site, and can be queried using this command from your local site.



Parameters

Note: All settings apply to all FlashCopy pairs that are specified.

-dev *storage_image_ID*

(Optional) The remote site storage image ID consists of the manufacturer name, machine type, and serial number. The remote site storage image ID is required if you do not specify fully qualified IDs or do not set the *dev* variable in your profile or through the **setenv** command. The remote site storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-conduit *LSS_ID*

(Required) The source logical subsystem (LSS) of an existing Remote Mirror and Copy relationship that is used as a means for communicating with the remote storage image.

The source volume IDs that are specified in the *SourceVolumeID:TargetVolumeID* parameter must serve as secondary volumes in a Remote Mirror and Copy relationship in which one of the conduit LSS volumes serves as a primary volume.

This parameter accepts a fully qualified LSS ID, which includes the storage image ID. The fully qualified LSS ID format is *storage_image_ID/XX*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

-s

(Optional) Displays only FlashCopy pair IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output plus out-of-sync tracks and date that the FlashCopy relationship was created. You cannot use the **-l** and the **-s** parameters together.

-activecp

(Optional) Displays the FlashCopy relationships with an active background copy process.

-record

(Optional) Displays only the FlashCopy relationships that were established with the **-record** option.

-persist

(Optional) Displays the FlashCopy relationships that were established with the **-persist** parameter.

-revertible

(Optional) Displays the FlashCopy relationships that were established with the **-revertible** parameter.

-cp

(Optional) Displays the FlashCopy relationships that were established with the run background copy (**-cp**) parameter.

-tgtse

(Optional) Displays the FlashCopy relationships that have a space-efficient target.

-state valid | invalid | validation-required | volume-inaccessible | tgt-failed | path-unavailable | not-valid

(Optional) Displays the FlashCopy relationships that are identified by the specific state.

Note: When you specify *not-valid*, all FlashCopy relationships that do not meet the requirements for the *valid* state are displayed.

-seqnum *flash_sequence_number*

(Optional) Displays the FlashCopy relationships that are associated with the specified sequence number.

This parameter is not supported for machine type 2105.

-srcss *Source_LSS_SSID*

(Optional) Displays the subsystem ID of the source logical subsystem at the remote site. The ID is in the format 0x0001 - 0xFFFF.

This value is required for the IBM Enterprise Storage Server® versions 2.4.0 and 2.4.1. When you specify *SS_IDs*, the source volumes are restricted to one LSS.

Example: FF10

SourceVolumeID:TargetVolumeID ... | -

(Required) Displays the FlashCopy relationships for the remote site source and target volume pairs with the specified IDs.

Example: Displaying a list of remote FlashCopy relationships and status information for each FlashCopy relationship

```
dsccli> lsremoteflash -l -dev IBM.2107-75FA120
-conduit IBM.2107-75FA150/10 IBM.2107-75FA120/0100:IBM.2107-75FA120/0200
```

Output

| ID | SrcLSS | Sequence Num | Active Copy | Recording | Persistent | Revertible |
|-----------|--------|--------------|-------------|-----------|------------|------------|
| 0100:0200 | 01 | 10 | Disabled | Disabled | Disabled | Disabled |

| Source-Write-Enabled | Target-Write-Enabled | Background-Copy | Copy-Indicator | OutOf-Sync-Tracks | Date-Created | Date-Synced | State | is-TgtSE | Pmir |
|----------------------|----------------------|-----------------|----------------|-------------------|----------------------------|----------------------------|-------|----------|------|
| Enabled | Disabled | Disabled | Yes | 0 | 10/01 /2007 02:20:00 | 10/01 /2007 02:23:47 | Valid | TSE | No |

Output definitions:

ID*

The FlashCopy pair ID. The FlashCopy pair ID consists of two volume IDs. One is designated as the source and the other is the target volume for a FlashCopy relationship.

SrcLSS

The logical subsystem ID.

SequenceNum

The sequence number that is associated with the FlashCopy relationship.

ActiveCopy

The status displays whether the background copy is active on the specified FlashCopy pair.

Recording

The change recording option that was used when creating the FlashCopy relationship. One of the following values is displayed for each FlashCopy relationship:

Disabled

The relationship was created without any of the change recording parameters.

Enabled

A type 1 relationship that was created with the **-record** parameter but without the **-multinc** parameter.

MultInc

A type 2 relationship that was created with both the **-record** and **-multinc** parameters.

Persistent

The status (enabled or disabled) of the designated FlashCopy pair that was established with persistent activated.

Revertible

The status (enabled or disabled) of the designated FlashCopy pair that was established with the revertible option activated.

SourceWriteEnabled

The status (enabled or disabled) of the FlashCopy relationship that was established with the Allow Source Writes option.

TargetWriteEnabled

The status (enabled or disabled) of the FlashCopy relationship that was established with the Allow Target Writes option.

BackgroundCopy

The status (enabled or disabled) of the FlashCopy relationship that was established with the Run Background Copy option.

OutofSyncTracks⁺

The number of tracks that are not synchronized for this FlashCopy relationship. A dash (-) is displayed when the track counter is not available.

DateCreated⁺

The date and the time that the FlashCopy relationship was established.

DateSynced

The date and the time that this FlashCopy relationship was synchronized, or " - " if the relationship is not synchronized.

State

The state of the FlashCopy relationships. One of the following values is displayed for each FlashCopy relationship:

Note: When a query indicates any state other than valid, the only information that is displayed on the report is the FlashCopy pair ID and the state condition. The rest of the information columns are displayed with a " - " value.

Valid

The FlashCopy relationship is in a normal state and was been queried successfully.

Validation Required

The FlashCopy relationship cannot be queried. The reason that the query is blocked is only temporary. If you issue a new query within several seconds, the problem no longer exists.

Tgt Failed

The FlashCopy relationship is in an error state. The point-in-time copy is lost, and the FlashCopy relationship must be withdrawn. You must issue the **rmflash** command to remove the FlashCopy relationship.

Volume Inaccessible

The volume cannot be accessed and that the query has failed. When this state is displayed, it generally means that the volume is in a fenced condition.

Invalid

A general internal error has occurred when the query is processed.

Path Unavailable

The specified inband path does not exist. The user must verify that the Remote Mirror and Copy path exists.

isTgtSE

Displays whether the FlashCopy relationship has a space-efficient target.

No

The target volume is not space-efficient.

TSE

The target is a track space-efficient volume.

ESE

The target is an extent space-efficient (ESE) volume. ESE volumes are used for thin provisioning.

Unknown

The space allocation method of the target is not known.

pmir

The IBM Remote Pair Copy option preserves synchronous Metro Mirror pairs when the FlashCopy source volume and target volume are Metro Mirror primary volumes and the Metro Mirror secondary volumes are on the same storage system. The FlashCopy operation is performed on both the local site and the remote site.

No

The IBM Remote Pair Copy option was not specified.

Preferred

The IBM Remote Pair Copy option was specified. If the target is a Metro Mirror primary, then the FlashCopy function must preserve the Full Duplex mode of the target Metro Mirror relationship, if it is possible. If the IBM Remote Pair Copy function is not possible, you can use processing defined for the IBM Remote Pair Copy option of "No".

Required

The IBM Remote Pair Copy option was specified. If the target is a Metro Mirror primary, then the FlashCopy function is required to preserve the Full Duplex mode of the target Metro Mirror relationship. Processing fails if the IBM Remote Pair Copy function is not possible.

Remote

The remote FlashCopy relationship was initiated by another FlashCopy established at the Metro Mirror primary site with the IBM Remote Pair Copy option of 'preferred' or 'required'.

Unknown

The IBM Remote Pair Copy relationship type cannot be determined. The source and target were created with IBM Remote Pair Copy, but they are no longer both Metro Mirror primaries or both Metro Mirror secondaries.

Key:

*

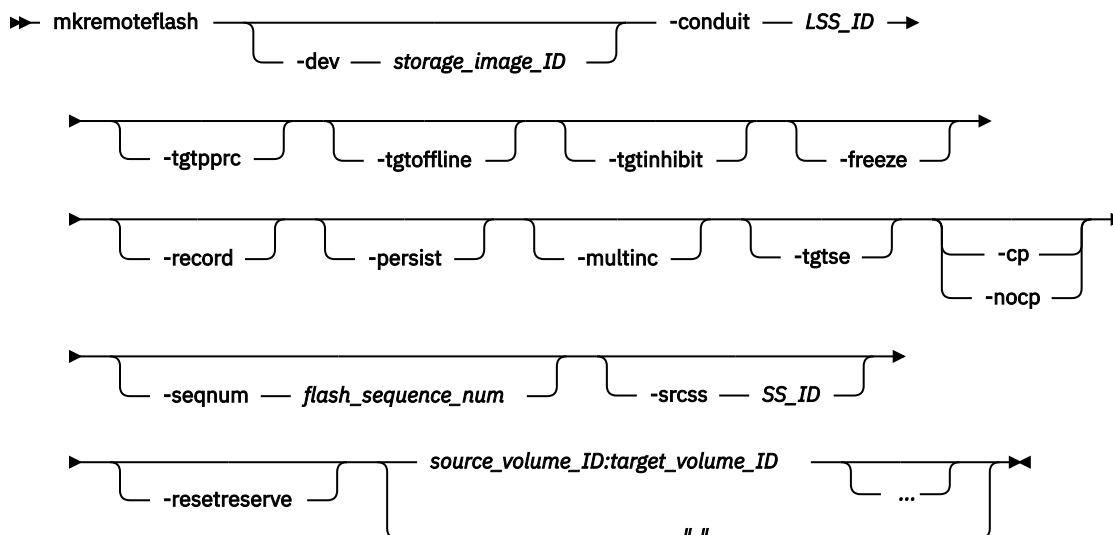
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

mkremoteflash

The **mkremoteflash** command initiates a remote point-in-time copy from source volumes to target volumes through a Remote Mirror and Copy relationship.



Parameters

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-conduit LSS_ID

(Required) The source logical subsystem (LSS) of an existing remote mirror and copy relationship that is to be used as a conduit for communicating with the remote storage image. The source volume IDs that are specified in the **SourceVolumeID:TargetVolumeID** parameter, must serve as secondary volumes in a remote mirror and copy relationship in which one of the conduit LSS volumes serves as a primary volume.

When you use this parameter, you must specify a fully qualified LSS ID. The fully qualified LSS ID format is *storage_image_ID/XX*. The value for *XX* is 00 - FE.

Example: IBM.2107-75FA120/00

-tgtpprc

(Optional) Allows the FlashCopy target volume to be a remote mirror and copy source volume.

-tgtoffline

(Optional) Causes the **mkremoteflash** command to be rejected if the target volume is online for host system access. This parameter applies only to CKD volumes.

-tgtinhibit

(Optional) Prevents host system write operations to the target while the FlashCopy relationship exists.

-freeze

(Optional) The Freeze Consistency Group condition. The use of this parameter triggers the *queue full* condition for the source volume. All writes to the source volume are queued by the host and are written after the *queue full* condition is reset.

During the *queue full* condition, the source volume reports *long busy* status.

The *queue full* condition is reset by an *extended long busy timeout* condition. The timeout condition affects all FlashCopy source volumes that are contained within a respective logical subsystem and that are established or modified with the **-freeze** parameter.

Note: This parameter is used with other processing steps for purposes such as backups, testing, or recovery solutions. The use of this parameter ensures that volumes on the target LSSs are consistent with the source LSSs volumes.

-record

(Optional) This parameter, without the **-multinc** parameter, creates a type 1 incremental FlashCopy relationship. The type 1 FlashCopy records data changes on both the source and target volumes of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

Select this parameter when you create an initial FlashCopy relationship that you later want to use with the **resyncflash** or **reverseflash** command. If the **-multinc** parameter is not selected, you can also use the **setflashrevertible** command.

When you select the **-record** parameter, the **-persist** parameter is automatically selected.

-persist

(Optional) Creates a persistent FlashCopy relationship in which the relationship remains after the copy completes and remains indefinitely until you enter a **rmflash** command against the FlashCopy pair. If this parameter is not specified, a normal FlashCopy relationship is created and is automatically removed after the copy completes.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

See the **-record** parameter for a description of a type 1 incremental FlashCopy relationship and the **-multinc** parameter for a description of a type 2 incremental relationship.

When you select either the **-record** or the **-multinc** parameter, the **persist** parameter is automatically selected.

-multinc

(Optional) Creates a type 2 incremental FlashCopy relationship. The type 2 FlashCopy records data changes only on the target volume of the FlashCopy pair.

A single volume can be the source volume to up to 12 FlashCopy relationships, and these relationships can be any combination of normal, persistent, or incremental relationships. However, only a single type 1 incremental relationship can exist.

The type 2 FlashCopy allows for more than one incremental FlashCopy relationship from the same source volume. However, because the change recording is maintained only on the target volume, the type 2 FlashCopy can cause a performance impact as more type 2 FlashCopy relationships are added.

Select this parameter when you create multiple FlashCopy volume pairs with the same source volume that you want to use with the **resyncflash** and **reverseflash** commands. However, FlashCopy pairs established with this modified recording method cannot be used with the **setflashrevertible** command.

When you select the **-multinc** parameter, the **-persist** and **-record** parameters are automatically selected.

-tgtse

(Optional) The target volume you specify is a space efficient volume.

-nocp

(Optional) Inhibits a background copy. Data will be copied from the source volume to the target volume only if a track on the source volume is modified. The FlashCopy volume pair relationship remains indefinitely until it is broken by a **rmremoteflash** command, or until all tracks on the source volume are modified.

When **-tgtse** is specified and the **-nocp** parameter is not specified, the no background copy behavior is the default. You cannot use the **-nocp** parameter with the **-cp** parameter in the same command.

-cp

(Optional) Starts a background copy. When (**-tgtse** is not specified) and neither the **-cp** nor the **-nocp** parameters are specified, the background copy behavior is the default.

You cannot use the **-cp** parameter with the **-nocp** parameter in the same command.

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relationships that are established with the specified sequence number. This sequence number can be used as an identifier for a relationship or group of relationships.

Example: 0010

-srcss *SS_ID*

(Optional) The subsystem ID of the source logical subsystem at the remote site. The ID is in the format 0x0001 - 0xFFFF.

-resetreserve

(Optional) Forcibly clears any SCSI reservation on the target volume and allows establishing of a FlashCopy relationship. The reservation is not restored after the relationship is established.

- When this option is not specified and the target volume is reserved, the command fails.
- This option is ignored if the target is a CKD volume; this option is applicable only for fixed block volumes.

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote FlashCopy relationship for the source and target volume pairs is to be incremented with the designated IDs. This parameter accepts fully qualified volume IDs, which includes the storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified.

A FlashCopy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID: IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

Example of a shortened version: 0001:0004

Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example: Creating a Remote FlashCopy volume pair 0100:0200

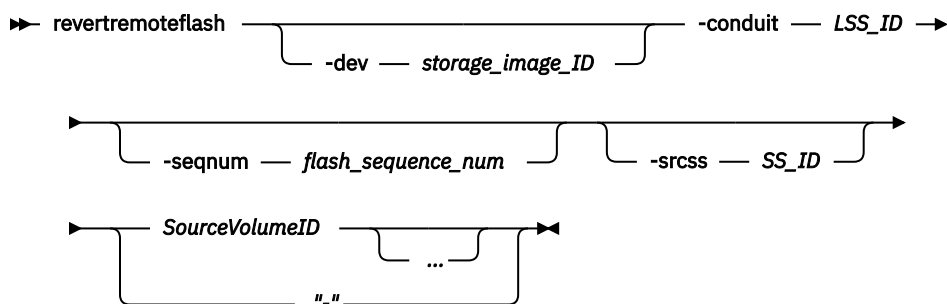
```
dscli> mkremoteflash -dev IBM.2107-75FA120  
-conduit IBM.2107-75FA150/10 0100:0200
```

Output

```
FlashCopy volume Pair 0100:0200 successfully created.  
Use the lsremoteflash command to determine copy completion.
```

revertremoteflash

The **revertremoteflash** command is used to restore data on the source volume to its most recent consistency formation. All new write operations to the source since the most recent consistency formation are overwritten with the previous consistency.



Parameters

You must take the following actions before you can use the **revertremoteflash** command:

Notes:

1. Issue the **mkflash** or **mkremoteflash** command with the **-persist** and **-record** parameters to establish the FlashCopy pair.
2. Issue the **setflashrevertible** or **setremoteflashrevertible** command against the FlashCopy pair.

-dev storage_image_ID

(Optional) Specifies the storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-conduit LSS_ID

(Required) Specifies the source logical subsystem (LSS) of an existing remote mirror and copy (formerly PPRC) relationship that is used as a means for communicating with the remote storage image. The source volume IDs that are specified in *SourceVolumeID:TargetVolumeID* must serve as secondary volumes in a remote mirror and copy relationship in which one of the conduit LSS volumes serves as a primary volume.

When you use this parameter, you must specify a fully qualified LSS ID. The fully qualified LSS ID format is *storage_image_ID/XX*. The value for XX is 00 - FE.

Example: IBM.2107-75FA120/00

-seqnum flash_sequence_num

(Optional) When a FlashCopy sequence number is specified, the **revertremoteflash** operation is performed only on those relationships that are associated with the specified number.

Example: 0010

This parameter is not supported for machine type 2105.

-srcss SS_ID

(Optional) Specifies the subsystem ID of the source logical subsystem at the remote site. The ID is in the format 0x0001 - 0xFFFF.

This value is required for the IBM Enterprise Storage Server versions 2.4.0 and 2.4.1. 3. When you specify *SS_IDs*, the source volumes are restricted to one logical subsystem.

Example: FF10

SourceVolumeID ... | -

(Required) Specifies the remote FlashCopy relationship for the source volume with the specified ID that is to be reverted. The chosen FlashCopy pair is the one that is established or modified with the **-record** parameter.

This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the **-dev** parameter is specified. You must separate multiple source volume IDs with spaces.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

XY

Specifies the logical subsystem number, 00 - FE.

ZZ

Specifies the volume number, 00 - FF.

X

Specifies the address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a shortened version: 0001

Example of multiple IDs: 0001 0003 0008

Example

Invoking the revertremoteflash command

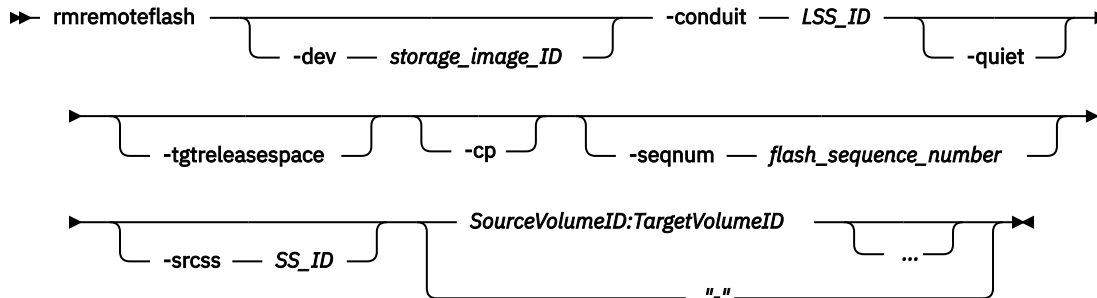
```
dscli> revertremoteflash -dev IBM.2107-75FA120  
-conduit IBM.2107-75FA150/10 0100
```

The resulting output

```
Remote FlashCopy volume pair 0100:0200 successfully reverted.
```

rmremoteflash

The **rmremoteflash** command removes a relationship between remote FlashCopy volume pairs.



Parameters

Notes:

1. Invoking this command and using the **-cp** parameter on a FlashCopy relationship that was previously marked with the **-persist** parameter does not remove the relationship. Instead, the source volume is copied to the target volume.
2. Invoking this command resets the **-tgtinhibit** parameter option if it was previously set.
3. All settings apply to all specified FlashCopy pairs.
4. The **-seqnum** parameter is not supported for model 2105.
5. When SS_IDs are specified, the source volumes are restricted to 1 LSS.

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-conduit LSS_ID

(Required) The source logical subsystem (LSS) of an existing remote mirror and copy (formerly PPRC) relationship that is to be used as a means for communicating with the remote storage image. The source volume IDs that are specified in *SourceVolumeID:TargetVolumeID* must serve as secondary volumes in a remote mirror and copy relationship in which one of the conduit LSS volumes serves as a primary volume.

This parameter allows the use of a fully qualified LSS ID, which includes the storage image ID. The fully qualified LSS ID format is *storage_image_ID/XX*. The value for XX is 00 - FE.

-quiet

(Optional) Turns off the FlashCopy pair removal confirmation prompt for this command.

-tgtreleasespace

(Optional) Releases the space that has been allocated to the space-efficient target logical volumes back to the repository. This release must occur at the same time that the FlashCopy pair is removed if the only access to the space-efficient volumes is through the conduit LSS ID.

-cp

(Optional) Changes the FlashCopy relationship from the *No Copy* to the *Copy* mode. Additionally the remaining source volume tracks are copied to the target volume. The relationship is removed when all the data is copied unless the relationship is persistent. When the **-cp** parameter is specified, the copy is processed for all volume pairs where the source volume ID is identical to the source volume that is specified in the command.

-seqnum *flash_sequence_num*

(Optional) The FlashCopy sequence number. When the sequence number is specified with this parameter, the **rmremoteflash** operation is performed only on those relations that are associated with the specified number.

-srcss *SS_ID*

(Optional) The subsystem ID of the source logical subsystem at the remote site. The ID is in the format 0x0001 - 0xFFFF.

This value is required for the IBM Enterprise Storage Server versions 2.4.0 and 2.4.1. 4. When you specify *SS_IDs*, the source volumes are restricted to one logical subsystem.

Example: FF10

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote FlashCopy relationships for the source and target volume pairs with the specified IDs that are to be removed.

This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the **-dev** parameter is specified. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID: IBM.2107-75FA120/0001:IBM.2107-68FA120/0004

Example of a shortened version: 0001:0004

Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example: Removing a relationship between remote FlashCopy volume pairs

```
dsccli> rmremoteflash -dev IBM.2107-75FA120
-conduit IBM.2107-75FA150/10 0100:0200
```

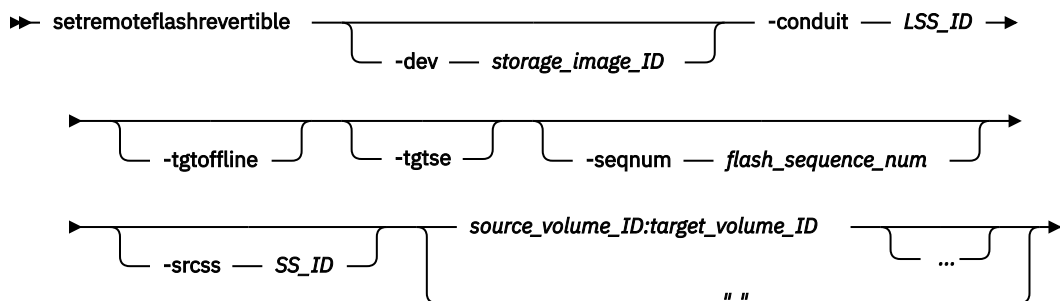
Output

```
Are you sure you want to remove the FlashCopy pair 0100:0200? [y/n]: Y
Removal of the remote FlashCopy volume pair 0100:0200 has been initiated
successfully. Use the lsremoteflash command to determine when the relationship is deleted.
```

setremoteflashrevertible

The **setremoteflashrevertible** command modifies a remote FlashCopy volume pair that is part of a FlashCopy relationship to *revertible*.

When a pair is revertible, the data can be committed to the target to form a new consistency group, or it can be reverted back to the last consistency group. This command must be run before the FlashCopy pair can be committed or reverted.



Parameters

Note: The **-nocp**, **-record**, **-persist**, and **-tgtinhibit** (target inhibit) parameters that were specified when the FlashCopy pair was made (**mkremoteflash** command) are included automatically when the **setremoteflashrevertible** command processes. However, FlashCopy pairs established with the modified recording method (multinc) cannot be used with the setflashrevertible command.

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-conduit *LSS_ID*

(Required) The source logical subsystem (LSS) of an existing remote mirror and copy relationship that is to be used as a passage for communicating with the remote storage image. The source volume IDs that are specified in *source_volume_ID:target_volume_ID* must serve as secondary volumes in a remote mirror and copy relationship in which one of the passage LSS volumes serves as a primary volume.

When you use this parameter, you must specify a fully qualified LSS ID. The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

-tgtoffline

(Optional) Causes an establish FlashCopy volume pair command to be rejected if the target volume ID is online for host system access.

This parameter applies only to CKD volumes.

-tgtse

(Optional) The target volume you specify is a space-efficient logical volume.

-seqnum *flash_sequence_num*

(Optional) Associates the remote FlashCopy relationships that are changed with the specified sequence number. Only the relationships that are successfully modified by the command get the

specified sequence number, leaving the ones that failed with the previous number (if previously specified).

Example: 0010

-srcss *SS_ID*

(Optional) The subsystem ID of the source logical subsystem at the remote site. The ID is in the format 0x0001 - 0xFFFF.

This value is required for the IBM Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example: FF10

***source_volume_ID:target_volume_ID ...* | -**

(Required) The remote FlashCopy relationships for the designated source and target volume pairs to be modified.

This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the **-dev** parameter is specified. You must separate multiple FlashCopy pair IDs with spaces.

A FlashCopy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a FlashCopy relationship. You must separate the two volume IDs of a FlashCopy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified FlashCopy pair ID: IBM.2107-75FA120/0001:IBM.2107-75FA120/0004

Example of a shortened version: 0001:0004

Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example: Reverting a remote FlashCopy volume pair that is part of a FlashCopy relationship

```
dscli> setremoteflashrevertible -dev IBM.2107-75FA120 0100:
```

Output

```
Remote FlashCopy pair 0100:0200 successfully made revertible.
```

Remote Mirror and Copy path commands

Commands are referenced for actions that are related to Remote Mirror and Copy (formerly PPRC).

The following Remote Mirror and Copy path commands are available:

lsavailpprcport

Generates a report that displays a list of ESCON or Fibre Channel I/O ports that can be defined as Remote Mirror and Copy paths.

lspprcpath

Generates a report that displays a list of existing Remote Mirror and Copy path definitions.

mkescconpprcpath

Creates a Remote Mirror and Copy path between source and target logical subsystems over an ESCON connection.

mkpprcpath

Establishes or replaces a Remote Mirror and Copy path between source and target logical subsystems (LSSs) over a Fibre Channel connection.

rmpprcpath

Deletes one or more specified Remote Mirror and Copy paths.

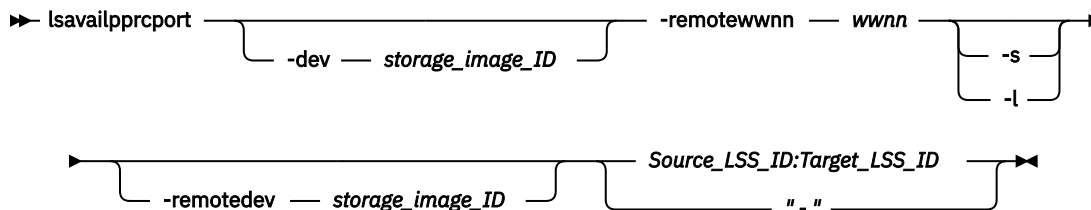
lsavailpprcport

The **lsavailpprcport** command displays a list of ESCON or Fibre Channel I/O ports that can be defined as remote mirror and copy (formerly PPRC) paths.

The storage system models support only Fibre Channel ports. The Enterprise Storage Server (2105 machine type) supports ESCON ports.

Secondary ports listed for PPRC are only available when configured as FCP. Secondary FICON ports, while displayed in the list, are not supported, and the DS CLI command `mkpprcpath` issued to a secondary FICON port will fail.

Note: If you are creating paths between an older release of the storage system (Release 5.1 or earlier), which supports only 4-port host adapters, and a newer release of the storage system (Release 6.0 or later), which supports 8-port host adapters, the paths should connect only to the lower four ports on the newer storage system.



Parameters

-dev *storage_image_ID*

(Optional). The source volume storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-remotewwnn *wwnn*

(Required) Specifies the worldwide node name of the secondary storage image. The format is a 16-hexadecimal ID or a colon-separated string.

Example: 12341234000A000F or 12:34:12:34:00:0A:00:0F

Note: You want to use the WWNN that is associated with the remote storage image. Run the **lssi** or **showsi** command to obtain this number. If you use the WWNN that is associated with the primary storage system, this command fails.

-s

(Optional). Displays the local port ID. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional). Displays all fields. You cannot use the **-l** and the **-s** parameters together.

-remotedev storage_image_ID

(Required or Optional). The remote storage system that contains the I/O ports that are queried by the *Source_LSS_ID:Target_LSS_ID* parameter. The remotedev ID consists of the value for the manufacturer, machine type, and serial number.

Required - This parameter is required when querying ESCON I/O ports unless a fully qualified target logical subsystem ID is specified.

Optional - This parameter is optional if you are querying fibre channel I/O ports.

Note: If specified the format of this entry might be checked for correctness even though the value is not used.

Example: IBM.2107-75FA120

Source_LSS_ID:Target_LSS_ID | -

(Required) Queries I/O ports that are available for a remote mirror and copy path relationship for the source and target LSSs. This parameter accepts fully qualified LSS IDs, which includes the storage image ID or shortened version without the storage image ID, if the **-dev** parameter is specified.

A remote mirror and copy path LSS pair ID consists of two LSS IDs, one designated as the source LSS and the other as the target LSS for a remote mirror and copy path relationship. The two LSS IDs must be separated with a colon and no spaces. The first LSS ID is the source LSS. The second LSS ID is the target LSS.

The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

If you do not use the **-dev** and **-remotedev** parameters, the fully qualified *source_LSS_ID:target_LSS_ID* value must be placed after the **-remotewwnn** value in your command line. Your command line can look like the following example:

```
dscli> lsavailpprcport -l
-remotewwnn 12341234000A000F IBM.2107-75FA120/01:IBM.2107-75FA150/01
```

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example pair: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example: Displaying ESCON or Fibre Channel I/O ports

```
dscli> lsavailpprcport -l
-dev IBM.2107-75FA120 -remotewwnn 12341234000A000F 01:01
```

Output

| Local port | Attached port | Type | Switch ID | Switch port |
|------------|---------------|--------------|----------------------|-------------|
| I0100 | I0200 | FCP | N/A | N/A |
| I0150 | I0620 | ESCON | N/A | N/A |
| I0200 | N/A | ESCON Switch | IBM.111.2222.75113AB | I10 |
| I0250 | N/A | ESCON Switch | IBM.111.2222.75113AB | I20 |

Output descriptions

Local port

The fully qualified unique port ID on the local storage system. FCP and ESCON port IDs are displayed as follows:

FCP port ID

Four hexadecimal characters in the format 0xEEAP, where 'EE' is a port enclosure number (00 - 3F), 'A' is the adapter number (0 - F), and 'P' is the port number (0 - F). The FCP port ID number is prefixed with the letter I.

ESCON port ID

Four hexadecimal characters in the format 0xEEAP, where 'EE' is a port enclosure number (04 - 07), 'A' is the adapter number (0 - 3), and 'P' is the port number (0 - 1). The ESCON port ID number is prefixed with the letter I.

Note: When you specify the `-s` parameter, the local port information is the only information displayed on the report.

Attached port

The fully qualified unique port ID on the attached storage system. FCP and ESCON port ID numbers are displayed in the format that is described for local port. However, if there is an ESCON Switch value, N/A (not applicable) displays.

Type

The connection type. FCP is the only applicable value for a 2107 or 1750 machine type. For a 2105 machine type, you can have a value of ESCON or ESCON Switch.

Switch ID

The switch ID for ESCON switch connections.

Note: For FCP and direct ESCON, N/A (not applicable) displays.

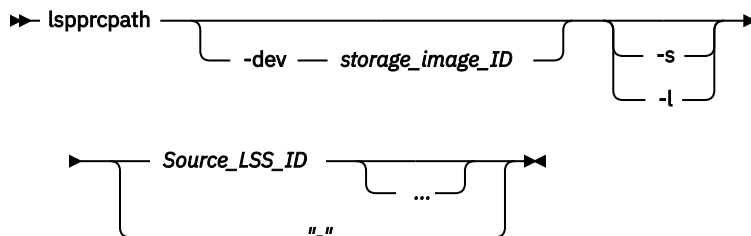
Switch port

The port ID on the Switch device that is connected to the attached ESS. The switch port ID component is two hexadecimal characters in the format 0xPP, where 'PP' is a port number (00 - ff). The number is prefixed with the letter I.

Note: For FCP and direct ESCON, N/A (not applicable) displays.

lspprcpath

The **lspprcpath** command displays a list of existing remote mirror and copy path definitions.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of values for the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source LSS, do not set the `devId` variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for `devId` for the current command.

-s

(Optional) Displays the default output of the report but does not include the *Failed Reason* column. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output and the *Failed Reason* and *PPRC CG* descriptions. You cannot use the **-l** and the **-s** parameters together.

Source_LSS_ID ... | -

(Required) The Remote Mirror and Copy paths that are defined for the specified source LSS IDs be displayed.

This parameter accepts ranges and individual LSS IDs. You might specify fully qualified LSS IDs, including the storage image ID, or a shortened version if the **-dev** parameter is specified. The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

You must separate multiple LSS IDs with spaces.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: 00

Example of multiple source LSS IDs: 00 01 02

Example: Displaying a list of existing remote mirror and copy path definitions

```
dsccli> lsprrcpath -dev IBM.2107-75FA120 -l 10
```

Output

| Src | Tgt | State | SS |
|---------------------|---------------------|----------|------|
| IBM.2107-75FA120/10 | IBM.2107-75FA150/10 | Failed | 0010 |
| IBM.2107-75FA120/10 | IBM.2107-75FA150/11 | Success | 0011 |
| IBM.2107-75FA120/10 | IBM.2107-75FA150/12 | Degraded | 0012 |
| IBM.2107-75FA120/10 | IBM.2107-75FA150/13 | Invalid | 0013 |

| Port | Attached Port | Tgt WWNN | Failed Reason | PPRC CG |
|------------------------|------------------------|-----------------------|--|----------|
| IBM.2107-75FA120/I0100 | IBM.2107-75FA150/I0100 | 3007ACF 3012399E0 | Configuration Error | Disabled |
| IBM.2107-75FA120/I0100 | IBM.2107-75FA150/I0100 | 3007ACF- 3012399E0 | - | Enabled |
| IBM.2107-75FA120/I0100 | IBM.2107-75FA150/I0100 | 3007ACF- 3012399E0 | Path Degraded Due to High Failure Rate | Disabled |
| IBM.2107-75FA120/I0100 | IBM.2107-75FA150/I0100 | 3007ACF- 3012399E0 | - | Enabled |

Output definitions

Src

The fully qualified logical subsystem ID. Use the **-fullid** parameter to display fully qualified IDs, which include the storage image ID.

Tgt

The fully qualified remote mirror and copy ID for the path target LSS. Use the **-fullid** parameter to display fully qualified IDs, which include the storage image ID.

State

The current remote mirror and copy path state. One of the following values can be displayed:

Failed

The path is not established and has failed. When this is the state value, see the Failed Reason column for an explanation.

Success

The path is established and it is operating normally. When this is the state value, the Failed Reason column displays a " - " value.

Invalid

The path is in an unknown state. When this is the state value, the Failed Reason column displays a " - " value.

Degraded

The path is established, but with degraded performance. When this is the state value, see the Failed Reason column for an explanation.

SS

The subsystem identifier (SSID) of the target LSS.

Port

The fully qualified unique Port ID for the source storage system.

The port ID component is four hexadecimal characters in the format *EEAP*, where *EE* is a port enclosure number (00 - 3F), *A* is the adapter number (0 - F), and *P* is the port number (0 - F). The number is prefixed with the letter *I*.

Attached Port

The fully qualified unique Port ID for the attached secondary storage system.

The port ID component is four hexadecimal characters in the format *0xEEAP*, where *EE* is a port enclosure number (00 - 3F), *A* is the adapter number (0 - F), and *P* is the port number (0 - F). The number is prefixed with the letter *I*.

Tgt WWNN

The worldwide node name of the remote storage image.

Failed Reason

The reason for the path state. You must issue the **lspprcpath** command with the **-l** parameter to see the values displayed in this field. If the State field has a value of Invalid or Success, a " - " value is displayed in this field. When the State field displays a value of **Failed**, one of the following values is displayed:

Configuration Error

A path has failed for one of the following reasons:

- The specification of the SA ID does not match the installed ESCON adapter cards in the primary controller.
- For ESCON paths, the secondary control unit destination address is zero and an ESCON Director (switch) was found in the path.
- For ESCON paths, the secondary control unit destination address is nonzero and an ESCON Director does not exist in the path. That is, the path is a direct connection.

Delete the original entry and resubmit the **mkpprcpath** command.

Down

An FCP path has failed because of a communication or hardware failure.

Primary Login Exceeded

The maximum number of log ins for each source FCP path has been exceeded.

Retry Exceeded

The maximum number of times that the storage system tried to reestablish FCP paths has been exceeded.

Secondary Login Exceeded

The maximum number of log ins for each FCP path to the secondary LSS has been exceeded. The FCP target is unavailable.

Secondary Unavailable

An FCP path to the secondary LSS is unavailable.

Primary No Resources

No resources are available at the source site for the logical paths to be established.

Retry

The number of attempts to reestablish path connection.

Secondary Mismatch

A mismatch that involves the secondary control unit sequence number or the LSS.

Secondary No Resources

Resources are not available at the secondary LSS to establish logical paths.

Secondary LSS Mismatch

A mismatch of the secondary control unit LSS ID or a failure of the I/O that collects secondary information for validation.

Timeout

A timeout has occurred. No reason is available.

Not Properly Configured

The primary Fibre Channel adapter is not configured properly, or it is not loaded with the correct version of microcode.

Secondary Not PPRC Capable

The Fibre Channel path from secondary adapter is not capable of processing a remote mirror and copy path. This can occur from one of the following reasons:

- The secondary adapter is not configured properly, or it is not loaded with the correct version of microcode.
- The secondary adapter is already a target of 32 different storage systems.

ESCON Channel Direction

The primary control unit port or link cannot be converted to channel mode because a logical path is already established on the port or link. The establish path operations are not automatically retried within the control unit.

ESCON Initialization Failed

Indicates that initialization for the ESCON protocol has failed.

ESCON Link Offline

The ESCON link is offline. This is caused by the lack of light detection coming from a host, peer, or switch.

Path Degraded Due to High Failure Rate

Indicates that a Fibre Channel path is established; however, because of the high failure rate, the path is degraded.

Path Removed Due to High Failure Rate

The Fibre Channel path link has been removed because the path has experienced a high failure rate.

System Reserved Path

The system has reserved resources for a remote mirror and copy path, for example, after a **failoverpprc** or a **freezepprc** command is used. The resources can be used later, such as for the **failbackpprc** command. In most cases, no action is required. If it is known that a system reserved path is not required, it can be removed with the **rmpprcpath** command only after there are no remote mirror and copy pairs remaining between the LSSs.

PPRC CG

Displays the status of the PPRC consistency group. You must issue the **lspprcpath** command with the **-l** parameter to see the values displayed in this field. One of the following values can be displayed:

Enabled

The remote mirror and copy consistency group is enabled.

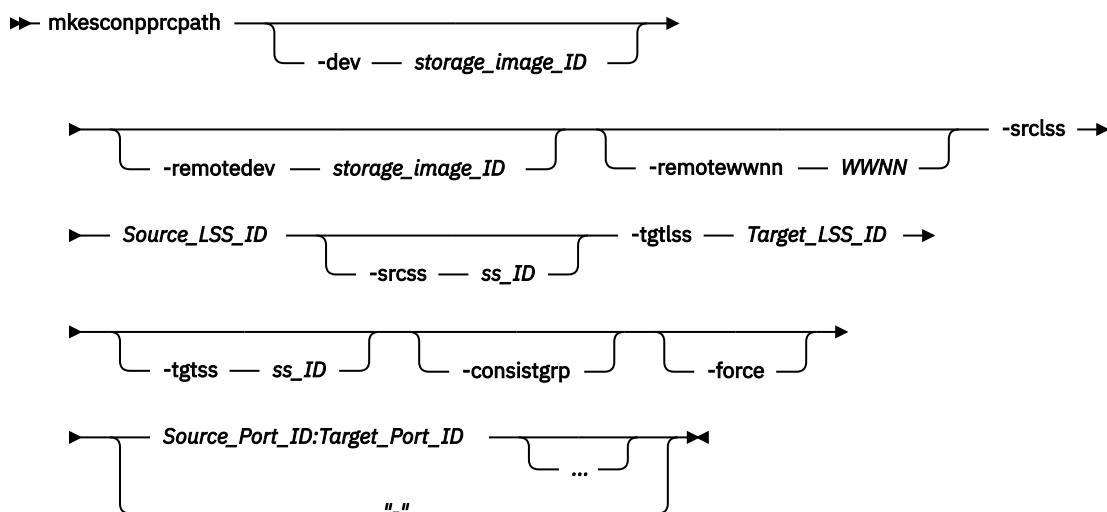
Disabled

The remote mirror and copy consistency group is disabled.

mkesconpprcpath

The **mkesconpprcpath** command creates a remote mirror and copy (formerly PPRC) path between source and target logical subsystems over an ESCON connection.

The command allows you to specify ESCON direct and ESCON switch connections. Use this command only with IBM Enterprise Storage Servers (2105, Model 800 and Model 750).



Parameters

Notes:

1. The **mkesconpprcpath** command is applicable **only** for the IBM Enterprise Storage Server (2105, Model 800 and Model 750). DS8000 models support only Fibre Channel connections.
2. When you specify a switch port ID as the target port, specify the outgoing port that is connected to the remote ESS and not to the incoming port that is connected to the local ESS.

-dev *storage_image_ID*

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified source LSS ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2105-FA120

-remotedev *storage_image_ID*

(Optional). The remote storage image ID, which consists of manufacturer, machine type, and serial number. This parameter is required if you do not fully qualify the target LSS ID.

Example: IBM.2105-FA150

-srclass Source_LSS_ID

(Required). The source logical subsystem (LSS) ID. Accepts a fully qualified LSS ID, which includes the storage image ID or a shortened version without the storage image ID, if the **-dev** parameter is used. The fully qualified LSS ID format is storage_image_ID/xx, where 'xx' is a hexadecimal number in the range '00 - FE'.

-srcss ss_ID

(Optional). The subsystem ID of the primary logical subsystem in the format '0x0001 - 0xFFFF'.

This value is required for the IBM Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example: 0010

-tgtlss Target_LSS_ID

(Required). The target logical subsystem (LSS) ID. Accepts a fully qualified LSS ID, which includes the storage image ID, or a shortened version without the storage image ID, if the **-remotedev** parameter is used. The fully qualified LSS ID format is storage_image_ID/xx, where 'xx' is a hexadecimal number in the range '00 - FE'.

-remotewwnn WWNN

(Optional). The worldwide node name. The format is a 16-hexadecimal ID.

Note: If you use this parameter, the format is checked even though there might be times that the value is not used.

Example: 12341234000A000F

-tgtss ss_ID

(Optional). The subsystem ID of the secondary logical subsystem in the format '0x0001 - 0xFFFF'.

This value is required for the IBM Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example: 0010

-consistgrp

(Optional). Creates a consistency group for the remote mirror and copy volume pairs that are associated with the PPRC paths that are established by this command. A remote mirror and copy consistency group is a set of remote mirror and copy volume pairs that have the same source and target LSS.

Normally, when an error occurs in a member of a remote mirror and copy volume pair, the volume is put in a *suspended* state. However, if the volume is participating in a consistency group, it is placed in a *long busy* state.

-force

(Optional). Creates a new remote mirror and copy path even if the specified remote mirror and copy path already exists.

Source_Port_ID:Target_Port_ID ... | -

(Required). Establishes a remote mirror and copy path between the source and target ports for the specified source and target logical subsystems. The source port must be an ESCON I/O port that is configured for point-to-point or switch topology. The source port is enabled automatically for remote mirror and copy primary I/O operations. The target port must be a switch I/O port that is configured for point-to-point or switch topology. The target port is enabled automatically for remote mirror and copy primary I/O operations.

Note: Do not specify a target port ID when you specify an ESCON direct connection. Instead, specify only the source port ID.

This parameter accepts only non-fully qualified port IDs, which does not include the storage image ID. A remote mirror and copy path port pair ID consists of two port IDs. The first is designated as the source port and the second as the target port for the remote mirror and copy path. You must separate the two port IDs with a colon and no spaces. A direct ESCON I/O port ID is four hexadecimal characters in the format *EEAP*, where *EE* is a port enclosure number '00 - 3F', *A* is the adapter number '0 - F', and *P* is the port number '0 - F'. This number is prefixed with the letter *I*. A switch ESCON I/O port ID is two hexadecimal characters in the range '00 - FF'. This number is prefixed with the letter *I*.

This parameter accepts up to eight remote mirror and copy path port pair IDs. You must separate multiple port pair IDs with spaces.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example pair: I1A10:I20

Example of a source ESCON port and target switch port pair: I1A10:I20

Example of multiple pairs: I1A10:I20 I1A11:I21 I1A12 (the last object identifies an ESCON connection)

Example: Creating a Remote Mirror and Copy path (2105 use only)

```
dscli> mkescconpprcpath -dev IBM.2105-FA120 -remotedev IBM.2105-FA150 -src1ss 01 -tgt1ss 01
I0100:I20 I0110:I21
```

Output

```
Remote Mirror and Copy path
IBM.2105-FA120/01:IBM.2105-FA150/01 successfully created.
```

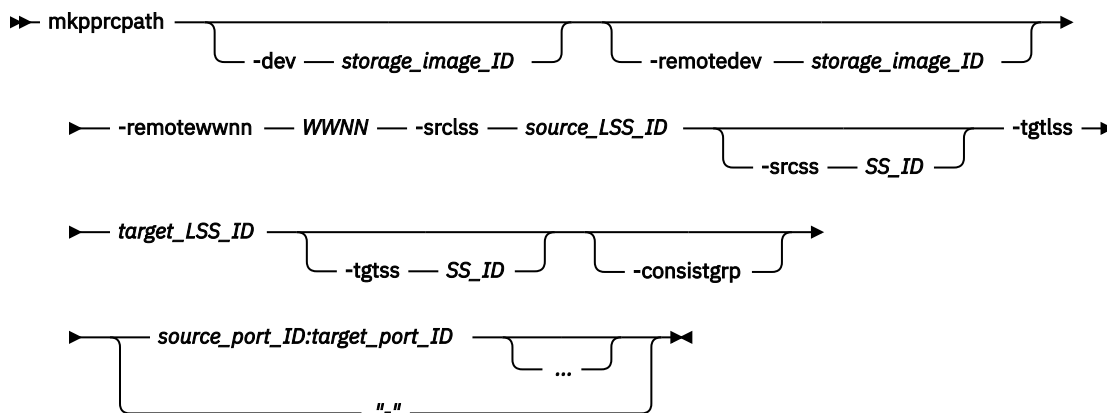
mkpprcpath

The **mkpprcpath** command establishes or replaces a remote mirror and copy (formerly PPRC) path between source and target logical subsystems (LSSs) over a Fibre Channel connection.

It is not necessary to remove any existing remote mirror and copy paths before you establish new paths. All existing paths are automatically removed before the new paths are established. As a result, all multiple paths between any specific pair of source and target LSSs must be specified in a single **mkpprcpath** command.

Machine type 2107 supports this connectivity. Paths can be established between the following machine types: 2105:2105, 2107:2107, 2107:1750, 2107:2105, 1750:1750, 1750:2105.

Note: Secondary ports that are listed for PPRC, after you enter the **lsavailpprcport** command, are only available when configured as FCP. Secondary FICON® ports, while displayed in the list, are not supported, and the DS CLI command **mkpprcpath** entered to a secondary FICON port fails.



Parameters

-dev *storage_image_ID*

(Optional) The source storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *devid* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-remotedev storage_image_ID

(Optional) The ID of the secondary storage image, which includes manufacturer, machine type, and serial number. If specified, the format of this entry might be checked for correctness although the value is not used.

Example IBM.2107-75FA150

-remotewwnn WWNN

(Required) The worldwide node name of the secondary storage image. The format is a 16-hexadecimal ID or a colon-separated string.

Note: Ensure that you use the worldwide node name that is associated with the secondary storage system. Run the **lssi** or **shows** command to obtain this number.

Example 12341234000A000F or 12:34:12:34:00:0A:00:0F

-src1ss source_LSS_ID

(Required) The source logical subsystem ID. Use a fully qualified LSS ID, which includes the storage image ID, or use a shortened version without the storage image ID, if the **-dev** parameter is used. The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

Example of a shortened version 00

-srcss SS_ID

(Optional) The subsystem ID of the primary logical subsystem in the format 0x0001 - 0xFFFF.

This value is required for the IBM TotalStorage Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example 0010

-tgt1ss target_LSS_ID

(Required) The logical subsystem ID associated with the secondary storage system as the target. Use a fully qualified LSS ID, which includes the storage image ID. The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

Example of a shortened version 01

-tgtss SS_ID

(Optional) The subsystem ID of the secondary logical subsystem in the format 0x0001 - 0xFFFF.

This value is required for the IBM TotalStorage Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example 0010

-consistgrp

(Optional) Creates a consistency group for the remote mirror and copy volume pairs. A remote mirror and copy consistency group is a set of remote mirror and copy volume pairs that have the same source and target LSS. This option is intended to be used only with Metro Mirror pairs.

Normally, when an error occurs in a member of a remote mirror and copy volume pair, the storage system places the volume in a *suspended* state. However, if the volume participates in a consistency group, it is placed in a *long busy* state.

Note: A consistency group volume pair that is suspended will not go into an extended long busy state unless the primary volume is in a full duplex state before the suspension.

source_port_ID:target_port_ID ... | -

(Required) Establishes a remote mirror and copy path between the source and target ports for the specified source and target logical subsystems. The source and target ports must be Fibre Channel I/O ports that are configured for point-to-point or switched fabric topology. They are enabled automatically for remote mirror and copy secondary I/O operations. They are not enabled for FICON I/O operations.

Use fully qualified port IDs, which include the storage image ID, or use a shortened version without the storage image ID if the **-dev** parameter is specified. A remote mirror and copy path port pair ID consists of two port IDs. Designate the first as the source port and the second as the target port for the remote mirror and copy path. You must separate the two port IDs with a colon and no spaces. A port ID is four hexadecimal characters in the format *EEAP*, where *EE* is a port enclosure number (00 -

3F), *A* is the adapter number (0 - F), and *P* is the port number (0 - F). This number is prefixed with the letter **I**.

To establish multiple remote mirror and copy paths between any single source and target LSS, you must specify all of the path port pair IDs in a single **mkpprcpath** command. This parameter accepts up to eight remote mirror and copy path port pair IDs. You must separate multiple port pair IDs with spaces.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of the shortened version - I1A10:I2A20

Example of multiple pairs - I1A10:I2A20 I1A11:I2A21 I1A12:I2A22

Example: Establishing a remote mirror and copy path

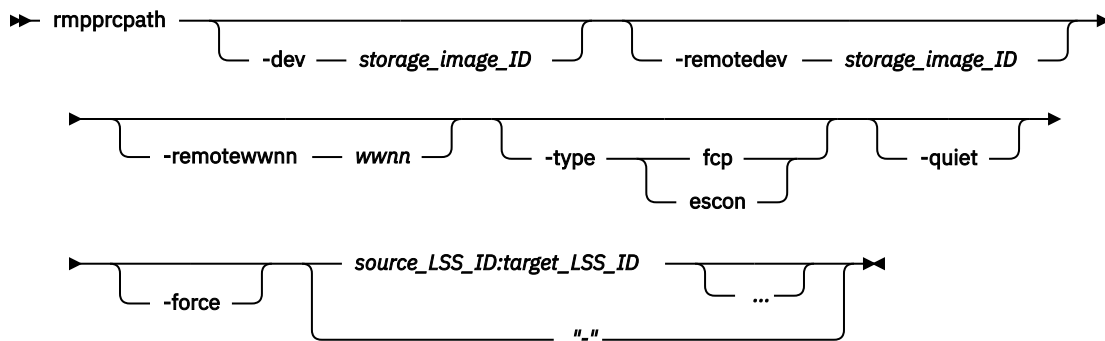
```
dsccli> mkpprcpath -dev IBM.2107-75FA120
-srclss 01 -tgtlss 01 -remotewwnn 12341234000A000F I0100:I0100
```

Output

Remote Mirror and Copy path 01:01 successfully established.

rmpprcpath

The **rmpprcpath** command deletes a Remote Mirror and Copy path.



Parameters

-dev *storage_image_ID*

(Optional) The source storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified source LSS ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-remotedev *storage_image_ID*

(Optional) The target storage image ID, which includes manufacturer, machine type, and serial number. This parameter is required if you do not specify a fully qualified target LSS ID or if the **-dev** parameter is used.

-remotewwnn *wwnn*

(Optional) The secondary worldwide node name. The format is a 16-hexadecimal ID or a colon-separated string.

Note: The following considerations can help you decide whether to use this parameter:

- If you do not specify this parameter, DS CLI processing requires a query for this information from the remote device. In some cases, due to the path-specific state, the query might fail to locate the remote WWNN. If the remote WWNN cannot be located, the **rmpprcpath** command fails.

Process the **lspprcpath** command to obtain the remote WWNN information and then process the **rmpprcpath** command with the remote WWNN information included.

- Use the **lspprcpath** command to obtain the remote WWNN information.

-type fcp | escon

(Optional) The type of the connection over which the path was created.

fcp

Fibre-channel protocol

escon

Enterprise Systems Connection (IBM Z).

-quiet

(Optional) Turns off the Remote Mirror and Copy path removal confirmation prompt for this command.

-force

(Optional) Removes Remote Mirror and Copy paths even if Remote Mirror and Copy volume pairs exist. Otherwise, specified paths that are associated with existing Remote Mirror and Copy volume pairs are not be removed.

source_LSS_ID:target_LSS_ID ... | -

(Required) The Remote Mirror and Copy path relationships for the source and target LSSs that are to be removed. The LSS pair ID consists of two LSS IDs, one designated as the source LSS and the other as the target LSS for a Remote Mirror and Copy path relationship. The two LSS IDs must be separated with a colon and no spaces. The first LSS ID is the source LSS. The second LSS ID is the target LSS.

This parameter accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified.

The fully qualified LSS ID format is *storage_image_ID/XX*, where *XX* is a hexadecimal number in the range 00 - FE.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified pair: IBM.2107-75FA120/00:IBM.2107-75FA150/00

Example of a shortened version: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example: Deleting a Remote Mirror and Copy path

```
dscli> rmpprcpath -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 -remotewwnn 12341234000A000F 01:01
```

Output

```
Are you sure want to remove the Remote Mirror and Copy path 01:01?  
[y/n]: Y  
Remote Mirror and Copy path 01:01 successfully removed.
```

Remote Mirror and Copy commands

Remote Mirror and Copy (formerly PPRC) commands are used to create, manage, view, and delete Remote Mirror and Copy pairs.

The following Remote Mirror and Copy pair commands are available:

failbackpprc

Copies the required data from the source volume to the target volume to resume mirroring. You can use this command after a **failoverpprc** command has been issued to restart mirroring from site A (local site) to site B (remote site).

failoverpprc

Generates Global Mirror and Metro Mirror disaster recovery processes with the following results:

- In a Global Mirror failover recovery process, the **failoverpprc** command initiates failover processing of B volumes to A volumes.
- In a Global Mirror failback recovery process (production is returned to the local site), the **failoverpprc** command initiates failover processing from A volumes to B volumes.
- In a Metro Mirror disaster recovery process, failover processing to the Global Copy secondary volume causes the secondary volumes to become primary volumes and immediately suspends these volumes. The **failoverpprc** command changes a secondary device into a primary suspended device while leaving the primary device in its current state.

lspprc

Generates a report that displays a list of remote mirror and copy volume relationships for a storage image and the status information for each remote mirror and copy volume relationship in the list.

mkpprc

Establishes a remote mirror and copy relationship for a volume pair.

chpprc

Modifies the characteristics of an existing Remote Mirror and Copy relationship.

freezepprc

Creates a new remote mirror and copy consistency group. It places the source logical subsystem (LSS) in the long busy state so that no I/O can be directed to it. It also removes remote mirror and copy paths between the source LSS and target LSS and sets the queue-full condition for the primary volume.

pausepprc

Pauses an existing remote mirror and copy volume pair relationship or pauses a single volume ID.

resumepprc

Resumes a remote mirror and copy relationship for a volume pair.

rmpprc

Removes one or more specified remote mirror and copy volume pair relationships, or it removes a single volume ID (which might be useful when a disaster occurs and you want to specify only the available volume and not both the primary and secondary volumes).

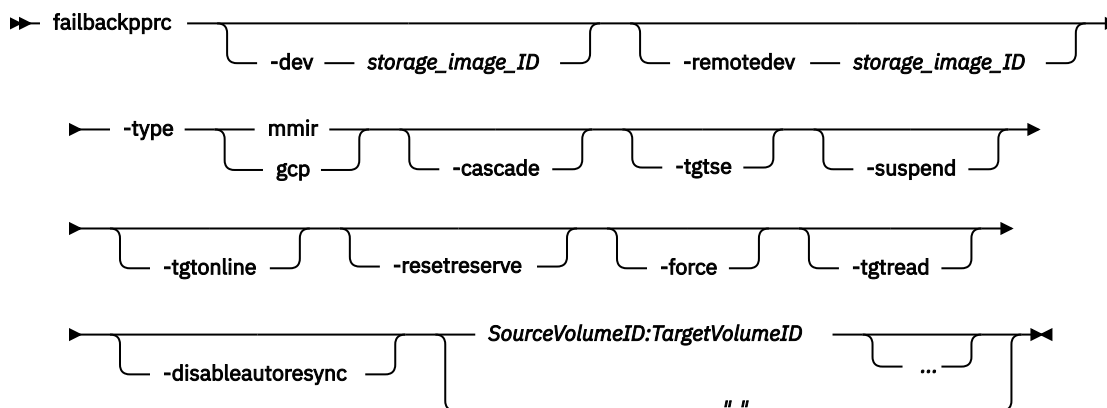
unfreezepprc

Resumes I/O activity on a storage system where the **freezepprc** command has been issued. The **unfreezepprc** command resets the queue full condition for the primary volume.

failbackpprc

The **failbackpprc** command copies the required data from the source volume to the target volume to resume mirroring.

This command is used in the disaster recovery processes that are associated with sites using Metro Mirror, Global Mirror, or Metro/Global Mirror processing.



Parameters

Notes:

1. You can enter the **failbackpprc** command against any remote mirror and copy volume that is in a primary suspended state. The failback processing copies the required data from the source volume to the target volume to resume mirroring.
2. A Metro Mirror (synchronous) pair must be suspended before it can be reestablished as a Global Copy (extended distance) pair and conversely the opposite way.
3. When you specify subsystem IDs (SSIDs), the source and target volumes are restricted to 1 LSS for the source and 1 LSS for the target.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you don't specify a fully qualified source volume ID (which includes the storage image ID, for the source volume IDs that are defined by the **Source_Volume_ID:Target_Volume_ID** parameter), don't set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Note: The use of the **failbackpprc** command requires a role reversal for this parameter. The value for this parameter must be the **original primary** site that has been repaired and is ready to once again become your primary production site. For example:

- Original primary site (Site A) has a value of IBM.2107-75FA120 with volumes 0100, 0101, 0102, 0103.
- Original secondary site (Site B) has a value of IBM.2107-75FA150 with volumes 0200, 0201, 0202, 0203.
- The following **failbackpprc** command is correct:

```
dscli> failbackpprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0200 0101:0201 0102:0202 0103:0203
```

-remotedev storage_image_ID

(Optional) The target storage image ID consists of the manufacturer name, machine type, and serial number. The **-remotedev** parameter identifies the remote storage system that contains the target volume IDs that are defined by the **SourceVolumeID:TargetVolumeID** parameter. The **-remotedev** parameter is required if you don't specify a fully qualified target volume ID or if you use the **-dev** parameter.

Note: The **failbackpprc** command requires a role reversal for this parameter. The value for this parameter must be the **original secondary** site. For example:

- Original primary site (Site A) has a value of IBM.2107-75FA120 with volumes 0100, 0101, 0102, 0103.
- Original secondary site (Site B) has a value of IBM.2107-75FA150 with volumes 0200, 0201, 0202, 0203.
- The following **failbackpprc** command is correct:

```
dscli> failbackpprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0200 0101:0201 0102:0202 0103:0203
```

-type mmir | gcp

(Required) Establishes one or more remote mirror and copy volume relationships as either Metro Mirror (synchronous) or Global Copy (extended distance) relationships.

mmir

Metro Mirror maintains the remote mirror and copy relationship in a consistent manner by returning the I/O write completion status to the application when the updates are committed to the target. This process becomes slower as the physical distance between source and target increases.

gcp

Global Copy maintains the remote mirror and copy relationship in a nonsynchronous manner. I/O write completion status is returned to the application when the updates are committed to the source. Updates to the target volume are completed later. The original order of updates isn't strictly maintained.

-cascade

(Optional) Enables a remote mirror and copy target volume to be a remote mirror and copy source volume for a different remote mirror and copy volume relationship.

-tgtse

(Optional) Identifies the PPRC secondary volume as a space efficient volume.

-suspend

(Optional) Suspends the remote mirror and copy relationship when the task completes.

Notes:

1. This parameter isn't valid for a Global Copy (Extended Distance) remote mirror and copy volume relationship.
2. This parameter isn't valid for a Metro Mirror (Synchronous) remote mirror and copy volume relationship that is established with the No Copy option activated.

-tgtonline

(Optional) Establishes a remote mirror and copy volume relationship, including when the target volume is online to host systems.

This parameter applies to IBM Z volumes. It doesn't apply to open systems volumes.

-resetreserve

(Optional) Allows the establishment of a remote mirror and copy relationship when the volume on the secondary logical subsystem is reserved by another host. If this parameter isn't specified and the volume on the secondary logical subsystem is reserved, the command fails.

Note: This parameter applies only to fixed block volumes.

-force

(Optional) Forces a validation of the volumes involved in the establish request to process or be bypassed. This parameter allows you to create a Metro Mirror pair between two volumes who had no previous relationship and *ONLY* copy changed tracks.

Notes:

1. This parameter can only be used as part of a Metro/Global Mirror (3-site) disaster recovery process.
2. Only use this parameter if you're fully aware of the affect this parameter has on your transactions. A couple of scenarios are provided in this guide that describe a set of circumstances that allows you to safely use this parameter. If your circumstances don't match the scenarios, you're cautioned not to use this parameter unless advised to do so by your technical support representative.

-tgtread

(Optional) Allows host servers to read from the remote mirror and copy target volume. For a host server to read the volume, the remote mirror and copy pair must be in a full-duplex state.

Note: This parameter applies only to Open System volumes.

-disableautoresync

(Optional) Allows you to disable the mechanism that automatically resumes a suspended Global Copy relationship. The default isn't disabled.

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote mirror and copy volume pair IDs for the source and target volume pairs for failback processing. The original values (before the disaster) return with the source volume IDs equal to the A volumes and the target volume IDs equal to the B volumes.

This parameter accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs if the **-dev** parameter is specified. You must separate one or more remote mirror and copy pair IDs with spaces.

A remote mirror and copy volume pair ID consists of two volume IDs. For a remote mirror and copy relationship, one volume is identified as the source and the other as the target volume. You must separate the two volume IDs of a remote mirror and copy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify one or more values. If you use the dash (-), the specified value is read from standard input. You can't use the dash (-) while you're in the DS CLI interactive command mode.

Example of a fully qualified pair: IBM.2107-75FA120/0100:IBM.2107-75FA150/0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Example: Copying all the modified tracks from specified volumes to specified volumes in Remote Mirror and Copy relationships

```
dscli> failbackpprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0100 0101:0101 0102:0102 0103:0103
```

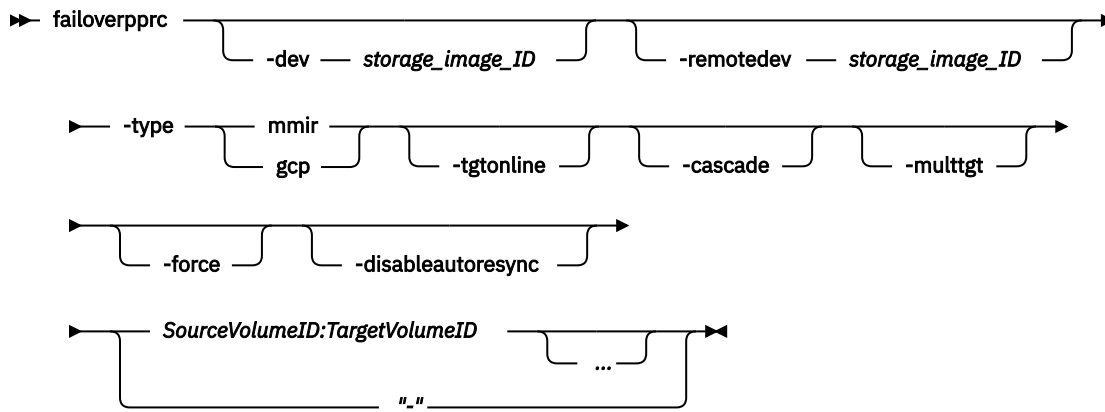
Output

```
Remote Mirror and Copy pair IBM.2107-75FA120/0100:IBM.2107-75FA150/0100  
successfully failed back.  
Remote Mirror and Copy pair IBM.2107-75FA120/0101:IBM.2107-75FA150/0101  
successfully failed back.  
Remote Mirror and Copy pair IBM.2107-75FA120/0102:IBM.2107-75FA150/0102  
successfully failed back.  
Remote Mirror and Copy pair IBM.2107-75FA120/0103:IBM.2107-75FA150/0103  
successfully failed back.
```

failoverpprc

The **failoverpprc** command is used only with disaster recovery processing.

This command is used in the disaster recovery processes associated with sites that use Metro Mirror, Global Mirror, or Metro/Global Mirror processing. The **failoverpprc** command succeeds even if the paths are down and the volume at the production site is unavailable or nonexistent.



Parameters

The **failoverpprc** command is used in the Global Mirror and Metro Mirror disaster recovery processes with the following results:

- In a Global Mirror failover recovery process, the **failoverpprc** command initiates failover processing of B volumes to A volumes. This process causes the B volumes to become the primary volumes and the A volumes to become the secondary volumes. The effect is that the Global Copy state of the B volumes changes from secondary to primary and suspended.
- In a Global Mirror failback recovery process (production is returned to the local site), the **failoverpprc** command initiates failover processing from A volumes to B volumes. This process causes the A volumes to become the primary volumes and the B volumes to become the secondary volumes.
- In a Metro Mirror disaster recovery process, failover processing to the Global Copy secondary volume causes the secondary volumes to become primary volumes and immediately suspends these volumes. When you run a Global Copy failover, the B volumes are the primary volumes and the A volumes are the secondary volumes. This action changes only the Global Copy state of the secondary volumes from Target Copy Pending to Suspended. The **failoverpprc** command changes a secondary device into a primary suspended device while leaving the primary device in its current state. This command succeeds even if the paths are down and the volume at the production site is unavailable or nonexistent.

Note: When you specify the subsystem identifier (SSID), the source and target volumes are restricted to one LSS for the source and one LSS for the target.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified source volume ID, do not set the *devid* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Note: The **failoverpprc** command requires a role reversal for this parameter. The value for this parameter must be the **original secondary** site. For example:

- Original primary site (Site A) has a value of IBM.2107-75FA120 with volumes 0100, 0101, 0102, 0103.
- Original secondary site (Site B) has a value of IBM.2107-75FA150 with volumes 0200, 0201, 0202, 0203.
- The following **failoverpprc** command is correct:

```

dscli> failoverpprc -dev IBM.2107-75FA150
              -remotedev IBM.2107-75FA120 0200:0100 0201:0101
              0202:0102 0203:0103
  
```

-remotedev storage_image_ID

(Optional) The target storage image ID consists of the manufacturer name, machine type, and serial number. This parameter is required if you do not specify a fully qualified target volume ID or if you use the **-dev** parameter.

Note: The use of the **failoverpprc** command requires a role reversal for this parameter. The value for this parameter must be the **original primary** site. For example:

- Original primary site (Site A) has a value of IBM.2107-75FA120 with volumes 0100, 0101, 0102, 0103.
- Original secondary site (Site B) has a value of IBM.2107-75FA150 with volumes 0200, 0201, 0202,0203.
- The following **failoverpprc** command is correct:

```
dscli> failoverpprc -dev IBM.2107-75FA150  
-remotedev IBM.2107-75FA120 0200:0100 0201:  
0101 0202:0102
```

-type mmir | gcp

(Required) Establishes one or more remote mirror and copy volume relationships as either Metro Mirror (synchronous) or Global Copy (extended distance) relationships.

mmir

Metro Mirror maintains the remote mirror and copy relationship in a consistent synchronous manner when the updates are committed to the target. This process becomes slower as the physical distance between source and target increases.

gcp

Global Copy maintains the remote mirror and copy relationship in a nonsynchronous manner when the updates are committed to the source. Updates to the target volume are done later. The original order of updates is not strictly maintained.

-tgtonline

(Optional) Establishes a remote mirror and copy volume relationship, including when the target volume is online to host systems.

This parameter applies to IBM Z volumes. It does not apply to open systems volumes.

-cascade

(Optional) Enables a PPRC target volume to also be a PPRC source volume of a different PPRC volume relationship.

-multtgt

(Optional) Converts to a multi-target relationship when failing over the A - B relationship in a cascading A - B - C setup configuration.

-force

(Optional) Forces a validation of the volumes involved in the establish request to process or be bypassed. With this parameter, you can create a PPRC pair between two volumes that have no previous relationship and only changed tracks are copied.

Notes:

1. When you specify the **-force** parameter, PPRC paths must be established between the source volume and the target volume.
2. This parameter can be used only as part of a Metro/Global Mirror (three-site) disaster recovery process.
3. Use the **-force** parameter if you are fully aware of the affect that this parameter has on your transactions. A couple of tasks are provided as examples to help you safely use this parameter. If your circumstances do not match the scenarios, you are cautioned not to use this parameter unless advised to do so by your technical support representative.

-disableautoresync

(Optional) Disables the mechanism that automatically resumes a suspended Global Copy relationship. The default is not disabled. The **-disableautoresync** parameter is available only in Version 5 Release 3 or later.

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote mirror and copy volume pair IDs of the source and target volumes that must have their relationships changed so that the target volumes (B volumes) become the source volumes and the original source volumes (A volumes) become the target volumes. This results in the following conditions:

- The source volumes (B volumes) show as a suspended host.
- The target volumes (A volumes) show as a suspended target and they are accessible for mounting.

This parameter also accepts fully qualified volume IDs, which include storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

A remote mirror and copy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a remote mirror and copy relationship. You must separate the two volume IDs of a remote mirror and copy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified pair: IBM.2107-75FA150/0100:IBM.2107-75FA120/0100

Example of a shortened version: 0100:0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Example: Using the failoverpprc command for disaster recovery processing

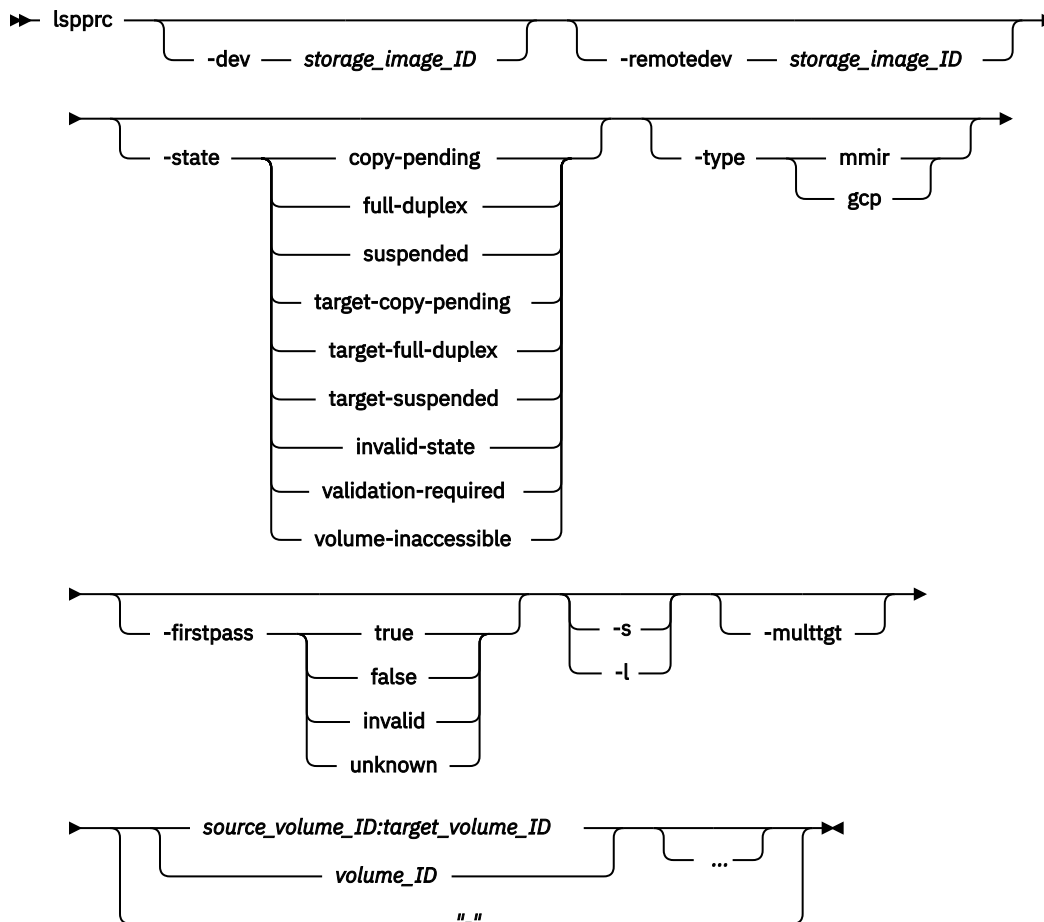
```
dscli> failoverpprc -dev IBM.2107-75FA150  
-remotedev IBM.2107-75FA120 0200:0100 0201:0101 0202:0102
```

Output

A confirmation message is presented for each remote mirror and copy pair that is successfully reversed.

lspprc

The **lspprc** command displays a list of remote mirror and copy (formerly PPRC) volume relationships for a storage image. The command also displays status information for each remote mirror and copy volume relationship in the list.



Parameters

-dev *storage_image_ID*

(Optional). The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the source and target volumes, do not set the *devid* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-remotedev *storage_image_ID*

(Optional; however, required as noted). The target volume storage image ID consists of the manufacturer name, machine type, and serial number.

Note: The **-remotedev** parameter is required when volume pairs are specified and the **-dev** parameter is specified, as well.

-state **copy-pending** | **full-duplex** | **suspended** | **target-copy-pending** | **target-full-duplex** | **target-suspended** | **invalid-state** | **validation-required** | **volume-inaccessible**

(Optional) Displays the state of the remote mirror and copy relationships:

copy-pending

Remote mirror and copy relationships that have pending copy processing. A Global Copy relationship is always copy-pending.

full-duplex

Remote mirror and copy relationships that are full-duplex.

suspended

Remote mirror and copy relationships that are suspended. The Reason attribute might indicate why the relationship is suspended.

target-copy-pending

Remote mirror and copy relationships where the target volume has copy processing that is pending. In this state, the source volume is unknown or cannot be queried.

target-full-duplex

Remote mirror and copy relationships where the target volume is full-duplex. In this state, the source volume is unknown or cannot be queried.

target-suspended

Remote mirror and copy relationships where the target volume is suspended. In this state, the source volume is unknown or cannot be queried. The Reason attribute might indicate why the relationship is suspended.

invalid-state

Remote mirror and copy relationships with an Invalid State. The Invalid State means that a general internal error occurred when the query was processed. The report that is generated with this query displays only the source and target volume IDs of a remote mirror and copy volume relationship. The report also displays the state designation of Invalid State. All the other information columns are displayed with a " - " value.

validation-required

Remote mirror and copy relationships where further validation is required. Running the **lspprc** command again might display a different state output. However, if you request a query with just the *validation-required* designation, the report displays only the source and target volume IDs of a remote mirror and copy volume relationship that have a designation of validation-required. All the other information columns are displayed with a " - " value.

volume-inaccessible

Remote mirror and copy relationships where the volume cannot be viewed. In this case, it means that the volume is fenced. The report that is generated with this query displays only the source and target volume IDs of a remote mirror and copy volume relationship and the state designation of *volume-inaccessible*. All the other information columns are displayed with a " - " value.

-type mmir | gcp

(Optional) Displays the type of the remote mirror and copy relationships that you want to view.

mmir

Metro Mirror relationships.

gcp

Global Copy relationships.

-firstpass true | false | invalid | unknown

(Optional) Displays the first pass status of the Global Copy relationships that you want to view.

true

The first pass of the Global Copy is complete.

false

The first pass of the Global Copy is not yet complete.

invalid

The remote mirror and copy relationship is not a Global Copy relationship, or the query was sent to the secondary volume of the Global Copy relationship.

unknown

The first pass status of the Global Copy is unknown.

-s

(Optional) Displays the remote mirror and copy volume pair IDs. You cannot use the **-s** and the **-l** parameters together.

-1

(Optional) Displays the default output plus extra attributes that are identified as long output. You cannot use the **-s** and the **-1** parameters together.

-multtgt

(Optional) Displays internal remote mirror and copy relationships that are created automatically by the storage system as a part of a multi-target configuration. The remote mirror and copy relationships are suspended, unless they are needed in a recovery situation to resynchronize the two volumes, without requiring a full-volume copy.

SourceVolumeID:TargetVolumeID | Volume_ID ... | -

(Required) Displays the remote mirror and copy relationships for the source and target volume pairs, or for volumes with the specified IDs.

This parameter accepts fully qualified volume IDs, which include storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

A remote mirror and copy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a remote mirror and copy relationship. You must separate the two volume IDs of a remote mirror and copy pair ID with a colon and no spaces. The first volume ID is the source volume. The second volume ID is the target volume.

You can enter remote mirror and copy pair IDs, a range of remote mirror and copy pair IDs, single volume IDs, or a range of volume IDs. You cannot enter a combination of remote mirror and copy pair IDs and volume IDs.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a shortened version pair: 0100:0100

Example of multiple pair IDs: 0100:0100 0200:0200 0300:0300

Example of a range of pair IDs: 0100-010F:0100-010F

Example of a source or target volume ID: 0100

Example of a range of source or target volume IDs: 0100-010F

Note: A query of target volume IDs is directed to the storage image that is identified by the **-dev** parameter or embedded in the fully qualified single volume IDs.

Example: Displaying a list of remote mirror and copy volume relationships

The following tables represent the headers that are displayed on the output report that is associated with the **lspprc** command with the **-1** parameter.

```
dscli> lspprc -dev IBM.2107-75FA120
-remotedev IBM.2107-75FA150 -1 0100:0100 0101:0101
```

Output

| ID | State | Reason | Type | Out Of Sync Tracks | Tgt Read | Src Cascade |
|---|-------------|--------|--------------|--------------------|----------|-------------|
| IBM.2107-75FA120/0100 : IBM.2107-75FA150/0100 | Full-Duplex | - | Metro Mirror | 0 | Enabled | Disabled |
| IBM.2107-75FA120/0101 : IBM.2107-75FA150/0101 | Full-Duplex | - | Metro Mirror | 0 | Enabled | Disabled |

| Tgt Cascade | Date Suspended | Source LSS | Timeout (secs) | Critical Mode | First Pass Status | Incremental Resync | Tgt Write |
|-------------|----------------|------------|----------------|---------------|-------------------|--------------------|-----------|
| Enabled | - | 01 | 120 | Disabled | False | Enabled | Enabled |
| Enabled | - | 02 | 120 | Disabled | False | Enabled | Enabled |

| GMIR CG | PPRC CG | isTgtSE | DisableAutoResync |
|----------|----------|---------|-------------------|
| Disabled | Disabled | Unknown | - |
| Disabled | Disabled | Unknown | - |

Output descriptions

ID

The source and target volume IDs of a remote mirror and copy volume relationship. Use the **-fullid** parameter to display fully qualified IDs, which include the storage image ID.

State

The current remote mirror and copy volume relationship state. One of the following values is displayed:

Copy Pending

The relationship is copy pending. A Global Copy (extended distance) relationship is always copy pending.

Full Duplex

The relationship is full duplex.

Suspended

The relationship is suspended. The Reason attribute might indicate why the relationship is suspended.

Target Copy Pending

The source volume is unknown or cannot be queried and the target state is copy pending.

Target Full Duplex

The source volume is unknown or cannot be queried and the target state is full-duplex.

Target Suspended

The source volume is unknown or cannot be queried and the target state is suspended.

Invalid State

A general internal error occurred when the query was processed.

Note: The report that is generated with the *Invalid State* designation displays only the source and target volume IDs of a remote mirror and copy volume relationship and the state designation of Invalid State. All the other information columns are displayed with a "-" value.

Validation Required

The status of the volume cannot be currently determined. Further validation is required. Sometimes, running the same **lspprc** command again generates different state output.

Note: The report that is generated with the *validation-required* designation displays only the source and target volume IDs of a remote mirror and copy volume relationship and the state designation of *validation-required*. All the other information columns are displayed with a " - " value.

Volume Inaccessible

The volume might not be queried. This information means that the volume is fenced.

Note: The report that is generated with the *Volume Inaccessible* designation displays only the source and target volume IDs of a remote mirror and copy volume relationship and the state designation of *Volume Inaccessible*. All the other information columns are displayed with a " - " value.

Reason

The reason why the remote mirror and copy volume relationship is suspended or copy-pending. The following values can be displayed:

-

The volume is suspended but the reason for the suspension is not defined within the system.

Not in PPRC Relationship

The designated volume is not part of a remote mirror and copy pair.

Host Source

The remote mirror and copy processing on the volume was suspended by the primary host. The host command might specify an immediate suspension or that the volume is to be suspended when it entered a full duplex state.

Host Target

The remote mirror and copy processing was suspended on the secondary volume. Updates to primary volumes and out-of-sync tracks are still being processed.

Update Target

The remote mirror and copy processing was suspended on a secondary volume by the primary control unit update secondary device status command.

Internal Conditions Both

The remote mirror and copy processing was suspended on a volume by either the primary control unit or the secondary control unit because of internal conditions.

Simplex Target

The remote mirror and copy processing was suspended on a volume when the secondary control unit sent a state change to the primary control unit indicating a transition to a simplex state.

Internal Conditions Target

The remote mirror and copy processing was suspended on a secondary volume when the primary control unit was notified that the secondary volume became suspended due to internal conditions.

Power

The remote mirror and copy processing was suspended on a volume when the primary or secondary storage system was shut down or restarted.

Notes:

1. The paths to the secondary storage system might not be available if the power to the primary storage system was shut down. If only the secondary storage system was shut down, it might be possible for the paths to be restored depending on the path status. Use the following process to determine whether your remote mirror and copy processing can be restored on the affected volumes:
 - a. Enter the **lspprc** command and use the generated report to determine the path status.
 - b. Enter the **mkpprc** command if the paths are still in tact. This process resynchronizes the volume pairs.

- c. Continue with your processing.
2. If the previous process cannot be completed, you must remove the pair relationships on the affected volumes and start your remote mirror and copy processing from the beginning on the affected volumes.

Freeze

The remote mirror and copy processing was suspended on a volume pair because the host issued a Freeze PPRC Group order.

Volume Not Configured

The remote mirror and copy processing was suspended on a volume because the volume is not part of a copy pair relationship.

Remote Copy Pending

The volume transitioned to the pending state as a result of establishing a FlashCopy relationship. Before the attempt was made to establish the FlashCopy relationship, the volume was in Full Duplex mode.

Release Space Failure

The pair is suspended due to the failure to release unused space-efficient storage on the Remote Mirror and Copy secondary volume.

With Secondary Consistency

The Remote Mirror and Copy secondary volumes form a consistent data set.

Safeguarded Copy Incremental Recovery

The copy is suspended due to Safeguarded Copy Incremental Recovery.

Type

The remote copy and mirror volume relationship is a Metro Mirror (synchronous) relationship, a Global Copy (extended distance) relationship, or the relationship type is unknown.

Out Of Sync Tracks

The number of tracks that are not synchronized for this FlashCopy relationship. The maximum value depends on the source volume size.

Notes:

1. If you enter the **lspprc** command to view the out-of-sync value for a volume pair (for example, 0000:0001) on a 2105, there is no observable decrease in the value from when you issue the query to the end of the process.
2. If you enter the **lspprc** command to view the out-of-sync value for a single volume (for example, 0000) on a 2105, there is an observable decrease in the value but only at 10-second intervals. If you enter the **lspprc** command and reissue it again before 10 seconds expires, there is no observable change in the value.
3. If you enter the **lspprc** command to view the out-of-sync value for a volume pair or a single volume, there is an observable decrease in the value but only at 10-second intervals.

Tgt Read

Read I/O operations to the target volume are enabled or disabled.

Src Cascade

The source volume of this relationship is enabled or disabled to also be a target volume of a different relationship.

Tgt Cascade

The target volume of this relationship is enabled or disabled so that it is also a source volume for a different relationship.

Date Suspended

The date when this relationship was last suspended. The value can be displayed as a " - ".

SourceLSS

The consistency group LSS ID that is associated with the source volume of this PPRC volume relationship.

Timeout (secs)

The consistency group Long Busy Timeout setting for the LSS ID that is associated with the source volume of this PPRC volume relationship. This value can be modified by entering the **ch1ss** (FB) or the **ch1cu** (CKD) command.

Critical Mode

The value (enabled or disabled) that determines whether the remote copy and mirror primary volume represents a critical volume.

First Pass Status

The first pass of Global Copy is complete. When you query the primary volume of a Global Copy pair, *True* is displayed when the first pass is complete, *False* is displayed when the first pass is not yet complete, and *Invalidis* displayed if the pair is not Global Copy or if the secondary was queried.

Incremental Resync

The value (enabled or disabled) to determine whether incremental resynchronization is running.

Tgt Write

Input is allowed to the remote mirror and copy secondary volume.

GMIR CG

The value for this field is fixed to display N/A (not available). Use the **lssession** command to monitor the status of Global Mirror relationships.

PPRC CG

The status of the remote mirror and copy consistency group: enabled, disabled, or not available.

Notes:

1. This value is displayed when you designate the use of the **-1** parameter, and when the primary volume is being queried. If the secondary volume is being queried, the value that is displayed for this field is N/A (not available).
2. This value is not reported for model 2105. If a model 2105 is being queried, the value that is displayed for this field is N/A (not available).

isTgtSE

The value that displays whether the remote mirror and copy relationship has a space-efficient secondary.

Unknown

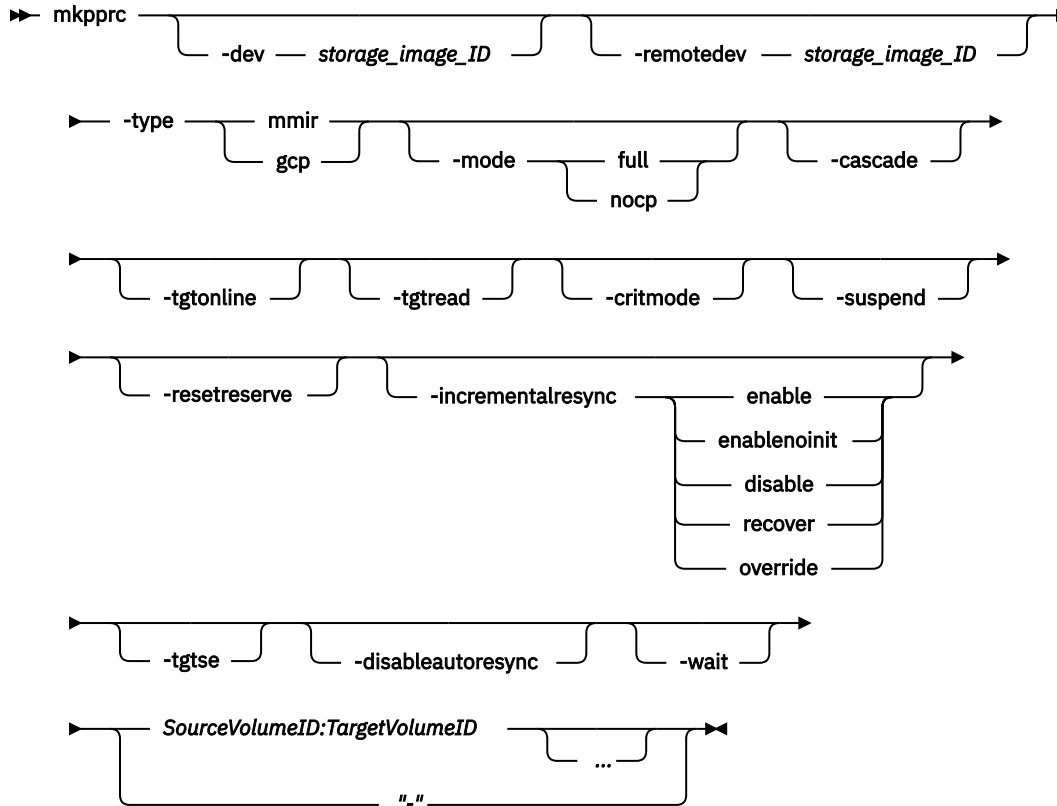
The space allocation method of the target is not known.

DisableAutoResync

The value indicates whether the mechanism that automatically resumes a suspended Global Copy relationship is active.

mkpprc

The **mkpprc** command establishes a remote mirror and copy (formerly PPRC) relationship for a volume pair.



Parameters

Notes:

1. When you specify subsystem IDs, the source and target volumes are restricted to one LSS for the source and one LSS for the target.
2. If you are using the Cisco MDS 9216 Multilayer Fabric Switch, you must not enable the write acceleration feature. The **mkpprc** command might fail if the write acceleration feature is enabled.

-dev *storage_image_ID*

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified source volume ID, do not set the *devId* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devId* for the current command.

Example: IBM.2107-75FA120

-remotedev *storage_image_ID*

(Optional) The target storage image ID consists of the manufacturer name, machine type, and serial number. This parameter is required if you do not specify a fully qualified target volume ID, or if the **-dev** parameter is selected.

-type *mmir* | *gcp*

(Required) Establishes one or more remote mirror and copy volume relationships as either Metro Mirror (synchronous) or Global Copy (extended distance) relationships.

mmir

Metro Mirror maintains the remote mirror and copy relationship in a consistent (synchronous) manner by returning I/O write completion status to the application when the updates are committed to the target. This process becomes slower as the physical distance between source and target increases.

gcp

Global Copy maintains the remote mirror and copy relationship in a nonsynchronous manner. I/O write completion status is returned to the application when the updates are committed to the source. Updates to the target volume are performed at a later time. The original order of updates is not strictly maintained.

-mode full | nocp

(Optional) The following initial data copy mode for the remote mirror and copy volume relationships:

full

Full mode copies the entire source volume to the target volume. This value is the default when you do not specify the no copy mode.

nocp

No Copy mode does not copy data from source to target volumes. This option presumes that the volumes are already synchronized.

-cascade

(Optional) Enables a remote mirror and copy target volume to be a remote mirror and copy source volume for a different remote mirror and copy volume relationship. The default value for this parameter is disabled.

-tgtonline

(Optional) Establishes a remote mirror and copy volume relationship, including when the target volume is online to host systems. This parameter applies to IBM Z volumes and does not apply to open systems volumes. The default value for this parameter is disabled.

-tgtread

(Optional) Allows host servers to read from the remote mirror and copy target volume. For a host server to read the volume, the remote mirror and copy pair must be in a full-duplex state. This parameter applies to open systems volumes and does not apply to z System volumes. The default value for this parameter is disabled.

-critmode

(Optional) Protects the source volume from receiving new data. If the last path fails between the pairs and results in the inability to send information to the target, the source is protected. Current updates and subsequent attempts to update the source fail with a unit check on IBM Z. The default value for this parameter is disabled.

Note: This parameter applies only to IBM Z volumes.

Critical mode operates in one of three ways that depend on the setting of the LCU critical mode and the setting of the **-critmode** parameter in this command. The [Critical volume mode definition overview](#) table describes how the critical volume mode works.

| Critical Mode | LCU, Critical Heavy | Mkpprc critmode | Description |
|---------------|---------------------|-----------------|--|
| Normal | Disabled or Enabled | Disabled | <ul style="list-style-type: none"> Suspends the primary volume. Allows write operations to the primary volume. |

| <i>Table 11. Critical volume mode definition overview (continued)</i> | | | |
|---|----------------------------|------------------------|---|
| Critical Mode | LCU, Critical Heavy | Mkpprc critmode | Description |
| Critical Volume | Disabled | Enabled | <ul style="list-style-type: none"> • Suspends the primary volume when the last path to the secondary volume fails. • Inhibits write operations to the primary volume. |
| Critical Heavy | Enabled | Enabled | <ul style="list-style-type: none"> • Suspends the primary volume when the secondary volume cannot be updated for any reason. • Inhibits write operations to the primary volume. |

Notes:

1. Use the **-critmode** parameter only for log devices, not for devices that the system requires. In extreme cases, the host system might require you to load the initial program to recover a device that is write inhibited. Whenever possible, use the **freezepprc** command as an alternative to using the **-critmode** parameter.
2. The **-critmode** parameter cannot be used with Global Copy or remote copy and mirror cascading volumes.
3. To reset a volume that is write inhibited because of critical mode, you can enter the **mkpprc**, **pausepprc**, or **rmpprc** command to this volume.
4. Use automation software as part of any solution that includes critical mode. Automation software is not a part of the software that is provided with the storage system; you must supply it. However, IBM has offerings to assist with this automation. For more information, contact your IBM storage representative.

-suspend

(Optional) Suspends the remote mirror and copy relationship when the task completes. This parameter is not valid for a Global Copy (extended distance) remote mirror and copy volume relationship. This parameter is not valid for a Metro Mirror (synchronous) remote mirror and copy volume relationship that is established with the No Copy option. The default value for this parameter is disabled.

-resetreserve

(Optional - open system volumes only) Allows the establishment of a remote mirror and copy relationship when the volume on the secondary logical subsystem is reserved by another host. You can use this parameter only with open system volumes. If this option is not specified and the volume on the secondary logical subsystem is reserved, the command fails.

-incrementalresync enable | enablenoinit | disable | recover | override

(Required for three-site Metro/Global Mirror recovery) The resynchronization method that is used in a three-site Metro/Global Mirror disaster recovery configuration. A three-site Metro/Global Mirror configuration usually involves the following sites:

- Site A (local site), which contains the production volumes (or the A volumes).
- Site B (intermediate site), which contains the B volumes and a local, synchronous copy.
- Site C (remote site), which contains the C volumes and an asynchronous copy that is located remotely from sites A and B.

You can specify the following options when you first establish volume pairs by using the **mkpprc** command or on established volume pairs with this command.

enable

The change recording features are enabled on each of the primary Metro Mirror volumes to process the microcode to monitor and track data in a Metro/Global Mirror configuration. This is data that has been written to the primary volumes but not secured on the remote site volumes.

enablennoinit

The change recording features are not created or started on the primary Metro Mirror volumes in a Metro/Global Mirror configuration. Only use this option in specific recovery scenarios.

disable

The current incremental resynchronization function is stopped on the primary volumes of the Metro Mirror volume pairs.

recover

A new Global Mirror volume pair is established by using an existing primary Metro Mirror (A) volume at the local site and a secondary Global Copy (C) volume at the remote site. When this command processes, only changes to the local Metro Mirror volumes are copied to the volumes at the remote site.

Note: When you specify this option, the system verifies that the failed secondary volumes for the volumes in a Metro Mirror relationship are the primary volumes for the volumes in a Global Copy relationship and that the specified volumes have the intermediate volumes in common. That is, the primary specified volumes are the A volumes and the secondary specified volumes are the C volumes in a Metro/Global Mirror configuration.

override

A new Global Mirror volume pair is established by using an existing primary Metro Mirror (A) volume at the local site and a secondary Global Copy (C) volume at the remote site. When this command processes, only changes to the local Metro Mirror volumes are copied to the volumes at the remote site.

Note: When you specify this option, there is no validation to ensure the secondary relationship in this configuration before the **mkpprc** command is processed. Therefore, you must ensure that the primary specified volumes are the A volumes and the secondary specified volumes are the C volumes in a Metro/Global Mirror configuration.

-tgtse

(Optional) Identifies the PPRC secondary volume as a space efficient volume.

-disableautoresync

(Optional) Disables the mechanism that automatically resumes a suspended Global Copy relationship. The default is not disabled. The **-disableautoresync** parameter is available only in Version 5 Release 3 or later.

-wait

(Optional) Delays the command response until the remote copy and mirror volumes are in one of the final states: simplex, full duplex, suspended, secondary full duplex, secondary suspended, or secondary simplex (until the pair is not in the Copy Pending state). The default value for this parameter is disabled.

Notes:

1. This parameter cannot be used with the **-type gcp** or **-mode nocp** parameters.
2. When you use the **-wait** parameter, you must wait until the original command completely processes before you can enter a new command.
3. If you are running in single-shot mode, you can periodically enter the **lspprc** command to check the remote mirror and copy volume pair state. Then, continue with new commands until the correct state is reached.

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote mirror and copy volume relationship for the source and target volume pairs with the specified IDs.

This parameter accepts fully qualified volume IDs, which include storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

A remote mirror and copy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a remote mirror and copy relationship. You must separate the two volume IDs of a remote mirror and copy pair IDs with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a fully qualified pair: IBM.2107-75FA120/0100:IBM.2107-75FA150/0100

Example of a shortened version: 0100:0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Extra processing tips

The following examples represent some CLI volume format options that you might want to incorporate in your processing:

Processing multiple volumes

The following examples are ways that this environment might be processed, and both are correct. The first method might be fine if you were managing a few volumes, while the second processes hundreds or thousands of volumes more efficiently.

```
mkpprc -dev IBM.2107-13AB79A -remotedev IBM.2107-13AB76A
```

```
-type mmir -mode full
```

```
-tgtread 1000:1205 1001:1206 1002:1207 1003:1208 1004:1209 ... and so on
```

```
mkpprc -dev IBM.2107-13AB79A -remotedev IBM.2107-13AB76A
```

```
-type mmir -mode full -tgtread 1000-1004:1205-1209
```

Using the grouping method in your command

You can also group the volumes. However, the order of the volumes is critical when you group them, and they must be contiguous. The following example shows how to code for grouping:

```
mkpprc -dev IBM.2107-13AB79A -remotedev IBM.2107-13AB76A  
-type mmir -mode full  
-tgtread 1000-1004:1205-1209 1100-1104:1300-1304
```

Example: Creating the remote mirror and copy relationship for a volume pair

```
dscli> mkpprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0100 -type mmir 2100-2107:2100-2107
```

Output:

```
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2100:2100 successfully created.  
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2101:2101 successfully created.  
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2102:2102 successfully created.  
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2103:2103 successfully created.
```

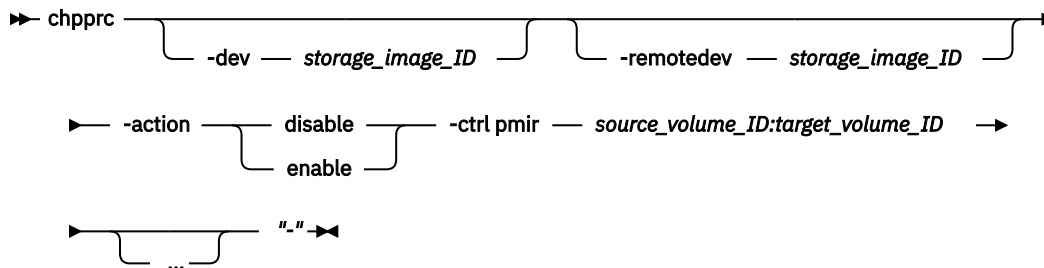
```
dscli> mkpprc -dev IBM.2107--75FA120  
-remotedev IBM.2107--75FA150 -type gcp -incrementalresync enablenoinit  
-mode nocp 2100-2107:2100-2107
```

Output

```
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2100:2100 successfully created.  
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2101:2101 successfully created.  
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2102:2102 successfully created.  
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship  
2103:2103 successfully created.
```

chpprc

The **chpprc** command modifies the characteristics of an existing Remote Mirror and Copy relationship.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID. A storage image ID consists of one or more source volumes IDs that are defined by the *source_volume_ID:target_volume_ID* variable. For example, storage system models use IBM.2107-75FA120.

-remotedev *storage_image_ID*

(Required) The remote storage image ID consists of the manufacturer name, machine type, and serial number. The remote storage ID is required if you specify **-dev**. The **-remotedev** identifies the remote DS storage system that contains one or more target IDs that are defined by the *source_volume_ID:target_volume_ID* variable. For example, storage system models use IBM.2107-75FA120.

-action **disable** | **enable**

(Required) The action to apply for the specified control. The valid values are as follows:

disable

Disables a multi-target setup that is used for the Remote Pair Copy FlashCopy relationship (also known as a preserve mirror relationship).

enable

Enables a multi-target setup that is used for the Remote Pair Copy FlashCopy relationship (also known as a preserve mirror relationship).

-ctrl pmir source_volume_ID:target_volume_ID ... | -

(Required) Establishes a Remote Mirror and Copy volume relationship for the source and target volumes with one or more Remote Mirror and Copy IDs that you specified. Multiple Remote Mirror and Copy Pair IDs must be separated with a white space between each value.

This parameter accepts fully qualified volume IDs, which consist of storage image IDs or a shortened version without storage image IDs, if you specify the **-dev** parameter.

A Remote Mirror and Copy Pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a Remote Mirror and Copy relationship. The two volume IDs of a Remote Mirror and Copy Pair ID must be separated with a colon and no space. The first volume ID is the designated source volume. The second volume ID is the designated target volume.

The format of the volume ID can be represented as *XYZZ*, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

An example of a shortened version is 0001:0004

An example of multiple pairs is 0001:0004 0003:00FF 0008:000C

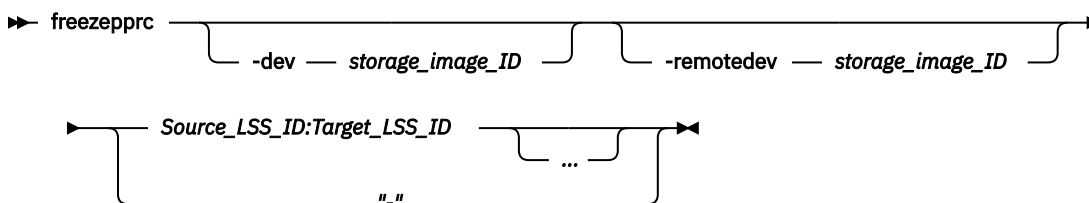
Example: Modifying the characteristics of an existing Remote Mirror and Copy relationship

```
dscli> chpprc -dev IBM.2107-75FA120
```

freezepprc

The **freezepprc** command creates a new remote mirror and copy consistency group.

It places the source logical subsystem (LSS) in the *long busy* state so that no I/Os can be directed to it. It also removes remote mirror and copy paths between the source LSS and target LSS and sets the *queue full* condition for the primary volume. This causes the host to queue writes to the primary volume until the *queue full* condition is reset. During the *queue full* condition, the primary volume reports *long busy* status.



Parameters

Note: When specifying SSIDs, the command is limited to one LSS pair.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2107-75FA120

-remotedev storage_image_ID

(Optional) The target storage image ID consists of the manufacturer name, machine type, and serial number. This parameter is required if you do not specify a fully qualified target LSS ID or if the **-dev** parameter is used.

Source_LSS_ID:Target_LSS_ID ... | -

(Required) The consistency group for the source and target LSSs with the IDs specified be placed in a long busy state. Accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified.

A remote mirror and copy path LSS pair ID consists of two LSS IDs, one designated as the source LSS and the other as the target LSS for a remote mirror and copy path relationship. The two LSS IDs must be separated with a colon and no spaces. The first LSS ID is the source LSS. The second LSS ID is the target LSS.

The fully qualified LSS ID format is *storage_image_ID/xx*, where *xx* is a hexadecimal number in the range 00 - FE.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a pair: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example: Creating a new consistency group

```
dscli> freezepprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 01:01
```

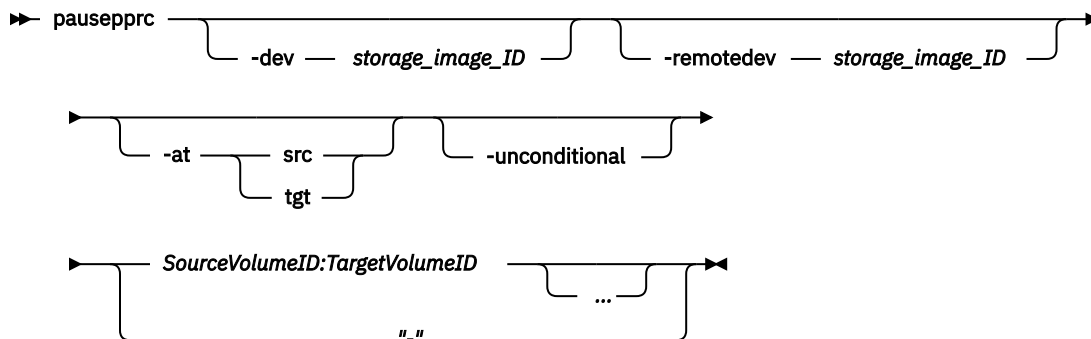
Output

```
Remote Mirror and Copy consistency group 01:01 successfully created.
```

pausepprc

The **pausepprc** command pauses an existing Remote Mirror and Copy volume pair relationship or pauses a single volume ID.

To use this command with a single volume, you must specify either the **-at src** parameter option or the **-at tgt** parameter option. If neither of these options are specified in the command, single volumes are not valid.



Parameters

Note: When you specify SSIDs, the command is limited to one LSS pair.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified source volume ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

Example of a fully qualified storage image ID: IBM.2107-75FA120.

-remotedev storage_image_ID

(Optional most times) The target storage image ID consists of the manufacturer name, machine type, and serial number.

Note: The **-remotedev** parameter is required when volume pairs are specified and the **-dev** parameter is specified, as well.

-at src | tgt

(Optional) Initiates a suspend action from either the source volume or the target volume.

src

Initiates a suspend action from the source volume. After the task successfully runs, the source and target volumes are in the **suspend** state.

The **-at src** parameter option can also be used with single volumes. When you specify a single volume using this option, the volume is treated as a source and the target is treated as a null.

tgt

Initiates a suspend action from the target volume. After the command successfully runs, the target volume is in the **suspend** state, but there is no guarantee that the source volume is suspended as well. For a suspend action that is issued to the target, the source can remain in the **active** state.

The **-at tgt** parameter option can also be used with single volumes. When you specify a single volume using this parameter option, the volume is treated as a target and the source is treated as a null.

Notes:

1. If you specify the **-at tgt** or **-at src** parameter and the **-unconditional** parameter, the value for the **-remotedev** parameter is ignored.
2. If you specify the **-at tgt** parameter and do not specify the **-unconditional** parameter, the values for the **-dev** and *SourceVolumeID* parameters are ignored.
3. If you specify the **-at src** parameter and do not specify the **-unconditional** parameter, the values for the **-remotedev** and *TargetVolumeID* parameters are ignored.

-unconditional

(Optional) A source or target volume is selected individually, and not as a pair. The **-unconditional** parameter is valid only if the **-at** parameter is selected. Do not use volume pair IDs.

Notes:

1. The source volume ID must be specified when you specify the **-at src** parameter.
2. The target volume ID must be specified when you specify the **-at tgt** parameter.

SourceVolumeID:TargetVolumeID ... | -

(Required) The Remote Mirror and Copy volume relationship for the source and target volume pairs with the specified IDs are to be paused.

Note: Provide a single volume ID instead of a volume pair if you use the **-unconditional** parameter. Specifying pairs results in a format error.

This parameter accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the **-dev** parameter is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

A Remote Mirror and Copy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a Remote Mirror and Copy relationship. You must separate the two volume IDs of a remote mirror and copy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Note: Requests directed to target volumes are sent to the Storage Image identified by the **-dev** parameter or is embedded in the fully qualified single volume IDs.

Example of a fully qualified pair: IBM.2107-75FA120/0100:IBM.2107-75FA150/0100

Example of a shortened version: 0100:0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Example: Pausing an existing Remote Mirror and Copy volume pair relationship

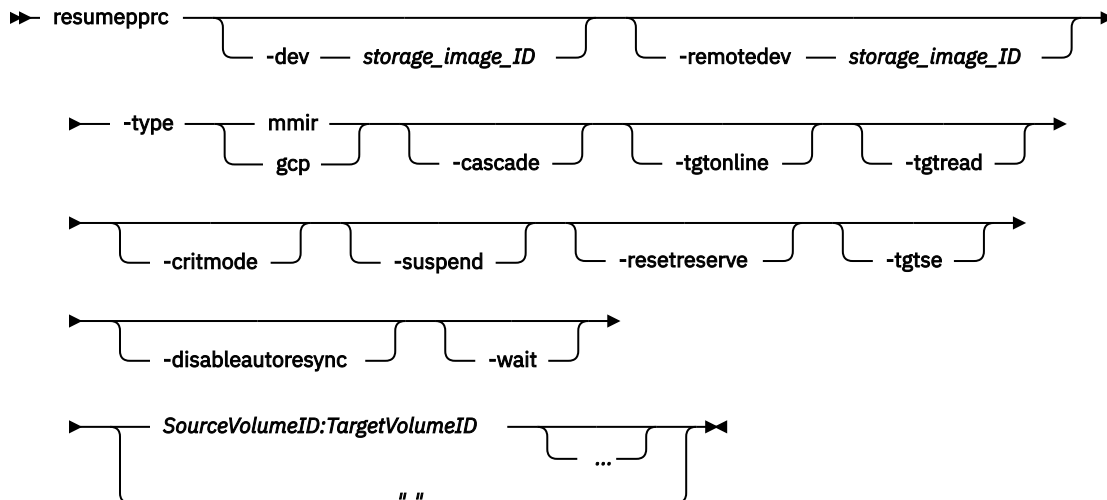
```
dscli> pausepprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0100
```

Output

```
Remote Mirror and Copy pair IBM.2107-75FA120/0100:0103  
successfully paused.
```

resumepprc

The **resumepprc** command resumes a remote mirror and copy (formerly PPRC) relationship for a volume pair.



Parameters

Notes:

1. When you specify subsystem IDs, the source and target volumes are restricted to one LSS for the source and one LSS for the target.
2. When you use the **-wait** parameter, periodically issue the **lspprc** command. This command allows you to verify which of the states that the pair has reached during processing.
3. You cannot issue other commands while the **-wait** parameter is processing. The entire transaction must complete before you can proceed with commands other than status commands like **list** commands or **show** commands.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified source volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-remotedev storage_image_ID

(Optional) The target storage image ID consists of the manufacturer name, machine type, and serial number. This parameter is required if you do not specify a fully qualified target volume ID or if you specify the **-dev** parameter.

-type mmir | gcp

(Required) Modifies one or more remote mirror and copy volume relationships to be either Metro Mirror (synchronous) or Global Copy (extended distance) relationships.

mmir

Metro Mirror processing maintains the remote mirror and copy relationship in a consistent (synchronous) manner when the updates are committed to the target. This process becomes slower as the physical distance between source and target increases.

gcp

Global Copy processing maintains the remote mirror and copy relationship in a nonsynchronous manner when the updates are committed to the source. Updates to the target volume are performed at a later point in time. The original order of updates is not strictly maintained.

-cascade

(Optional) Enables a remote mirror and copy target volume to be a remote mirror and copy source volume for a different remote mirror and copy volume relationship.

-tgtonline

(Optional) Establishes a remote mirror and copy volume relationship, including when the target volume is online to host systems. This parameter applies to IBM Z volumes. It does not apply to open systems volumes.

-tgtread

(Optional) Allows host servers to read from the remote mirror and copy target volume. For a host server to read the volume, the remote mirror and copy pair must be in a full-duplex state. This parameter applies to open systems volumes and does not apply to IBM Z volumes. The default value for this parameter is disabled.

-critmode

(Optional) Protects the source volume from receiving new data. If the last path fails between the pairs, which results in the inability to send information to the target, the source is protected. Current updates and subsequent attempts to update the source fail, with a unit check on IBM Z .

-suspend

(Optional) Suspends the specified remote mirror and copy relationship when the task completes. This parameter is not valid for a Global Copy (extended distance) remote mirror and copy volume relationship. This parameter is not valid for a Metro Mirror (synchronous) remote mirror and copy volume relationship that is established with the No Copy option.

-resetreserve

(Optional) Establishes the remote mirror and copy relationship when the volume on the secondary logical subsystem is reserved by another host. If this parameter is not specified and the volume on the secondary logical subsystem is reserved, the command fails.

This parameter can only be used with fixed block volumes.

-tgtse

(Optional) The secondary volume is a space-efficient logical volume.

-disableautoresync

(Optional) Allows you to disable the mechanism that automatically resumes a suspended Global Copy relationship. The default is not disabled.

-wait

(Optional) Delays a command response until remote copy and mirror volumes are in one of the final states: simplex, full duplex, suspended, secondary full duplex, secondary suspended or secondary simplex (until the pair is not in the Copy Pending state). This parameter cannot be used with the **-type gcp** or **-mode nocp** parameters.

SourceVolumeID:TargetVolumeID ... | -

(Required) The remote mirror and copy volume relationship is resumed for the source and target volume pairs with the specified IDs.

This parameter accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

A remote mirror and copy pair ID consists of two volume IDs: one designated as the source and the other as the target volume for a remote mirror and copy relationship. You must separate the two volume IDs of a remote mirror and copy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Resuming a remote mirror and copy relationship for a volume pair

```
dscli> resumepprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0100
```

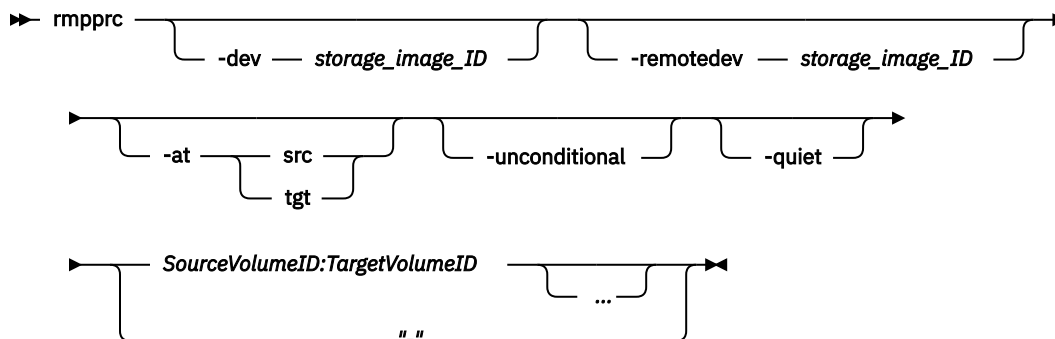
Output

```
Remote Mirror and Copy volume pair IBM.2107-75FA120/0100:0103  
relationship successfully resumed. This message is being returned before the copy completes.
```

rmpprc

The **rmpprc** command removes a Remote Mirror and Copy volume pair relationship or removes a single volume ID.

You can remove a single volume ID when a disaster occurs, which allows you to specify only the available volume and not both the primary and secondary volumes. You must specify either the **-at src** parameter option or the **-at tgt** parameter option when you process a single volume. If neither of these options are specified in the **rmpprc** command, a single volume cannot be processed. The **-unconditional** parameter must also be specified when you process a single volume; otherwise, an error occurs and the command process fails.



Parameters

Notes:

1. When you specify subsystem IDs, the source and target volumes are restricted to one LSS for the source and one LSS for the target.
2. If there is a communication problem between the primary server and the secondary server (two-site configuration) when the **rmpprc** command is issued, the following actions occur:
 - Error message CMUN03012E is issued. This error message indicates that there was a communication problem between the primary and secondary server and that the transaction has failed. However, a partial removal of the pair relationship has occurred.
 - The pair relationship is ended on either the primary volumes or the secondary volumes and the volumes that had the relationship removed enter a simplex state. If a volume is in a simplex state, the volume is not in a Copy Services relationship.

If this circumstance has occurred, reissue the **rmpprc** command using the **-at src** or the **-at tgt** parameter and the **-unconditional** parameter for each volume that does not have its pair relationship removed.

The following list represents the format of the **rmpprc** command when you must remove a partial pair relationship:

- If the source volume has not been removed from the pair relationship, enter the **rmpprc** command at the **dscli** command prompt with the following parameters and variables:

```
dscli> rmpprc -dev storage_image_ID -at src
-unconditional SourceVolumeID
```

- If the target volume has not been removed from the pair relationship, enter the **rmpprc** command at the **dscli** command prompt with the following parameters and variables:

```
dscli> rmpprc -dev storage_image_ID -at tgt
-unconditional TargetVolumeID
```

The value of the storage image ID must be the secondary server.

The management console must be able to communicate with the secondary server for this command to process successfully.

3. If a disaster occurs involving a three-site configuration, the **rmpprc** command with the **-at tgt** and **-unconditional** parameters are used in the recovery process.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all source volumes, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-remotedev storage_image_ID

(Optional most times) The target storage image ID consists of the manufacturer name, machine type, and serial number.

Note: The **-remotedev** parameter is required when volume pairs are specified and the **-dev** parameter is specified, as well.

-at src | tgt

(Optional) Initiates a break action from either a source volume or a target volume.

src

Select the **-at src** parameter option to initiate a break action from the source volume. After the task successfully runs, the source and target volumes are in the **simplex** state.

tgt

Select the **-at tgt** parameter option to initiate a break action from the target volume. After the command successfully runs, the target volume is in the **simplex** state, but there is no guarantee that the source volume state will change. For a break action issued to the target, the source can remain in the **suspend** state.

The **-at tgt** parameter option can also be used with single volumes but you must also specify the **-unconditional** parameter. When you specify a single volume using this parameter, the volume is treated as a target and the source is treated as a null.

Notes:

1. If you specify the **-at tgt** or **-at src** parameter and the **-unconditional** parameter, the value for the **-remotedev** parameter is ignored.
2. If you specify the **-at tgt** parameter and do not specify the **-unconditional** parameter, the values for the **-dev** and *SourceVolumeID* parameters are ignored.
3. If you specify the **-at src** parameter and do not specify the **-unconditional** parameter, the values for the **-remotedev** and *TargetVolumeID* parameters are ignored.

-unconditional

(Optional) A source or target volume has been selected individually, and not as a pair. The **-unconditional** parameter is valid only if the **-at** parameter is selected. Do not use volume pair IDs.

Notes:

1. The source volume ID must be specified when you specify the **-at src** parameter.
2. The target volume ID must be specified when you specify the **-at tgt** parameter.

-quiet

(Optional). Turns off the Remote Mirror and Copy relationship removal confirmation prompt for this command.

SourceVolumeID:TargetVolumeID ... | -

(Required) The Remote Mirror and Copy volume relationship for the specified source and target volume pairs to be deleted.

Note: Provide a single volume ID instead of a volume pair if you use the **-unconditional** parameter. Specifying pairs results in a format error.

This parameter accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs, if the **-dev** parameter is specified. You must separate multiple Remote Mirror and Copy pair IDs with spaces.

A Remote Mirror and Copy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a Remote Mirror and Copy relationship. You must separate the two volume IDs of a Remote Mirror and Copy pair ID with a colon and no space. The first volume ID is the source volume. The second volume ID is the target volume.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ*, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting the volume pair relationship for the specified volume pair

```
dsccli> rmpprc -dev IBM.2107-75FA120  
-remotedev IBM.2107-75FA150 0100:0100
```

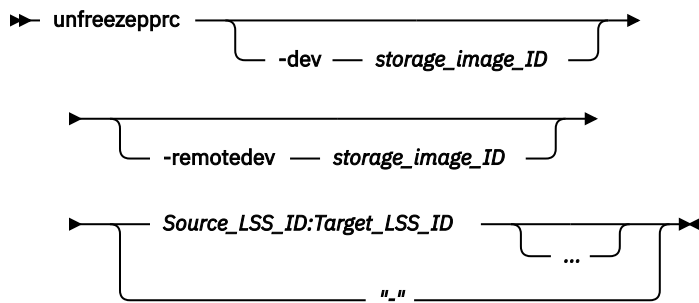
Output

```
Are you sure you want to delete the Remote Mirror and Copy volume pair relationship 0100:0100?  
[y/n]: Y  
Remote Mirror and Copy pair IBM.2107-75FA120/0100:0100  
successfully removed.
```

unfreezepprc

The **unfreezepprc** command resumes I/O activity on a storage system where the **freezepprc** command has been issued.

The **unfreezepprc** command resets the *queue full* condition for the primary volume. All queued writes to the source volume are written.



Parameters

Notes:

1. This command affects all remote copy and mirror primary volumes that are contained by the LSS(s) that are defined by the Source_LSS_ID:Target_LSS_ID source volume.
2. When specifying subsystem IDs, the command is limited to one LSS pair.
3. Resuming I/O activity on a storage system where the **freezepprc** command has been issued is sometimes referred to as the *thaw* operation.

-dev storage_image_ID

(Optional) The source storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2107-75FA120

-remotedev storage_image_ID

(Optional) The target storage image ID consists of the manufacturer name, machine type, and serial number. This parameter is required if you do not specify a fully qualified target LSS ID or if the **-dev** parameter is used.

Source_LSS_ID:Target_LSS_ID ... | -

(Required) Removes the consistency group from the long busy state for the specified source and target LSSs with the IDs.

This parameter accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified.

A remote mirror and copy path LSS pair ID consists of two LSS IDs, one designated as the source LSS and the other as the target LSS for a remote mirror and copy path relationship. The two LSS IDs must be separated with a colon and no spaces. Multiple remote mirror and copy path LSS pair IDs must be separated with a space between each value. The first LSS ID is the source LSS. The second LSS ID is the target LSS.

The fully qualified LSS ID format is **storage_image_ID/xx**, where *xx* is a hexadecimal number in the range 00 - FE.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example pair: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example: Removing the consistency group for the specified pair

```
dsccli> unfreezepprc -dev IBM.2107-75FA120
-remotedev IBM.2107-75FA150 01:01
```


Output

Remote Mirror and Copy pair ID 01:01 successfully thawed.

Global Mirror commands

Global Mirror commands are used to create, manage, view, and delete Global Mirror relationships.

The following Global Mirror commands are available:

mkgmir

Starts Global Mirror processing for a specified session.

pausegmir

Pauses Global Mirror processing for the specified session. There are 2 primary reasons to pause Global Mirror processing:

- To repair a part of the Global Mirror infrastructure, such as: Global Copy volume pairs or FlashCopy pairs
- To make modifications to the Global Mirror tuning parameters

resumegmir

Resumes Global Mirror processing for a specified session. If you have issued a **pausegmir** command to pause Global Mirror processing, issue the **resumegmir** command to continue Global Mirror processing.

rimgmir

Ends Global Mirror processing for the specified session.

showgmir

Generates two reports. The first report displays the detailed properties about the current Global Mirror operations that are associated with a specified logical subsystem ID. The second report displays the performance metrics for the current Global Mirror operations that are associated with a specified logical subsystem ID.

lsgmir

Displays a list of Global Mirror for the storage image of the specified logical subsystem (LSS).

showgmircg

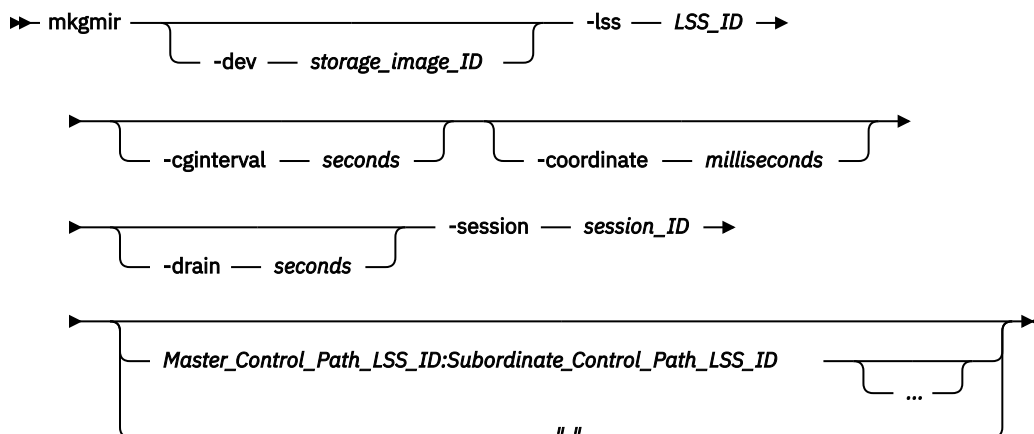
Generates a report that displays the consistency group status for the specified Global Mirror session.

showgmiroos

Generates a report that displays the number of unsynchronized (out of sync) tracks for the specified Global Mirror session.

mkgmir

The **mkgmir** command starts Global Mirror for a specified session.



Parameters

Note: If you are using the Cisco MDS 9216 Multilayer Fabric Switch, you must not enable the write acceleration feature. The **mkgmir** command might fail if the write acceleration feature is enabled.

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. The **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-lss LSS_ID

(Required) The master logical subsystem (LSS) that receives the **mkgmir** command. This parameter accepts a fully qualified master LSS ID. The parameter includes either the storage image ID or a shortened version without the storage image ID if you specify the **-dev** parameter.

-cginterval seconds

(Optional) The consistency group interval time, in seconds. This number specifies how long to wait between the formation of consistency groups. If this number is not specified or is set to zero, consistency groups are formed continuously. The consistency group interval setting is required for a start action. If not specified, the default interval is zero. The consistency group interval setting can be modified for a resume action; otherwise, the interval that is specified for the start action is maintained.

The maximum value is 65,535 seconds.

-coordinate milliseconds

(Optional) The maximum coordination interval, in milliseconds. This value indicates the maximum time that Global Mirror processing queues primary/host/IO to start forming a consistency group. The coordination interval setting is required for a start action. If this value is not specified, the default interval is 50 milliseconds.

The coordination interval setting can be modified for a resume action; otherwise, the interval that is specified for the start action is maintained. The maximum value is 65,535 milliseconds.

-drain seconds

(Optional) The maximum consistency group drain time in seconds and the maximum amount of time that the consistent set of data is allowed to drain to the remote site before the current consistency group fails. The drain time setting is required for a start action. If the drain time is not specified, the default drain time is 240 seconds.

The drain time setting can be modified for a resume action; otherwise, the time that is specified for the start action is maintained.

-session session_ID

(Required) The Global Mirror for the specified session is start or resume. A session ID is a Global Mirror session number that you assign in the 01 - FF hexadecimal range.

Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID ... | -

(Optional) One or more Global Mirror associations. A Global Mirror association consists of two fully qualified LSS IDs. The first is designated as the master resource and the second is the subordinate resource between a PPRC path that was established. An LSS ID is a two-character value hexadecimal value in the range 00 - FE. You must separate the fully qualified LSS IDs of a Global Mirror association with a colon and no spaces. The master resource must be identical for all relationships.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example: Starting Global Mirror for session 01

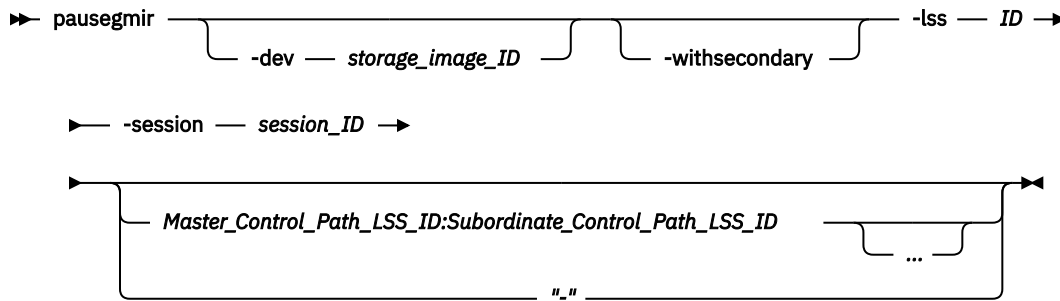
```
dscli> mkgmir -dev IBM.2107-75FA120  
-lss 10 -session 01 IBM.2107-75FA120/00:IBM.2107-75FA150/00
```

Output

```
Global Mirror for session 01 successfully started.
```

pausegmir

The **pausegmir** command pauses Global Mirror for the specified session.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-withsecondary

(Optional) After the Global Mirror session is paused with this parameter specified, the secondary volumes will form a consistent copy of the data set.

-lss *ID*

(Required) The master logical subsystem (LSS) that receives the **pausegmir** command. Accepts a fully qualified master LSS ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified.

-session *session_ID*

(Required) The session ID for which the Global Mirror process is to be paused. A session ID is a Global Mirror session number that you assign in the 01 - FF hexadecimal range.

Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID ... | -

(Optional) One or more Global Mirror path associations. A Global Mirror path association consists of two fully qualified LSS IDs, one designated as the master resource and the other as the subordinate resource between which a remote copy and mirror path has been established.

A LSS ID is two hexadecimal characters in the range 00 - FE. You must separate the fully qualified LSS IDs of a Global Mirror path association with a colon and no spaces. The master resource must be identical for all relationships.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example of one Global Mirror association with a single subordinate in the configuration:
IBM.2107-75FA120/00:IBM.2107-75FA150/00

Example of multiple Global Mirror associations with two subordinates in the configuration:
 IBM.2107-75FA120/00:IBM.2107-75FA150/00 IBM.2107-75FA120/00:IBM.2107-75FA150/01

Example: Pausing Global Mirror session 01

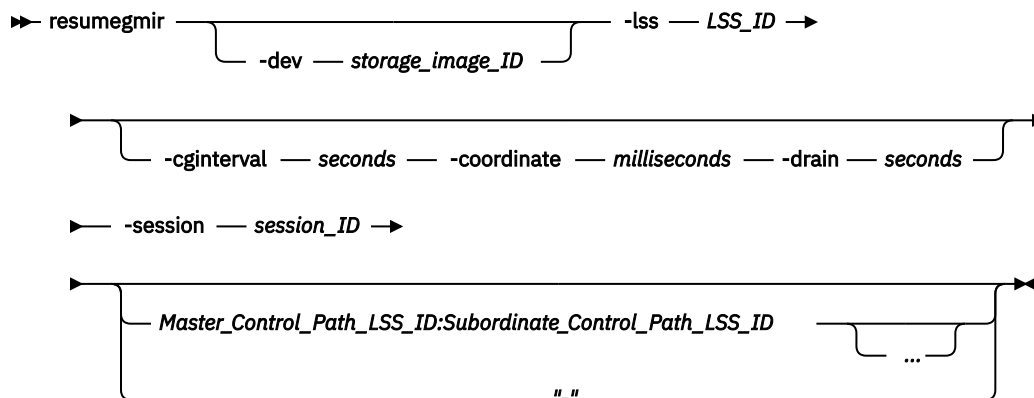
```
dscli> pausegmir -dev IBM.2107-75FA120 -lss 10
-session 01 IBM.2107-75FA120/00:IBM.2107-75FA150/00
```

Output

```
Global Mirror for session 01 successfully paused.
```

resumegmir

The **resumegmir** command resumes Global Mirror processing for a specified session.



Parameters

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-lss LSS_ID

(Required) The master logical subsystem (LSS) that is to receive the **resumegmir** command. Accepts a fully qualified LSS ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is two hexadecimal digits in the range 00 - FE.

Example of a fully qualified LSS ID: IBM.2107-75FA120/10

Tuning parameters consist of the following three values: -cginterval seconds, -coordinate milliseconds, -drain seconds

Tuning parameters have default values applied to them from the microcode. However, you can choose to change those values. You must designate a value for each of the parameters even if you are changing only one value. For example, if you decide to change only the value on the **-cginterval** parameter from 0 to 1, your command must include the default values for the other two parameters.

```
dscli> resumegmir IBM.2107-75FA120/10 -cginterval 1
-coordinate 50 -drain 30 -session 01
IBM.2107-75FA120/00:IBM.2107-75FA150/00
```

-cginterval *seconds*: The consistency group interval time, in seconds. This number specifies how long to wait between the formation of consistency groups. If this number is not specified or is set to zero, consistency groups are formed continuously.

The default value is 0. The maximum value is 65 535 seconds.

-coordinate *milliseconds*: The maximum coordination interval, in milliseconds. This value indicates the maximum time that Global Mirror processing queues Primary/Host/IO to start forming a consistency group.

The default value is 50 milliseconds. The maximum value is 65 535 milliseconds.

-drain *seconds*: The maximum consistency group drain time in seconds and the maximum amount of time that the consistent set of data is allowed to drain to the remote site before failing the current consistency group.

The default drain time is 30 seconds.

-session *session_ID*

(Required) The Global Mirror session that is to be started. A session ID is a Global Mirror session number that you assign in the 01 - FF hexadecimal range.

Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID ... | -

(Optional) One or more Global Mirror path associations. A Global Mirror path association consists of two fully qualified LSS IDs. The first is designated as the master resource and the second is the subordinate resource between which a PPRC path has been established. A LSS ID is two hexadecimal characters in the range 00 - FE. You must separate the fully qualified LSS IDs of a Global Mirror association with a colon and no spaces. The master resource must be identical for all relationships.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example of one Global Mirror association with a single subordinate in the configuration:
IBM.2107-75FA120/00: IBM.2107-75FA150/00

Example of multiple Global Mirror associations with two subordinates in the configuration:
IBM.2107-75FA120/00: IBM.2107-75FA150/00 IBM.2107-75FA120/00: IBM.2107-75FA150/01

Example: Resuming Global Mirror processing for session 01

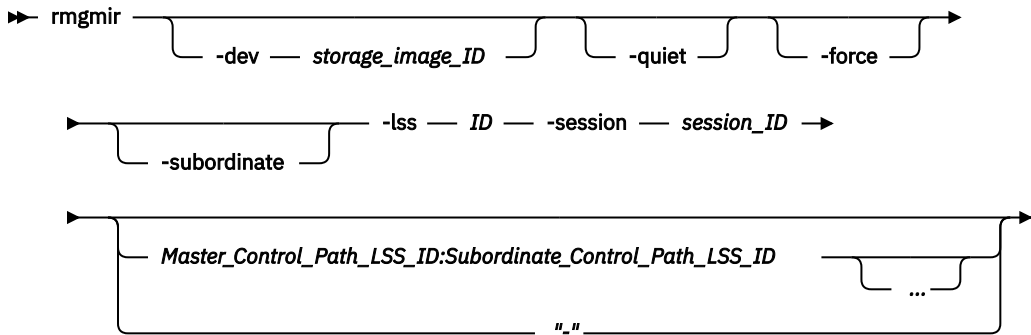
```
dsccli> resumegmir -dev IBM.2107-75FA120 -lss 10  
-session 01 IBM.2107-75FA120/00:IBM.2107-75FA150/00
```

Output

```
Global Mirror for session 01 successfully resumed.
```

rmgmir

The **rmgmir** command ends Global Mirror processing for the specified session.



Parameters

Note: Although this command might interrupt the formation of a consistency group, every attempt is made to preserve the previous consistent copy of the data on the FlashCopy target volumes. If, due to failures, this command cannot complete without compromising the consistent copy, the command stops processing and an error code is issued. If this occurs, reissue this command (**rmgmir**) with the **-force** parameter to force the command to stop the Global Mirror process.

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-quiet

(Optional) Turns off the end Global Mirror session confirmation prompt for this command.

-force

(Optional) Forces the Global Mirror process to stop regardless of the state of the Global Mirror associations.

-subordinate

(Optional) The **-lss** parameter specifies a subordinate LSS ID.

-lss ID

(Required) The logical subsystem (LSS) that is participating in the Global Mirror session. Accepts a fully qualified LSS ID, which includes the storage image ID or a shortened version without the storage image ID, if the **-dev** parameter is specified.

Example of a fully qualified LSS ID: IBM.2107-75FA120/10

-session session_ID

(Required) The session ID for which the Global Mirror path association will be removed. A session ID is a Global Mirror session number that you assign in the 01 - FF hexadecimal range.

Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID ... | -

(Optional) One or more Global Mirror path associations. A Global Mirror path association consists of two fully qualified LSS IDs. The first is designated as the master resource and the second is the subordinate resource between which there is a remote mirror and copy path. A LSS ID is two hexadecimal characters in the range 00 - FE. You must separate the fully qualified LSS IDs of a Global Mirror association with a colon and no spaces. The master resource must be identical for all relationships.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example of one Global Mirror path association with a single subordinate in the configuration:
IBM.2107-75FA120/00: IBM.2107-75FA150/00

Example of multiple Global Mirror path associations with two subordinates in the configuration:
IBM.2107-75FA120/00: IBM.2107-75FA150/00 IBM.2107-75FA120/00: IBM.2107-75FA150/01

Example: Stopping Global Mirror processing for session 01

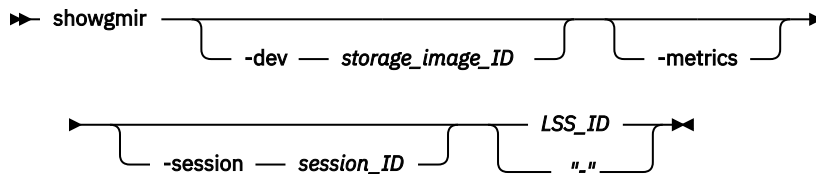
```
dsccli> rmgmir -dev IBM.2107-75FA120 -lss 10  
-session 01 IBM.2107-75FA120/00:IBM.2107-75FA150/00
```

Output

```
Are you sure you want to stop Session ID 01? [y/n]: Y  
Global Mirror for Session ID 01 successfully stopped.
```

showgmir

The **showgmir** command displays properties and performance metrics for a Global Mirror logical subsystem ID. You can issue this command on either the master storage system or on any of the subordinate storage systems. The report that is generated by this command varies significantly depending on which storage system that you issue the command and the parameters that you specify.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID consists of the manufacturer name, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-metrics

(Optional) The logical subsystem ID and its performance statistics display.

-session *session_ID*

(Optional) A session ID number displays. The number must be greater than 0 (01 - FF hexadecimal range). If you do not specify this parameter, all sessions are displayed.

LSS_ID | -

(Required) The logical subsystem (LSS) that receives the **showgmir** command displays. This parameter accepts a fully qualified LSS ID, which includes the storage image ID or a shortened version without the storage image ID if the **-dev** parameter is specified. The LSS ID is two hexadecimal digits in the range 00 - FE.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Note:

The type of report that you receive is determined by the value that you specify for the LSS ID as follows:

- When you issue the **showgmir** command from the master storage system and you specify an LSS ID that is the same type (both even numbers or both odd numbers) as the master, you receive the following results:
 - Without the **-metrics** parameter: A properties report that includes the master information
 - With the **-metrics** parameter: A properties and performance values report.
- When you issue the **showgmir** command from the master storage system and you specify an LSS ID that is not the same type (one even number and one odd number) as the master, you receive the following results:
 - Without the **-metrics** parameter: A properties report that displays only the fully qualified LSS_ID value and all the other input fields display a "-" value.
 - With the **-metrics** parameter: A properties and performance report that displays only the fully qualified LSS_ID value and all the other input fields display a "-" value.
- When you issue the **showgmir** command from the subordinate storage system and you specify an LSS ID that is the same type (both even numbers or both odd numbers) as the master, you receive the following results:
 - Without the **-metrics** parameter: A detailed properties report that displays only the master information (fully-qualified LSS ID, master session ID, and master storage system ID). All the other fields display as a "-" value.
 - With the **-metrics** parameter: A detailed properties and performance values report that displays only the master information (fully qualified LSS ID, master session ID, and master storage system ID). All the other fields display as a "-" value.
- When you issue the **showgmir** command from the subordinate storage system and you specify an LSS ID that is *not* the same type (one even number and one odd number) as the master, you receive the following results:
 - Without the **-metrics** parameter: A properties report that displays only the fully qualified LSS_ID value. All the other input fields on the report display a "-" value.
 - With the **-metrics** parameter: A properties and performance report that displays only the fully qualified LSS_ID value. All the other input fields on the report display a "-" value.

Example. Displaying the showgmir command (metrics not specified)

Note: The following example presumes that you have issued the **showgmir** command with an LSS ID that matches the master storage system.

```
dsccli> showgmir -dev IBM.2107-1300861 14
```

Output

| ID | Master Count | Master Session ID | Copy State | Fatal Reason | CG Interval Time (seconds) | Coord. Time (milli-seconds) | Max CG Drain Time (seconds) | Current Time |
|---------------------|--------------|-------------------|------------|--------------|----------------------------|-----------------------------|-----------------------------|-------------------------------|
| IBM.2107-1300861/14 | 1 | 0x25 | Running | Not Fatal | 0 | 50 | 30 | 04/25/2019 13:45:44 PDT |

| CG Time | Successful CG Percentage | FlashCopy Sequence Number | Master ID | Subordinate Count | Master/Subordinate Assoc |
|-------------------------------|--------------------------|---------------------------|----------------------|-------------------|---|
| 04/25/2019 13:45:44 PDT | 100 | 0x453- FCCF8 | IBM.2107-1300 861 | 1 | IBM.2107- 1300861/14: IBM.2107- 1300321/14 |

Output definitions

ID

The LSS ID that consists of a storage image ID followed by two hexadecimal characters that identify a Global Mirror (asynchronous remote mirror and copy) master LSS ID. The two hexadecimal digits is in the range 00 - FE.

Master Count

The number of Global Mirror master sessions. This value could be zero if none exist. When the value is zero, the master information fields of the report display a "-" value

Master Session ID

The session ID that you assigned, 01 - FF hexadecimal range.

Copy State

The Global Mirror copy state. One of the following values is displayed:

Running

The Global Mirror copy process that is running.

Paused

The Global Mirror session will be paused, that is, stopped from forming consistency groups, after the current consistency group has been formed. However, the secondary volumes in the Global Mirror session should not be considered to form a consistent data set. Another separate process is required to form a consistent data set on the secondary volumes. You can pause a session and later resume the session.

Pause In Progress

The Global Mirror copy process is in the process of pausing.

Paused with Secondary Consistency

The Global Mirror session will be paused, that is, stopped from forming of consistency groups, after the current consistency group has been formed. However, all of the secondary volumes in the Global Mirror session already form a consistent data set. You can pause a session and later resume the session.

Paused because Resume Failed

An attempt to resume a Global Mirror session that is in the *Paused* state failed. The Global Mirror session is still in the *Paused* state.

Fatal

The Global Mirror copy process failed.

Unowned

The session is not owned by the cluster that you specified using the LSS ID.

Recovering

The master session is in the process of recovering the session.

Fatal Reason

A reason code for the failure. One of the following values is displayed:

Time out

Revert FLC Failed Timeout

Revert FLC Failed

Not Fatal

Invalid Session ID

Inaccessible or Failed

Consistency Check Not Completed

Consistency Check Failed

Communication Failure

CG Corrupted

Busy Condition Preventing

CG Interval Time (seconds)

The consistency group interval time between attempts to form a consistency group, up to 65 535 seconds.

Coord. Time (milliseconds)

The maximum extended distance coordination interval. The default time is 50 milliseconds.

Max CG Drain Time (seconds)

The consistency group drain time. The consistency group drain time is the maximum time that the consistent set of data is allowed to drain to the remote site before failing the current consistency group. The maximum allowed time is 65 535 seconds.

Current Time

The time stamp when this report was generated. The date is displayed in the *MM/DD/YYYY* format. The time is displayed in the *HH:MM:SS* format on a 24-hour clock.

Note: If the clock is automatically adjusted at applicable times between standard and daylight saving time, daylight saving time is set to 1. If the clock is not automatically adjusted for daylight saving time, set to 0. For example, the report would display 12/04/2006 08:00:00 MST 0 if the clock is not automatically adjusted for daylight saving time.

CG Time

The recorded time stamp when the last successful consistency group was formed.

Successful CG Percentage

The percentage of successful attempts to form a consistency group, from 0% to 100%.

FlashCopy Sequence Number

The FlashCopy sequence number that is associated with the current consistency group.

Note: This value does not apply to a 2105; a "-" value is displayed in this column when a machine type 2105 is queried.

Master ID

The Global Mirror master storage image ID.

Subordinate Count

The count of subordinate associations (with an allowed value of 1 to 16). The master-subordinate association fields repeat according to this count.

Master/Subordinate Assoc

The Global Mirror path associations. A Global Mirror path association consists of two fully qualified LSS IDs. One ID is designated as the master resource and the other ID is designated as the subordinate resource; a remote mirror and copy path has been established between the two resources.

Example: Displaying the showgmir command (metrics specified)

Note: The following example presumes that you have issued the **showgmir** command with an LSS ID that matches the master storage system.

```
dscli> showgmir -dev IBM.2107-75FA120 -metrics 10
```

Output

| ID | Total Failed CG Count | Total Successful CG Count | Successful CG Percentage | Failed CG after Last Success | Last Successful CG Form Time | Coord. Time (milliseconds) | CG Interval Time (seconds) |
|---------------------|-----------------------|---------------------------|--------------------------|------------------------------|------------------------------|----------------------------|----------------------------|
| IBM.2107-75FA120/10 | 2 | 3 | 40 | 2 | 04/13/2019 13:08:37 PST | 50 | 5 |

| Max CG Drain Time (seconds) | First Failure Control Unit | First Failure LSS | First Failure Status | First Failure Reason | First Failure Master State | Last Failure Control Unit | Last Failure LSS |
|-----------------------------|----------------------------|-------------------|----------------------|----------------------|----------------------------|---------------------------|------------------|
| 240 | IBM.2107-75FA120 | 0x05 | Error | Long Busy | Error Recovery | IBM.2107-75FA120 | 0x05 |

| Last Failure Status | Last Failure Reason | Last Failure Master State | Previous Failure Control Unit | Previous Failure LSS | Previous Failure Status | Previous Failure Reason | Previous Failure Master State |
|---------------------|---------------------|---------------------------|-------------------------------|----------------------|-------------------------|-------------------------|-------------------------------|
| Error | Long Busy | Error Recovery | IBM.2107-75FA120 | 0x05 | Error | Long Busy | Error Recovery |

Output definitions

ID

The LSS ID. This ID consists of a storage image ID that is followed by two hexadecimal characters that identify a Global Mirror (Asynchronous PPRC) master LSS ID. The two hexadecimal digits is in the range 00 - FE.

Total Failed CG Count

The total number of consistency groups that did not complete in the user-specified drain time.

Total Successful CG Count

The total number of consistency groups that completed before the user-specified drain time.

Successful CG Percentage

The percentage of attempts that were successful in forming a consistency group.

Failed CG after Last Success

The total number of failed consistency groups after the last successful completion.

Last Successful CG Form Time

The last successful consistency group completion time.

Coord. Time (milliseconds)

The value in milliseconds that indicates the maximum amount of time that Global Mirror queues the primary host I/O to start forming a consistency group. The default is 50 milliseconds.

CG Interval Time (seconds)

The value in seconds that indicates how long to wait between formation of consistency groups.

Max CG Drain Time (seconds)

The value in seconds that indicates the maximum amount of time that Global Mirror allows for the consistent set of data to drain to the remote site.

First Failure Control Unit

The Control Unit MTS that caused the first failure of the consistency group formation.

First Failure LSS

The LSS number that caused the first failure of the consistency group formation.

First Failure Status

The first failure status of the consistency group formation. The "First Failure Reason" and "First Failure Master State" fields display data only when this field contains "Error".

First Failure Reason

The error reason of the first failure of the consistency group formation attempt.

First Failure Master State

The master state for the first Global Mirror failure.

Last Failure Control Unit

The Control Unit MTS that has caused the last failure of the consistency group formation.

Last Failure LSS

The LSS number that has caused the last failure of the consistency group formation.

Last Failure Status

The last failure status of the consistency group formation. The "Last Failure Reason" and "Last Failure Master State" fields display data only when this field contains "Error".

Last Failure Reason

The error reason of the last failure of the consistency group formation attempt.

Last Failure Master State

The master state for the last Global Mirror failure.

Previous Failure Control Unit

The Control Unit MTS that has caused the previous failure of the consistency group formation.

Previous Failure LSS

The LSS number that has caused the previous failure of the consistency group formation.

Previous Failure Status

The previous failure status of the consistency group formation. The "Previous Failure Reason" and "Previous Failure Master State" fields display data only when this field contains "Error".

Previous Failure Reason

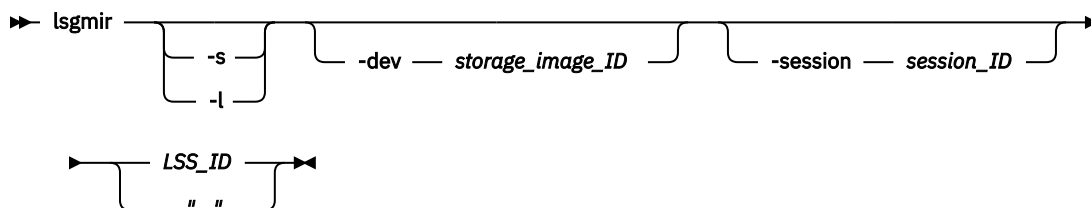
The error reason of the previous failure of the consistency group formation attempt.

Previous Failure Master State

The master state for the previous Global Mirror failure.

lsgmir

The **lsgmir** command displays a list of Global Mirror for the storage image of the specified logical subsystem (LSS).



Parameters

-s

(Optional) Specifies that you want the system to display only the session ID for the LSS. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional) Specifies that you want the system to display all the information that is associated with the session. You cannot use the **-l** and the **-s** parameters together.

-dev storage_image_ID

(Optional) Specifies the storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified extent pool ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-session session_ID

(Optional) Specifies a session ID number. The number must be greater than 0 (01 - FF hexadecimal range). If you do not specify this parameter, all sessions will be displayed.

LSS_ID | -

(Required) Specifies the logical subsystem (LSS) ID for the Global Mirror session. A fully qualified LSS ID is accepted, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-decimal digit number with no leading zeros, prefixed with the letter P.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a Global Mirror list of a specified LSS

```
dsccli> lsgmir -dev IBM.2107-75FA120
```

Output

| SessionID | MasterID | ID | State | %Success | CGtime |
|-----------|------------------|----|---------|----------|-------------------------|
| 1 | IBM.2107-75FA120 | 10 | Running | 90 | 08/31/2018 21:52:02 CST |

Output definitions

SessionID

The session ID number.

MasterID

The master ID.

ID

The logical subsystem ID.

State

One of the following Global Mirror states:

Running

A Global Mirror session is resumed.

Paused

The Global Mirror session will be paused, that is, stopped from forming consistency groups, after the current consistency group has been formed. However, the secondary volumes in the Global Mirror session should not be considered to form a consistent data set. Another separate process is required to form a consistent data set on the secondary volumes. You can pause a session and later resume the session.

Pause in Progress

The Global Mirror session is currently in the process of pausing.

Paused with Secondary Consistency

The Global Mirror session will be paused, that is, stopped from forming of consistency groups, after the current consistency group has been formed. However, all of the secondary volumes in the Global Mirror session already form a consistent data set. You can pause a session and later resume the session.

Paused because Resume Failed

An attempt to resume a Global Mirror session that is in the *Paused* state failed. The Global Mirror session is still in the *Paused* state.

Fatal

Global Mirror copy process is failed.

Unowned

The session is not owned by the cluster that you specified using the LSS ID.

Recovering

The Master is in the process of recovering the session.

%Success

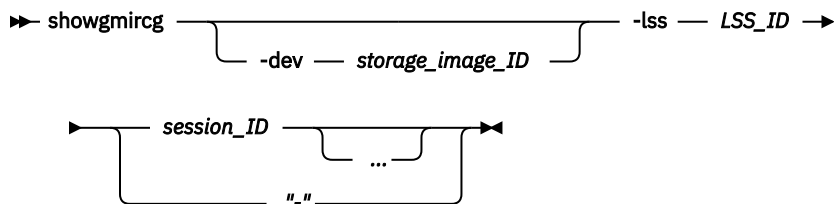
The percentage of successful attempts to form a consistency group.

CGtime

The time stamp of the last successful consistency group.

showgmircg

The **showgmircg** command displays consistency group status for the specified Global Mirror session.



Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-lss *LSS_ID*

(Required) Specifies the master logical subsystem (LSS) that receives the **showgmircg** command. LSS ID consists of two hexadecimal characters in the range of 00 - FE.

This parameter accepts a fully qualified master LSS ID, which includes either the storage image ID or a shortened version without the storage image ID if the **-dev** parameter is specified.

session_ID ... | -

(Required) Specifies one session to display. A session ID is a Global Mirror session number that you assign in the 01 - FF hexadecimal range.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example: 01

Example: Displaying consistency group status for a Global Mirror session

```
dscli> showgmircg -dev IBM.2107-75FA120 -lss 10 01
```

Output

```
LSS ID      IBM.2107-75FA120/10
Session     01
CG Status   0
```

Output definitions

LSS ID

The logical subsystem ID.

Session

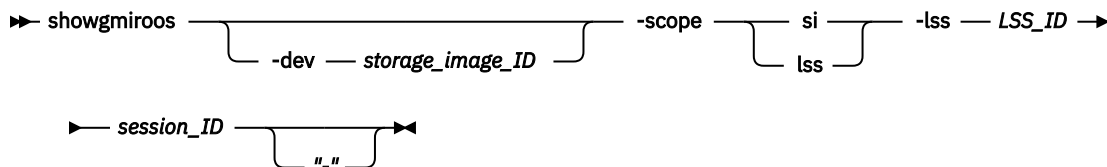
The Global Mirror session number.

CG Status

The Global Mirror Consistency Group status (primarily used by Field Engineering).

showgmiroos

The **showgmiroos** command displays the number of unsynchronized (out of sync) tracks for the specified Global Mirror session.



Parameters

Note: You might want to use this command to assist you in the following circumstances:

- To see how data is transferring. The **showgmiroos** command lets you see how far behind the remote site is from the local site in the transfer of data. The displayed value represents how many tracks must be transferred to catch up (be synchronized).
- You are not able to form consistency groups because you have exceeded the maximum drain time. The number of tracks that are not synchronized might be an indicator that you must adjust some values to allow for complete processing.

-dev storage_image_ID

(Optional) Specifies the storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-scope si | lss

(Required) Specifies the scope of the data to be returned: storage image (si) or logical subsystem (lss).

-lss LSS_ID

(Required) Specifies the master logical subsystem (LSS) that receives the **showgmiroos** command. Accepts a fully qualified master LSS ID, which includes either the storage image ID or a shortened version without the storage image ID if the **-dev** parameter is specified. The LSS ID is two hexadecimal digits in the range 00 - FE.

session_ID -

(Required) Specifies the session to display. A session ID is a Global Mirror session number that you assign in the 01 - FF hexadecimal range.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example: Displaying the number of unsynchronized (out of sync) tracks for a Global Mirror session

```
dscli> showgmirroos -dev IBM.2107-75FA120 -scope si -lss 10 01
```

Output

```
Scope          IBM.2107-75FA120
Session        01
OutOfSyncTracks 3
```

Output definitions

Scope

The scope of the returned information (storage image or logical subsystem).

Session

The Global Mirror session number.

OutOfSyncTracks

The number of unsynchronized tracks.

Global Mirror session commands

Global Mirror commands are used to create, modify, view, and delete Global Mirror sessions.

The following Global Mirror session commands are available:

chsession

Allows you to modify a Global Mirror session.

lssession

Generates a report that displays a list of Global Mirror sessions for a logical subsystem (LSS) and information regarding the volumes associated with each session in the list.

mksession

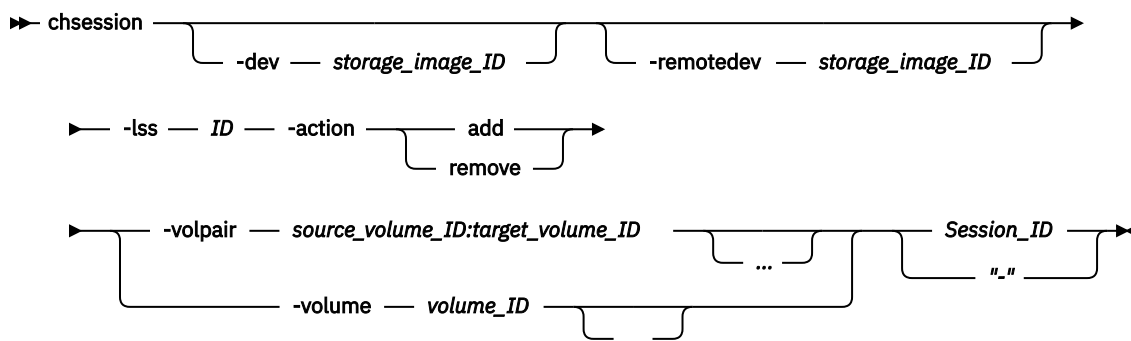
Opens a Global Mirror session.

rmsession

Closes an existing Global Mirror session.

chsession

The **chsession** command allows you to modify a Global Mirror session.



Parameters

-dev *storage_image_ID*

(Optional) The ID of the storage image containing the logical subsystem. The storage image ID includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID or do not set the *devid* variable in your profile or with the **setenv**

command. The storage image ID is also required if the HMC is associated with more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-remotedev storage_image_ID

(Optional) The remote DS system that contains one or more target volume IDs that are defined by the *source_volume_ID:target_volume_ID* variable of the **-volpair** parameter. The remote storage ID includes the manufacturer, machine type, and serial number. This parameter is required if you do not specify a fully qualified target volume ID or if you specify the **-dev** parameter.

-lss ID

(Required) The logical subsystem (LSS) ID for the Global Mirror session. The format of the LSS ID is a hexadecimal number in the range 00 - FE.

This parameter accepts a fully qualified LSS ID, which includes either the storage image ID or a shortened version without the storage image ID if the **-dev** parameter is specified.

-action add | remove

(Required). Specify one of the following values.

add

Volumes to be added to the session.

remove

Volumes to be removed from the session.

-volpair source_volume_ID:target_volume_ID ... | -volume volume_ID ...

(Required) An array of one or more volume IDs or volume ID ranges to be added or removed for the Global Mirror session. All volumes must share a common logical subsystem.

The ellipsis (...) indicates that, optionally, you can specify multiple values. To specify a range of volume IDs, you must separate the volume IDs with a hyphen. To specify a combination of one or more volume IDs and a range of volume IDs, separate the volume IDs and ranges with commas.

Notes:

- Specify either the **-volpair** parameter or the **-volume** parameter.
- See the following information for the **-volpair** and **-volume** parameters.

-volpair source_volume_ID:target_volume_ID ...

A Remote Mirror and Copy pair ID consists of two volume IDs, one designated as the source and the other as the target for a Remote Mirror and Copy relationship. To specify two volume IDs, separate the volume IDs with a colon and no space. The first volume ID is the designated source volume and the second ID as the designated target volume. The secondary volume ID is required to identify a specific relationship in a Multi-Target Metro Mirror relationship.

To specify fully qualified volume IDs, include the storage image ID or a shortened version without storage image ID if you specify the **-dev** or **-remotedev** parameters.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of 0xXYZZ, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

Example of multiple volume IDs and ranges: 0200-0204:0400-0404,0210:0410

-volume volume_ID ...

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of XYZZ, where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0 - F.

Example of a range of volume IDs: 0010-001F

Example of multiple volume IDs and ranges: 0100-010F,0180-018F,0120

Session_ID | -

(Required) The Global Mirror session that is modified for this session ID. A session ID is a hexadecimal number in the range 01 - FF.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a session ID: 01

Example: Modifying a Global Mirror session

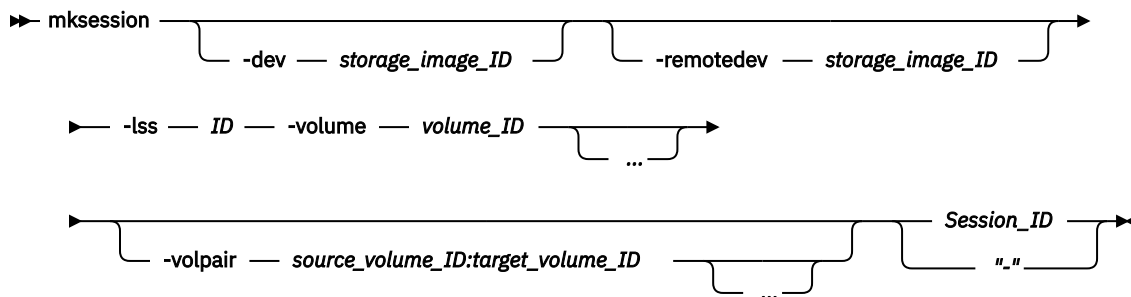
```
dscli> chsession -dev IBM.2107-75FA120 -remotedev IBM.2107-7504491 -lss 10 -action add  
-volpair 1000-1010:1000-1010 01
```

Output

```
Global Mirror session 01 successfully modified.
```

mksession

The **mksession** command opens a Global Mirror session.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the logical subsystem or do not set the *devid* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-remotedev *storage_image_ID*

(Optional) The remote DS system that contains one or more target volume IDs that are defined by the *source_volume_ID:target_volume_ID* variable of the **-volpair** parameter. The remote storage ID includes the manufacturer, machine type, and serial number. This parameter is required if you do not specify a fully qualified target volume ID or if the **-dev** parameter is selected.

-lss *ID*

(Required) Creates a Global Mirror session for this logical subsystem. Accepts a fully qualified LSS ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The LSS ID is a hexadecimal number in the range 00 - FE.

-volume volume_ID ...

(Required) An array of one or more volume IDs or a range of volume IDs to be included in the Global Mirror session. All volumes must share a common logical subsystem.

To specify a range of volume IDs, you must separate the volume IDs with a hyphen. To specify a combination of one or more volume IDs and a range of volume IDs, separate the volume IDs and ranges with commas. The ellipsis (...) indicates that, optionally, you can specify multiple values.

Do not qualify the volume ID with the storage image ID. The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of XYZZ, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

Example of a volume ID: 0010

Example of a range of volume IDs: 0010-001F

Example of multiple volume IDs and ranges: 0100-010F,0180-018F,0120

-volpair source_volume_ID:target_volume_ID ...

(Optional) An array of one or more volume pair IDs or volume pair ranges to include in the Global Mirror session. All volumes must be of a common LSS ID.

Either the **-volume** or **-volpair** parameter is required but you cannot specify both together.

The ellipsis (...) indicates that, optionally, you can specify multiple values. To specify a range of volume IDs, separate the volume IDs with a hyphen. To specify a combination of one or more volume IDs and a range of volume IDs, separate the volume IDs and ranges with commas.

To specify fully qualified volume IDs, include the storage image ID or a shortened version without storage image ID if you specify the **-dev** or **-remotedev** parameters.

A Remote Mirror and Copy pair ID consists of two volume IDs, one designated as the source and the other as the target volume for a Remote Mirror and Copy relationship. To specify two volume IDs, separate the volume IDs with a colon and no space. The first volume ID is the designated source volume. The second volume ID is the designated target volume. The secondary volume ID is required to identify a specific relationship in a Multi-Target Metro Mirror relationship.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of XYZZ, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

Example of multiple volume IDs and ranges: 0200-0204:0400-0404, 0100:0300

Session_ID | -

(Required) The session ID for which Global Mirror processing is allowed. A session ID is a hexadecimal number in the range 01 - FF.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of a session ID: 01

Example: Opening a Global Mirror session

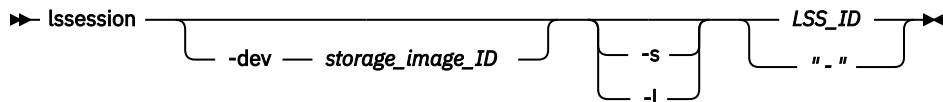
```
dsccli> mksession -dev IBM.2107-75FA120 -lss 10 -volume 1000-100F 01
```

Output

Global Mirror session ID 01 successfully opened.

lssession

The **lssession** command displays a list of Global Mirror sessions for a logical subsystem (LSS) and information about the volumes of each session in the list.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID or do not set the *devid* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-s

(Optional) Displays the session IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output. You cannot use the **-l** and the **-s** parameters together.

LSS_ID | -

(Required) The logical subsystem (LSS) ID for the Global Mirror session. The format of the LSS ID is a hexadecimal value in the range 00 - FE.

This parameter accepts a fully qualified LSS ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example 1: Displaying volumes information for Global Mirror sessions of an LSS (using the -l parameter)

```
dscli> lssession -dev IBM.2107-75FA120 -l 01
```

Output

| LSSID | Session | Status | Volume | Volume Status |
|---------------------|---------|--------|-----------------------|---------------|
| IBM.2107-75FA120/10 | 01 | Normal | IBM.2107-75FA120/1001 | Active |
| IBM.2107-75FA120/10 | 01 | Normal | IBM.2107-75FA120/1002 | Active |
| IBM.2107-75FA120/10 | 01 | Normal | IBM.2107-75FA120/1003 | Active |

| PrimaryStatus | SecondaryStatus | FirstPassComplete | AllowCascading | SecondaryVolume |
|---------------------|-------------------|-------------------|----------------|-----------------|
| Primary Full Duplex | Secondary Simplex | True | Disabled | - |
| Primary Full Duplex | Secondary Simplex | True | Disabled | - |
| Primary Full Duplex | Secondary Simplex | True | Disabled | - |

Example 2: Displaying volumes information for Global Mirror sessions of an LSS (using the -s parameter)

```
dscli> lssession -s -dev IBM.2107-75FA120 10
```

Output

| LSSID | Session | Volume |
|-------|---------|--------|
| 10 | 01 | 1001 |
| 10 | 01 | 1002 |
| 10 | 01 | 1003 |

Output definitions

LSSID

The unique identifier that is assigned to this logical subsystem object. The LSS ID is a hexadecimal value in the range 00 - FE.

Session

The Session ID number that you assigned in the 01 - FF hexadecimal range.

Status

The state of the session. One of the following values is displayed:

CG in progress

The consistency group for the session is in progress.

Increment Pending

The increment process is in progress.

Normal

The session is in a normal state.

Volume

The volume ID. If no volume is active for the session a " - " value is displayed.

VolumeStatus

The status of the volume in the session. One of the following values is displayed:

Join Pending

The volume is not active for the current session. However, it is added to the session in the next cycle.

Remove Pending

The volume is active for the current session. However, it is removed in the next cycle.

Active

The volume is an active member of the session.

PrimaryStatus

The primary remote copy and mirror status of the volume. One of the following values is displayed:

Primary Simplex

The volume is not part of a remote mirror and copy relationship.

Primary Copy Pending

The volume is primary in a remote mirror and copy relationship and the relationship is in a Copy Pending state, which means that the source and target volume are out-of-sync. In this situation, data still needs to be copied from the source to the target volume.

Primary Full Duplex

The volume is primary in a remote mirror and copy relationship and the relationship is in a Full Duplex state, which means that the copy operation has completed and the volume pair is synchronized, and that any updates to the primary volume are transferred synchronously to the secondary volume.

Primary Suspended

The volume is primary in a remote mirror and copy relationship and the relationship is suspended, which means that the primary is no longer transferring data to the secondary, and any changed data that is at the primary is tracked in an out-of-sync bitmap.

" _ "

No active volumes exist for the session.

SecondaryStatus

The secondary remote copy and mirror status of the volume. One of the following values is displayed:

Secondary Simplex

The volume is not part of a remote mirror and copy relationship.

Secondary Copy Pending

The volume is secondary in a remote mirror and copy relationship and the relationship is in a Copy Pending state, which means that the source and target volume are out-of-sync. In this situation, data still needs to be copied from the source to the target volume.

Secondary Full Duplex

The volume is secondary in a remote mirror and copy relationship and the relationship is in a Full Duplex state, which means that the copy operation has completed and the volume pair is synchronized, and that any updates to the secondary volume are transferred synchronously from the primary volume.

Secondary Suspended

The volume is secondary in a remote mirror and copy relationship and the relationship is suspended, which means that the primary is no longer transferring data to the secondary, and any changed data that is at the primary is tracked in an Out of Sync bitmap.

" _ "

No active volumes exist for the session.

FirstPassComplete

Whether the first cycle of the volume in the global mirror relationship has ended. The value displayed is either True or False.

AllowCascading

Whether the volume can be a secondary in a remote mirror and copy relationship. The value displayed is either Enabled or Disabled.

SecondaryVolume

The Global Mirror secondary volume that is used to describe which replication portion is the Global Mirror portion in a MultiTarget environment. The volume ID is represented as four hexadecimal digits in the form of XYZZ, where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

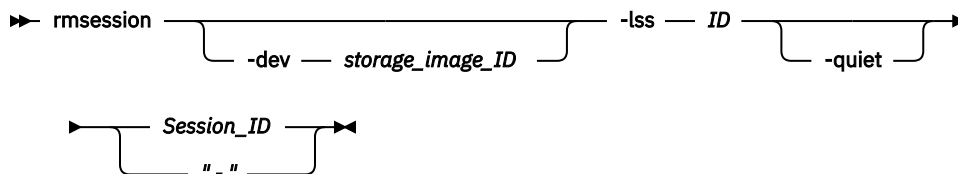
The volume number, 00 - FF.

The volume ID is always displayed as a full volume ID. However, if there are no active volumes in the Global Mirror session or if secondary information is not available, the output displays null (-).

Note: The secondary volume is specified in the **chsession -action add -volpair** command. If **-volume** is used in the **chsession** command instead of **-volpair** then the secondary volume is not displayed.

rmsession

The **rmsession** command closes an existing Global Mirror session.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2107-75FA120

-lss ID

(Required) The logical subsystem (LSS) ID for the Global Mirror session that is being closed. The format of the LSS ID is a hexadecimal value in the range 00 - FE.

This parameter accepts a fully qualified LSS ID, which includes the storage image ID, or shortened version without the storage image ID if the **-dev** parameter is specified.

-quiet

(Optional) Turns off the end Global Mirror session confirmation prompt for this command.

Session_ID | -

(Required) The session ID on which Global Mirror processing is to be closed. A session ID is a hexadecimal number in the range 01 - FF.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example of a session ID: 01

Example: Closing an existing Global Mirror session

```
dscli> rmcommand -dev IBM.2107-75FA120 -lss 10 01
```

Output

```
Are you sure you want to close Session ID 01? y/n Y  
Global Mirror Session ID 01 closed successfully.
```

Framework commands

User interface framework commands are provided for the DS command-line interface.

The following framework commands are available:

dscli

Starts the DS CLI. Use this command to complete storage management tasks from the command line.

echo

Specifies whether the dscli echoes each specified command, or to display a user-specified string. If echo is turned on, each command is printed before it is processed. The echo can also be turned on or off using the dscli profile file or the **setenv** command.

exit

Ends an interactive command-line interface session.

help

Displays a list of commands available in a command-line interface and optionally displays the syntax or brief description of each command. If you specify this command with no parameters, this command displays only a list of available commands.

helpmsg

Used to obtain details about information, warning, and error messages.

quit

Ends an interactive command-line interface session.

setenv

Sets DS CLI environment variables that are located in the DS CLI profile.

showenv

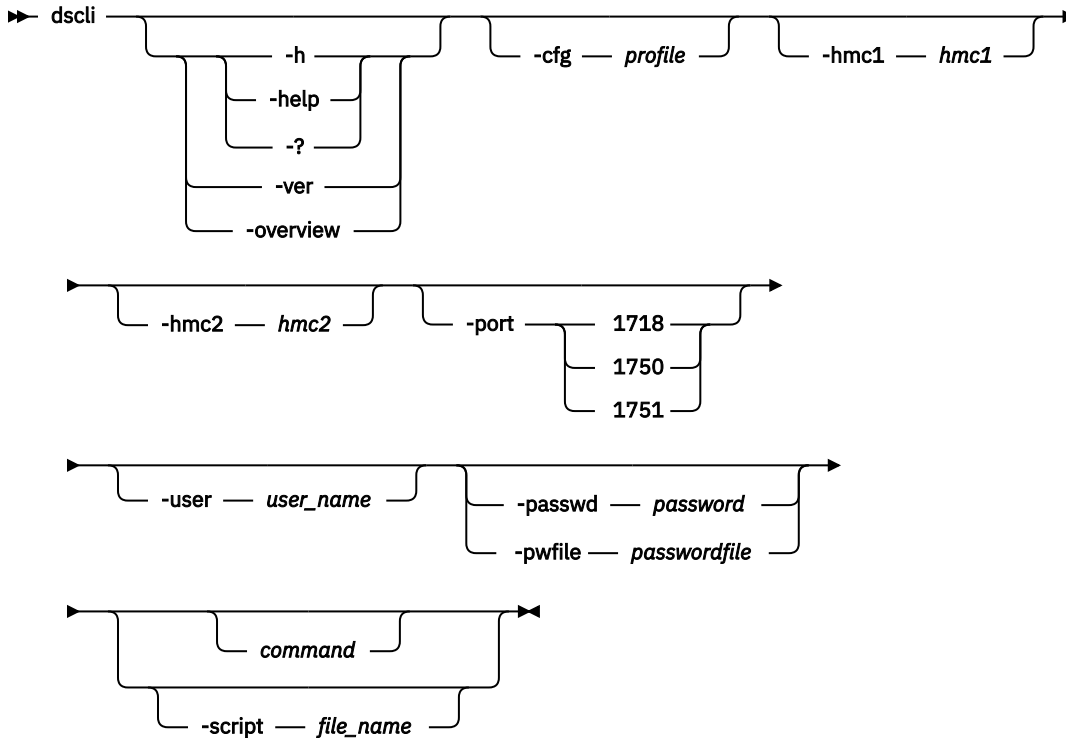
Displays the DS CLI environment variables.

ver

Displays the versions of the command-line interface, storage management console (HMC or SMC), and licensed machine code. It does not display the version number of the graphical user interface (GUI).

dscli

The **dscli** command starts the DS CLI. Use this command to run DS CLI commands in interactive, single-shot, or script mode.



Parameters

-help | -h | -?

(Optional) Displays a help screen about how to use the DS CLI program.

-ver

(Optional) Displays the DS CLI version.

-overview

(Optional) Provides overview information about the DS CLI.

-cfg profile

(Optional) Specifies a profile file. This parameter is not required if you use default profiles. The default profile file name is `dscli.profile`, and it is provided as part of the DS CLI package under the profile directory. See [“Creating a default CLI profile” on page 10](#) for more information.

-hmc1 hmc1

(Optional) The primary management console IP address or the DNS name.

Note: You can connect the DS CLI to the HMC by using an IPV6 IP address if your Java virtual machine level supports IPV6.

This parameter is not required if you created this information as a profile variable.

-hmc2 hmc2

(Optional) The secondary management console IP address or the DNS name. This parameter is not required if you created this information as a profile variable.

-port 1718 | 1750 | 1751

(Optional) Specifies that the DS CLI should use only the specified port. By default, the DS CLI first attempts to connect by using port 1751 with an NIST-compliant certificate. If that connection fails, the DS CLI attempts to connect to an existing storage system port 1750 with the legacy certificate. However, checking multiple ports can cause a connection delay when a DS CLI connects to a storage

system that does not listen on the 1751 port. If the target storage system is known, you can use this parameter to eliminate any connection delay that is caused by checking multiple ports.

1751

Connect by using port 1751 only on (storage system with NIST SP 800-131a-compliant certificate).

-user *user_name*

(Optional) Specifies your user name for entering DS CLI commands.

-passwd *password*

(Optional and not recommended) The password to authenticate when you start the CLI session. This parameter is not required nor recommended. If you use this method to designate your password, the password is displayed on the screen. Another option is to specify a password file (see the next parameter) that is used when you start the DS CLI.

-pwwfile *passwordfile*

(Optional) Specifies a password file containing your password as an alternative to the **-passwd** parameter.

Note: You cannot specify both the **-pwwfile** and the **-passwd** parameter when you start the DS CLI, otherwise an error message is given.

command

(Optional) The single command that you want to run.

Note: You cannot specify both the *command* and **-script** *file_name* parameters. Use **-script** for script mode, *command* for single-shot mode, and use neither for interactive mode.

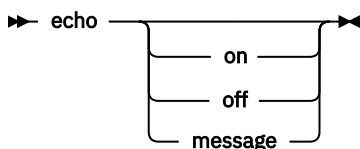
-script *file_name*

(Optional) Initiates the script mode so that multiple dscli program commands are issued consecutively by using a saved file. Format options that are specified using the framework **setoutput** command apply to all commands in the file. Output from successful commands routes to stdout, and output from failed commands routes to stderr. If an error occurs during the processing of one of the commands in the file, the script exits at the point of failure and returns to the system prompt.

echo

The **echo** command allows you to specify whether the dscli will echo each specified command, or to display a user-specified string.

If echo is turned on, each command will be printed before it is executed. The echo can also be turned on or off using the dscli profile file or the **setenv** command.



Parameters

on | off | message

(Optional) Specifies whether the echo is turned on or off, or if a message is displayed.

- If it is turned on, each command is displayed before it is executed.
- If it is turned off, the dscli will not display anything before executing a command.
- You can also choose to echo a string of your choice. For example, if you enter `echo something else`, the string "something else" will be displayed. Issuing the **echo** command without any parameters will display whether **echo** is on or off.

Note: If the **echoprefix** variable is set, its value is printed on the same line preceding the commands that are echoed.

Example

Issuing the echo command

```
dscli> echo on
```

Output

```
dscli> echo on
```

```
CMUC00212I echo: completed successfully.
```

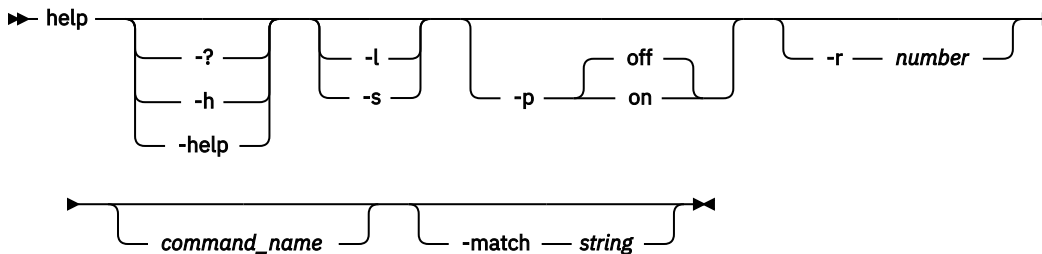
exit

The **exit** command ends an interactive command-line interface session.

▶▶ exit ▶▶

help

The **help** command displays a list of commands available in a command-line interface and optionally displays the syntax or brief description of each command. If you specify this command with no parameters, this command displays only a list of available commands.



Parameters

-? | -h | -help

Displays a detailed description of this command, including syntax, parameter descriptions, and examples. If you specify a help option, all other command options are ignored.

-l

Displays a list of available commands with the syntax diagrams for each. If you specify a command name with this parameter, this command displays the syntax for only the specified command.

-s

Displays a list of available commands with a brief description of each. If you specify a command name with this parameter, this command displays a brief description for only the specified command.

-p *off* | *on*

Display one page of text at a time or all text at once.

off Displays all text at one time. This value is the default.

on Displays one page of text at a time. Pressing any key displays the next page.

-r *number*

The number of rows per page to display when the -p parameter is on. The default is 24 rows. You can specify a value 1 - 100.

command_name

Displays help information for the specified command, including the syntax diagram, parameter descriptions, return codes and errors, descriptions, examples, and miscellaneous remarks.

-match *string*

Displays a list of commands that contain the specified string. This parameter cannot be used with any other parameters.

Example

Displaying help for exit

```
#dscli> help -s exit
```

Output

Ends a command-line interface session.

helpmsg

The **helpmsg** command is used to obtain details about information, warning, and error messages.

►► helpmsg — *message_ID* 

Parameters

Notes:

1. The message information revealed by this command is a snapshot of what is available in your current code version.
2. This command does not work for GUI messages.
3. For the most up-to-date information, see the list of individual messages in the DS8000 online documentation.

message_ID

(Required) The message number that you are querying. You must enter the entire message number (for example, CMUC00246I, CMUC00244W, CMUC00247E). You do not have to enter all caps. Substitute keys are not allowed and cause an error if used.

Example

Displaying message details for cmuc00247e

```
dscli> helpmsg cmuc00247e
```

Output

```
CMUC00247E COMMAND_INFO You are attempting to create volumes for a
logical subsystem that does not match the rank group of the extent
pool that you specified.
```

Explanation

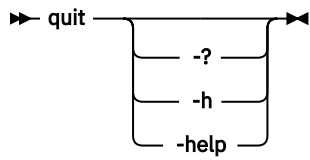
You create a logical volume from an extent pool in a rank group. The logical volume is also a member of a logical subsystem group. The logical subsystem group identifier and the rank group identifier of the extent pool that you specify must be identical. Even-numbered logical subsystem identifiers are associated with rank group identifier 0, and odd-numbered logical subsystem identifiers are associated with rank group identifier 1.

Action

Retry the create volume task and specify an extent pool and a logical subsystem group that are in the same rank group.

quit

The **quit** command ends an interactive command-line interface session.



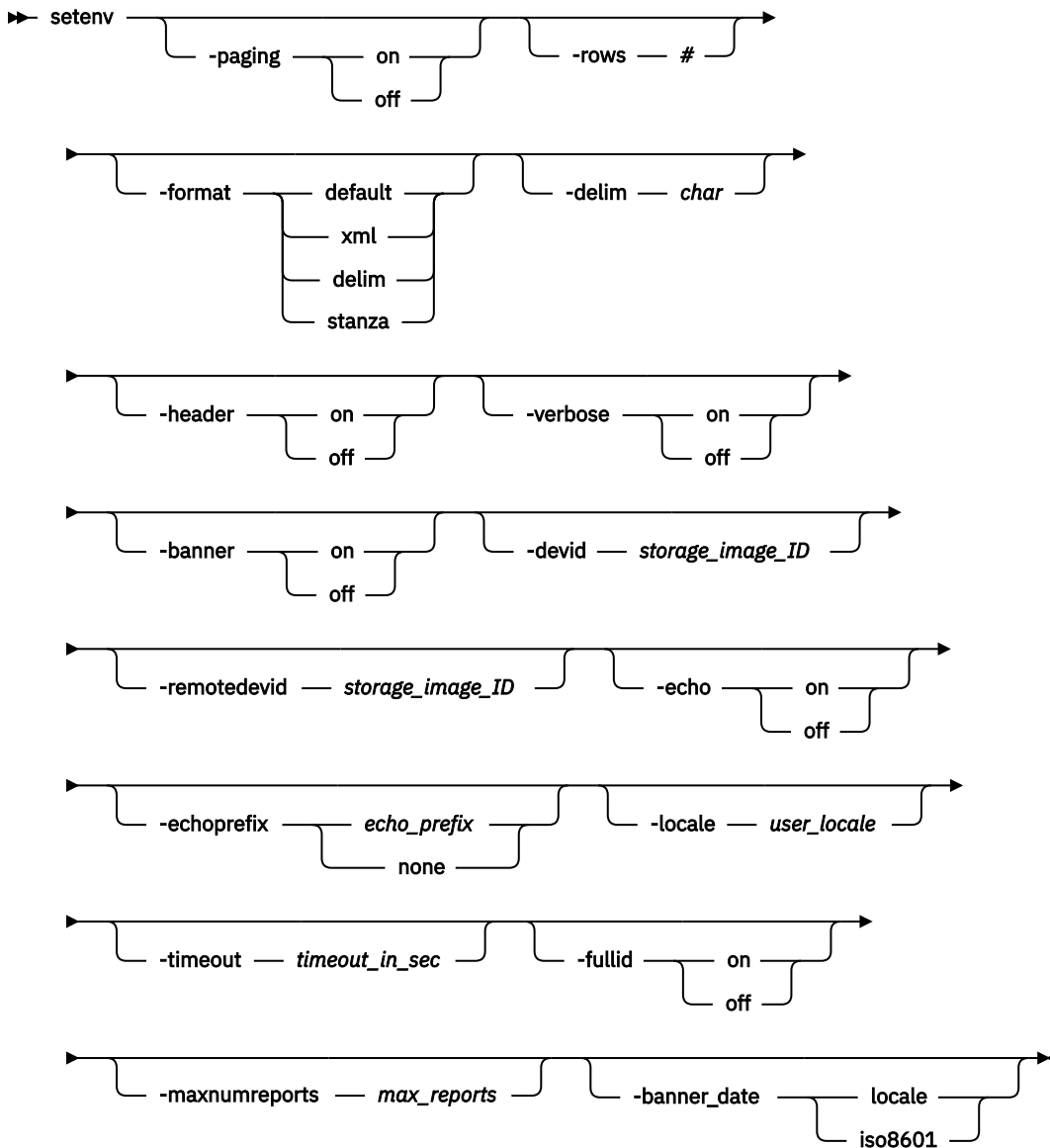
Parameters

-? | -h | -help

Displays a detailed description of this command, including syntax, parameter descriptions, and examples. If you specify a help option, all other command options are ignored.

setenv

The **setenv** command overrides the default values of the DS CLI environment variables. Default values are stored in the DS CLI profile. New values are valid for the current interactive session only and not permanently saved in the DS CLI profile.



Parameters

-paging on | off

(Optional) Display one page of text at a time or all of the text at once.

off

Displays all of the text at one time. This value is the default.

on

Displays one page of text at a time. Pressing any key displays the next page.

-rows #

(Optional) The number of rows per page to display when **-paging** is set to *on*. The default is 24 rows. You can specify a value of 1 - 100.

-format default | xml | delim | stanza

(Optional) The format of the output. You can specify one of the following values:

default

Specifies that the output is to be displayed in a tabular format with a space as the delimiter between the columns. This value is the default.

delim

Specifies that the output format is to be set to a table and sets the column delimiter to a single character that is specified by the **-delim char** parameter.

xml

Specifies that the output is to be displayed in XML format.

stanza

Specifies that the output is to be displayed in a stanza (vertical table) format.

-delim char

(Optional) The delimiter character (such as a comma) used in the report.

-header on | off

(Optional) Specifies whether to display the table header.

on

Displays the table header. This value is the default.

off

Does not display the table header.

-verbose on | off

(Optional) Specifies whether to enable verbose mode.

off

Disables verbose mode. The value that you specify takes the place of the value that you specified in the profile.

on

Enables verbose mode.

-banner on | off

(Optional) Specifies whether the banner (command header) message is enabled.

off

Turns off the header mode so that the command header does not display.

on

Turns on the header mode so that the command header is displayed.

-devid storage_image_ID

(Optional) The default devid.

-remotedevid storage_image_ID

(Optional) The default remote devid.

-echo on | off

(Optional) Specifies whether the echo is turned on or off. If it is turned on, each command is printed before it is run.

-echoprefix echo_prefix | none

(Optional) Specifies a prefix to display before each echoed command. **-echoprefix none** indicates that no prefix is displayed.

-locale user_locale

(Optional) The output language on the local computer. The default locale is based on the user environment settings. Example: en

-timeout timeout_in_sec

(Optional) The timeout value of client/server synchronous communication. The timeout value is displayed in seconds.

-fullid on | off

(Optional) Specifies that IDs are displayed in the fully qualified format, which includes the storage image ID. The default value is *off*.

-maxnumreports *max_reports*

(Optional) The maximum number of records for the performance report. The default value is 256.

-banner_date locale | iso8601

(Optional) The banner date and time format as follows:

locale

The locale format as set with the **-local** parameter, or by default, from the OS locale setting.

iso8601

The ISO 8601 date/time format as follows:

```
yyyy-MM-dd 'T' HH:mm:ssZ
```

where:

yyyy

the year

MM

the month (01-12)

dd

the day (01-31)

HH

the hour (00-23)

mm

the minutes (00-59)

ss

the seconds (00-59)

Z

the time zone offset from UTC [-HHmm | +HHmm]

The default value is *locale*.

Example

Enter the **setenv** command:

Setting the environment variable to display each command before it is run

```
dscli> setenv -echo on
```

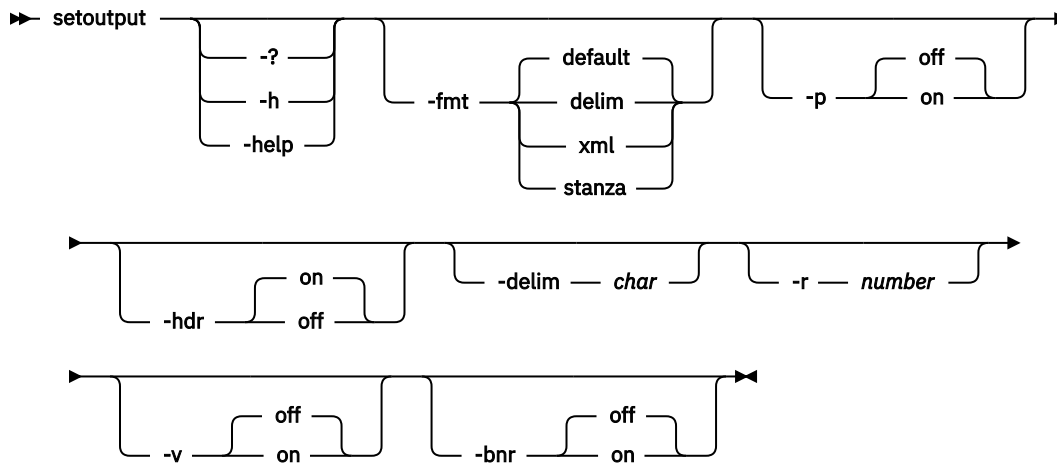
Output

```
CMUC00043I setenv: Environment variable successfully set.
```

setoutput

The **setoutput** command sets or displays command output format options.

Use this command to set either default or user-defined output formats. The output format remains during the active command session unless reset either with a command option or the resubmission of the **setoutput** command. Running this command with no parameters displays the current output settings in the default output format.



Parameters

-? | -h | -help

(Optional) Displays a detailed description of this command, including syntax, parameter descriptions, and examples. If you specify a help option, all other command options are ignored.

-fmt [default] | delim | xml | stanza

(Optional) The format of the output. You can specify one of the following values:

default

Specifies that the output is to be displayed in a tabular format with a space as the delimiter between the columns. This value is the default.

delim

Specifies that the output format is to be set to a table and sets the column delimiter to a single character that is specified by the **-delim char** parameter.

xml

Specifies that the output is to be displayed in XML format.

stanza

Specifies that the output is to be displayed in a stanza (vertical table) format.

-p off | on

(Optional) Specifies whether to display one page of text at a time or all of the text at once.

off

Displays all of the text at one time. This value is the default.

on

Displays one page of text at a time. Pressing any key displays the next page.

-hdr on | off

(Optional) Specifies whether to display the table header.

on

Displays the table header. This value is the default.

off

Does not display the table header.

-delim char

(Optional) Specifies that the delimiter character (such as a comma) used in the report.

-r number

(Optional) The number of rows per page to display when the **-p** parameter is on. The default is 24 rows. You can specify a value 1 - 100.

-v off | on

(Optional) Specifies whether to enable verbose mode.

off

Disables verbose mode. This value is the default.

on

Enables verbose mode.

-bnr off | on

(Optional) Specifies whether the banner (command header) message is enabled.

off

Turns off the header mode so that the command header does not display.

on

Turns on the header mode so that the command header is displayed.

Format Examples

Setting command output with no options

The **setoutput** command with no options displays the current output settings in the default format (space-separated plain text table), regardless of the values of the output settings.

```
dscli> setoutput
```

The resulting output

```
Paging Rows Format Headers Verbose Banner
=====
Off - Default On Off On
```

Setting command output to display in comma-separated format

The following lines are an example of the commands that you can enter to get (long) output in comma-separated format for an unassigned rank only. Enter the **setoutput** command to specify the report format and then enter the **lsrank** command to designate the rank you want to query.

```
dscli> setoutput -fmt delim -delim ,
dscli> lsrank -dev IBM.2107-75FA120 -state unassigned
```

Output

Note: Although this example shows the header turned on, you can choose to turn off the header. To turn off the header, issue the command and include the **-hdr off** parameter.

```
ID,Group,State,datastate,Array,RAIDtype,extpoolID,stgtype
=====
R0,-,Unassigned,Normal,A0,5,-,fb
```

Setting command output to display long output in XML format

The following lines are an example of the commands that you can enter to get (long) output in XML format for an unassigned rank only. Enter the **setoutput** command to specify the report format and then enter the **lsrank** command to designate the unassigned rank that you want to query.

```
dscli> setoutput -fmt xml
dscli> lsrank -dev IBM.2107-75FA120 -state unassigned
```

Output

```
<IRETURNVALUE>
<INSTANCE CLASSNAME="CliRankHandler"><PROPERTY NAME="rank_id">
<DISPLAY TYPE="string">R0</DISPLAY><VALUE TYPE="string">R0
</VALUE></PROPERTY><PROPERTY NAME="grp"><DISPLAY TYPE="unit8">-
</DISPLAY><VALUE TYPE="unit16">-</VALUE></PROPERTY>
<PROPERTY NAME="state"><DISPLAY TYPE="string">Unassigned</DISPLAY>
<VALUE TYPE="string">unassigned</VALUE></PROPERTY>
<PROPERTY NAME="data"><DISPLAY TYPE="string">Normal</DISPLAY>
<VALUE TYPE="string">Normal</VALUE></PROPERTY>
<PROPERTY NAME="array_id"><DISPLAY TYPE="string">A0
</DISPLAY><VALUE TYPE="string">A0</VALUE></PROPERTY>
<PROPERTY NAME="raidtype"><DISPLAY TYPE="unit8">5</DISPLAY>
<VALUE TYPE="string">5</VALUE></PROPERTY>
<PROPERTY NAME="extpool_id"><DISPLAY TYPE="string">-
</DISPLAY><VALUE TYPE="string">-</VALUE></PROPERTY>
<PROPERTY NAME="stgtype"><DISPLAY TYPE="string">fb</DISPLAY>
```

```
<VALUE TYPE="string">fb</VALUE><PROPERTY><INSTANCE>  
<IRETURNVALUE>
```

Setting command output to display long output in stanza format

When columns are horizontally long, output can be difficult to visually align. The stanza format option eliminates this problem. The following output is an example of the commands that you can enter to get (long) output in stanza format for an unassigned rank only. Issue the **setoutput** command to specify the report format and then enter the **lsrank** command to designate the unassigned rank that you want to query.

```
dscli> setoutput -fmt stanza  
dscli> lsrank -dev IBM.2107-75FA120 -state unassigned
```

Output

```
ID          R0  
Group      -  
State      unassigned  
datastate  normal  
Array      A0  
RAIDtype   5  
extpoolID  -  
stgtype    fb
```

showenv

The **showenv** command displays the DS CLI environment variables.

►► showenv ◀◀

Example: Displaying the DS CLI environment variables

```
dscli> showenv
```

Output

```
paging      off  
rows        24  
format      default  
delim       ,  
header      on  
verbose     off  
banner      on  
devid       IBM.2107-1301441  
remotedevid IBM.2107-1301441  
echo        off  
echoprefix  -  
locale      zh  
timeout     -  
fullid      off  
bannerDate  locale  
maxNumReports 256
```

Output definitions

paging

Indicates whether paging is turned on or off.

rows

Indicates the number of rows per page that are displayed.

format

Indicates the output format.

delim

Indicates the delimiter character that is used in the *delim* output format.

header

Indicates whether the header is turned on or off.

verbose

Indicates whether verbose mode is turned on or off.

banner

Indicates whether the banner is turned on or off.

devid

Indicates the default devid.

remotedevid

Indicates the default remote devid.

echo

Indicates whether the echo is turned on or off. If it is turned on, each command is printed before it is run.

echoprefix

Indicates that a prefix is displayed before each echoed command. A dash "-" is shown and no prefix is displayed if echoprefix is not specified.

locale

Indicates the output language on the local computer.

timeout

Indicates the timeout value of client/server synchronous communication. The timeout value is displayed in seconds.

fullid

Indicates that IDs are displayed in the fully qualified format, which includes the storage image ID.

bannerDate

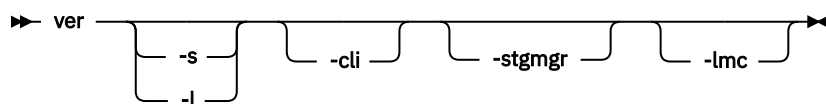
Indicates the format of the banner date and time.

maxnumreports

Indicates the maximum number of records for the performance report.

ver

The **ver** command displays the versions of the command-line interface, storage management console (HMC or SMC), and licensed machine code. It does not display the version number of the graphical user interface (GUI).

**Parameters****-s**

(Optional) Specifies that the system displays the version of the command-line interface program. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Specifies that the system displays the following version information:

- The version of the DS command-line interface.
- The version of the Storage Management GUI (SMC or HMC).
- The version of the licensed machine code.
- The storage image ID, which consists of the manufacturer, machine type, and serial number (MTS.)
- The version of the DS CLI that is installed on the HMC.
- The version of the currently active code bundle that is installed.

You cannot use the **-s** and **-l** parameters together.

-cli

(Optional) Displays the version of the DS Command-line interface program. Version numbers are in the format *version.release.modification.fix level*.

-stgmgr

(Optional) Displays the HMC code version number. This value is not the version number of the graphical user interface (GUI).

-lmc

(Optional) Displays the version of the DS licensed machine code.

Example**Displaying the versions of the command-line interface, storage management console (HMC or SMC), and licensed machine code**

```
dscli> ver -l
```

Output

```
Date/Time: February 27, 2014 6:00:01 AM MST IBM DSCLI
Version: 7.7.30.198 DS:

DSCLI          7.7.30.198
StorageManager 7.7.7.0.20130628.1DS
HMC DSCLI      7.7.30.180
=====Version=====
Storage Image   LMC           Bundle Version
=====
IBM.2107-75YZ881 7.7.30.128    87.30.40.0
```

Output definitions**DSCLI***

Indicates the version of the DSCLI, in this format: *version.release.modification.fix level*.

StorageManager⁺

Indicates the version of the Storage Manager (HMC microcode). This value is not the version number of the DS Storage Manager (graphical user interface, GUI).

HMC DSCLI⁺

Indicates the version of the HMC DSCLI in this format: *version.release.modification.fix level*.

Storage Image⁺

Indicates the storage image ID, which consists of the manufacturer, machine type, and serial number (MTS).

LMC⁺

Indicates the version of the Licensed Machine Code.

Bundle Version⁺

Indicates the version of the currently active installed code bundle.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

Install software commands

Use the install software commands to install software and display software information.

The following install software commands are available:

installsoftware

Installs software on the storage server.

lssoftware

Displays a list of installed software information.

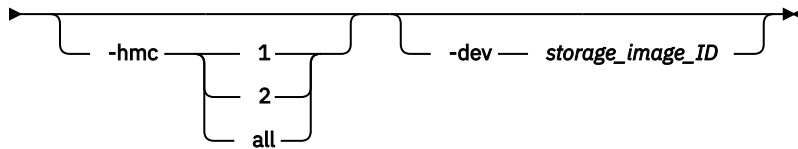
installsoftware

The **installsoftware** command installs software for the storage server.

Note: You can specify the software that was previously downloaded from the IBM Support Portal. The Support Portal for CSM is available from https://www.ibm.com/support/entry/myportal/product/system_storage/storage_software/storage_infrastructure_management/ibm_copy_services_manager?productContext=332956944.

Note: The **installsoftware** command cannot be run from the **Embedded DS CLI** window.

► installsoftware — -type — csm — -loc — *software_package* — -certloc — *certificate_file* ►



Parameters

-type

(Required) The software type of the installation package to be installed. Currently, the only supported type is CSM (IBM Copy Services Manager).

-loc *software_package*

(Required) The full path of the specified software installation package to be installed. For example, csm-setup-6.2.0-linux-x86_64.bin.

Note: Ensure that no spaces are included in the path you specify for the location of the software package.

-certloc *certificate_location*

(Required) The full path of the certificate file location. For example, C:\Downloads\CSM_Linux\csm-setup-6.2.0-linux-x86_64.bin -certloc.

Note: Ensure that no spaces are included in the path you specify for the location of the certificate file.

-hmc 1 | 2 | all

(Optional) The primary HMC hmc 1 or secondary HMC hmc 2 where the software is installed. The default is all. For example, C:\Downloads\CSM_Linux\csm-setup-6.2.0-linuxx86_64.bin.crt -hmc 1.

Note: -hmc 1 specifies the primary HMC and -hmc 2 specifies the secondary regardless of how -hmc 1 and -hmc 2 were specified at the **dscli** startup process.

A **dscli** connection can succeed even if you inadvertently specify the primary HMC with -hmc 2 and the secondary backup HMC with -hmc 1 at the **dscli** command startup. In this case, if you specify -hmc 1 with this command, the software is downloaded to the actual primary HMC.

-dev *storage_image_ID*

(Optional) The storage image ID. A storage image ID consists of a manufacturer, machine type, and serial number. For example, 2107-75FA120.

Example

Installing CSM software

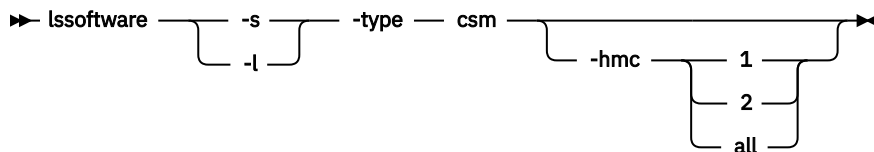
```
dscli> installsoftware -type csm -loc
C:\Downloads\CSM_Linux\csm-setup-6.2.0-linux-x86_64.bin -certloc
C:\Downloads\CSM_Linux\csm-setup-6.2.0-linux-x86_64.bin.crt -hmc 1
```

Output

```
CMUC00294I installsoftware: Upload file successfully.  
CMUC00294I installsoftware: Software CSM is successfully installed on HMC 1.
```

lssoftware

The **lssoftware** command displays a list of installed software.



Parameters

-type

(Required) Specifies IBM Copy Services Manager is installed on this storage server.

-hmc 1 | 2 | all

(Optional) The primary HMC hmc 1 or secondary HMC hmc 2 where the software is downloaded.

Note: -hmc 1 specifies the primary HMC and -hmc 2 specifies the secondary HMC regardless of how -hmc 1 and -hmc 2 were specified at the **dscli** startup process.

For example, a **dscli** connection can succeed even if you inadvertently specify the primary HMC using -hmc 2 and the secondary backup HMC using -hmc 1 at the **dscli** startup process. In this case, if you specify -hmc 1 with this command, the software is downloaded to the actual primary HMC.

Example: Displaying a list of installed software

```
dscli> lssoftware -l  
Sun Aug 11 02:23:49 PST 2015 IBM DS CLI  
Type          Version      Status      HMC  
=====
```

| | | | |
|-----|-----|---------|---|
| CSM | 6.1 | Running | 1 |
|-----|-----|---------|---|

Output definitions

Type

Indicates the software type.

Version

Indicates the currently installed software version.

Status

Indicates the status for the installed software.

Running

The software is enabled and is working normally.

Not running

The software is not enabled or is working abnormally.

HMC

Indicates the number of the HMC on which the software is installed.

1

Indicates the primary HMC.

2

Indicates the secondary HMC.

all

Indicates both primary and secondary HMCs.

I/O port and host connection configuration commands

Specific DS CLI commands are used to configure and display storage image I/O port information.

Storage image I/O port commands

There are specific commands used to configure and display storage image I/O port information.

The following storage image I/O port commands are available:

lsioport

Displays a list of I/O ports on a specified storage image and optionally provides performance metrics for each I/O port that is listed.

lsportprof

Displays a list of port profiles that are supported on a storage system and their recommended address discovery and logical block size values.

setioport

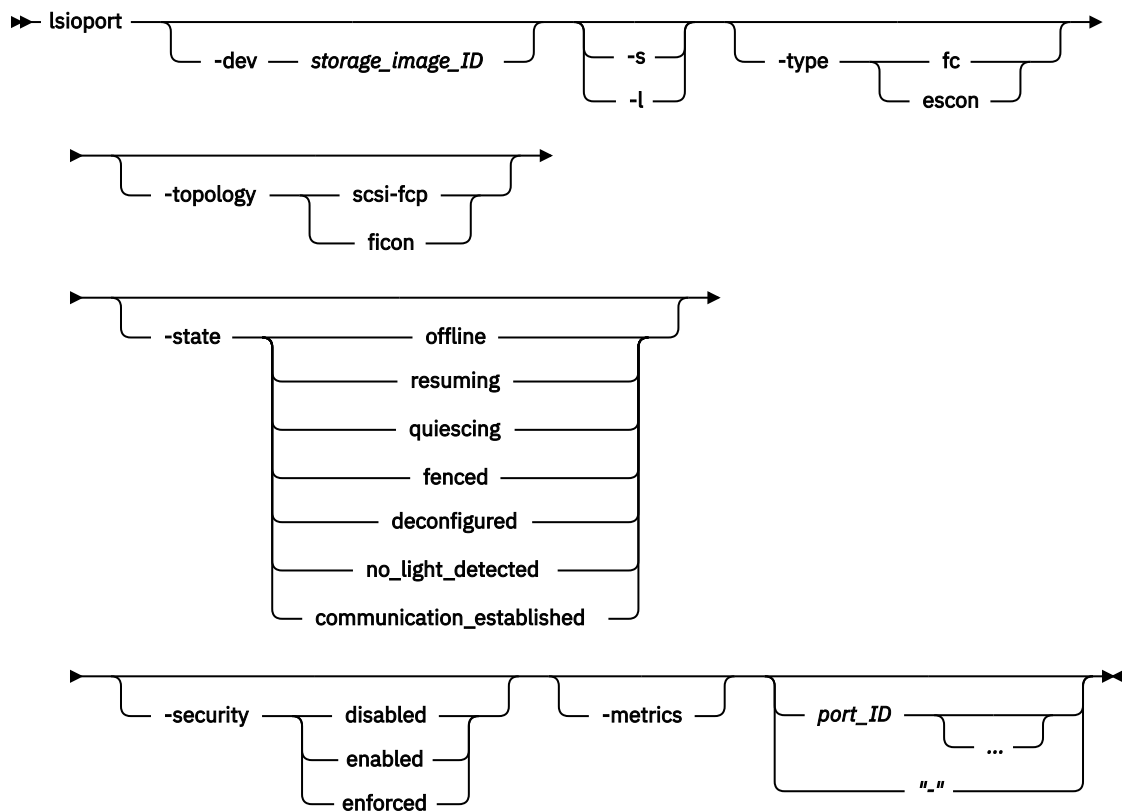
Configures one or more I/O ports for open systems or IBM Z host system connections.

showioport

Displays the properties of a specified I/O port. It optionally displays the performance metrics for the I/O port.

lsioport

The **lsioport** command displays a list of all I/O ports (ESCON and Fibre Channel type) that are installed in a specified storage image, and optionally provides performance metrics for each I/O port listed.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *dev* for the current command.

-s

(Optional) Displays fully qualified port IDs. You cannot use the **-l** and **-s** parameters together.

-l

(Optional) Displays default output plus the I/O port interface speed.

-type fc | escon

(Optional) Displays I/O ports of the specified port type. The *Escon* option can be specified as the port type

-topology scsi-fcp | ficon

(Optional) Displays Fibre Channel I/O ports with the specified topology.

-state offline | resuming | quiescing | fenced | deconfigured | no_light_detected | communication_established

(Optional) Displays I/O ports of the specified state. See the Example section for the state descriptions.

-security enabled | disabled | enforced

(Optional) Displays the current security setting of an I/O port. One of the following values is displayed.

Disabled

Endpoint Security is not enabled for the port.

Enabled

Endpoint Security is enabled to allow authentication between the host and the port, but authentication is not required for I/O processing.

Enforced

Endpoint Security is enabled and authentication is required between the host and the port for I/O processing. Host ports that do not support security or do not complete authentication will be logged out and denied login.

-metrics

(Optional) Displays port ID and performance metrics for each port that is specified.

Note: All performance counts are an accumulation since the most recent counter-wrap or counter-reset operation. I/O port performance counters are reset with a storage system power-on sequence.

port_ID ... | -

(Optional) Displays I/O ports that match the specified IDs. This parameter accepts a fully qualified port ID, which includes the storage image ID. You can also specify a shortened version without the storage image ID when the **-dev** parameter is specified.

A port ID is prefixed with the letter "I" and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 1, 2, 4, or 5.
- *P* is the port number (0 - 3).

Example 1: Displaying a list of all I/O ports (ESCON and Fibre Channel type) that are installed in a specified storage image

```
dsccli> lsioport -dev 2107-75FA120 -l
```

Output

Note: For DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as tables.

| ID | WWPN | State | Type | Topo | Portgrp | Speed | Security |
|--------------------|---------------------|------------------------------|---------------------|--------------|---------|--------|----------|
| 2107-75FA120/I0111 | 307BCF30 A3299E0 | Communication Established | Fibre Channel-LW | SCSI- FCP | 0 | 1 Gb/s | Disabled |

| Frame | I/O Enclosure | HA Card |
|-------|---------------|---------|
| 1 | 2 | 4 |

Report field definitions (without the -metrics parameter)

ID

The fully qualified port ID, which includes the storage image ID.

WWPN

The Fibre Channel worldwide port number. If the port type is not Fibre Channel, the value that is displayed is " - ".

State

The current I/O port status. One of the following values can be displayed:

Offline

The state of the port that is internal to the storage system and indicates that the port is not capable of processing I/O.

Resuming

The storage system is coming online.

Quiescing

The storage system is going offline.

Fenced

The storage system failed and is offline.

Deconfigured

The I/O port is being deleted.

No Light Detected

There is no light that is detected on the port and, therefore, the port is not capable of processing I/O.

Communication Established

The storage system can process all functions.

Type

The port type. The following values can be displayed:

- Fibre Channel-SW (short wave)
- Fibre Channel-LW - (long wave, 10 KM)
- Fibre Channel-LW 4 KM
- ESCON

Topo

The I/O port topology. The following values can be displayed:

- SCSI-FCP
- FICON
- " - " This value is displayed when the port type is not Fibre Channel.

Portgrp

The identifier that associates a subset of the I/O ports that are operating in anonymous access mode. Default value is 0 when these subsets are not specified.

Speed

The I/O port interface speed. The following values can be displayed:

- ESCON ports = 200 Mb/s
- FCP ports = 1 Gb/s, 2 Gb/s, 4 Gb/s, 8 Gb/s, 16 Gb/s, 32 Gb/s
- FICON ports = 1 Gb/s, 2 Gb/s, 4 Gb/s, 8 Gb/s, 16 Gb/s, 32 Gb/s

Security

The current security setting of an I/O port. One of the following values is displayed.

Disabled

Endpoint Security is not enabled for the port.

Enabled

Endpoint Security is enabled to allow authentication between the host and the port, but authentication is not required for I/O processing.

Enforced

Endpoint Security is enabled and authentication is required between the host and the port for I/O processing. Host ports that do not support security or do not complete authentication will be logged out and denied login.

Frame

Identifies the unique identifier of the storage system frame that contains the I/O enclosure.

I/O Enclosure

Identifies the unique identifier of the I/O enclosure that contains the host adapters.

HA Card

Identifies the ID number of the host adapter.

Report field definitions (with the -metrics parameter)

When you use the **-metrics** parameter and do not specify a port type, separate reports are displayed for storage system models:

- FICON/ESCON IO port type: A banner is displayed (for example: ===FICON/ESCON-Enabled I/O Ports===) before each report.
- SCSI-FCP IO port type.
- Security Login Counts per FC IO Port

Note: A report is not displayed for a port type that has no enabled ports.

FICON/ESCON ports

Each of the following headers and value types is displayed:

ID

The fully qualified port ID.

Date

The current time stamp for the I/O port performance counters. For example, 08/11/14 02:23:49 is the format that is used to report this value.

bytewrit

The number of bytes that are written in 128 KB increments.

byteread

The number of bytes that are read in 128 KB increments.

Reads

Indicates a value that is based on extended count-key-data (ECKD) data received operations.

Writes

Indicates a value that is based on ECKD data transferred operations.

Timewrite

Indicates a value that is based on the ECKD data that is transferred (write-accumulated time) on a channel. The displayed value is based on increments of 16 milliseconds.

Timeread

Indicates a value that is based on the ECKD data that is received (read-accumulated time) on a channel. The displayed value is based on increments of 16 milliseconds.

CmdRetries

The number of retries that are requested for transport mode write operations.

TransferReady

The number of transport mode operations from channels that require transfer ready and that were received from channels that support transport mode command retry operations.

SCSI-FCP ports

Each of the following headers and value types is displayed:

ID

The fully qualified port ID.

Date

The current time stamp for the I/O port performance counters. For example, 08/11/05 02:23:49 is the format that is used to report this value.

Bytewrit

Indicates a value for the remote mirror and copy data transferred operations in increments of 128 KB.

Byteread

Indicates a value for the remote mirror and copy data received operations in increments of 128 KB.

Writes

Indicates a value for the remote mirror and copy data transferred operations.

Reads

Indicates a value for the remote mirror and copy data received operations.

Timewrite

Indicates a value that is based on the remote mirror and copy data transferred (write-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Timeread

Indicates a value for the remote mirror and copy data received (read-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Byteread

Indicates a value that is based on the SCSI data received operations. The displayed value is based on increments of 128 KB.

Reads

Indicates a value that is based on the SCSI data transferred operations.

Writes

Indicates a value that is based on the SCSI data transferred operations.

Timeread

Indicates a value that is based on the SCSI data received (read-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Timewrite

Indicates a value that is based on the SCSI data transferred (write-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Security Login Counts per FC IO Port

Note: The Security Login Counter per FC IO Port report applies to all types of ports.

Each of the following headers and value types is displayed.

ID

The fully qualified port ID.

Logins

The number of remote hosts or peer *N_ports* currently logged in to the specified I/O port.

SecCapableLogins

The number of logins that are capable of Fibre Channel security protocols. (The security bit is set in both *N_port* login and response.) If the port is security-enabled, the remote ports are expected to perform authentication.

AuthLogins

The number of security-capable logins that have negotiated link authentication.

EncryptedLogins

The number of remote host or peer *N_ports* currently logged into the specified port that successfully authenticated and negotiated an encryption algorithm for IBM Fibre Channel Endpoint Security.

Example 2: Without any parameters

```
dscli> lsioport
```

Output

| ID | WWPN | State | Type | Topo | Portgrp | Security |
|-------|----------------------|------------------------------|---------------------|-------|---------|----------|
| I0100 | 50050763 06081343 | Communication Established | Fibre Channel-SW | FICON | 0 | Disabled |

Example 3: With the security parameter

```
dscli> lsioport -security enabled
```

Output

| ID | WWPN | State | Type | Topo | Portgrp | Security |
|-------|----------------------|------------------------------|---------------------|----------|---------|----------|
| I0101 | 50050763 06085344 | Communication Established | Fibre Channel-SW | SCSI-FCP | 0 | Enabled |

Example 4: With the metrics parameter

```
dscli> lsioport -metrics I0100
```

Output

| ID | Logins | SecCapableLogins | AuthLogins | EncryptedLogins |
|-------|--------|------------------|------------|-----------------|
| I0100 | 0 | 0 | 0 | 0 |

Report field definitions (with -metrics and -l parameters)

Fibre Channel Link Errors: Each of the following headers and value types is displayed:

ID

The fully qualified port ID.

LinkFailErr

The total number of miscellaneous Fibre Channel link errors.

LossSyncErr

The number of loss of synchronization errors. These errors occur when there is a confirmed and a persistent synchronization loss on the Fibre Channel link.

LossSigErr

The number of times that a loss of signal was detected on the Fibre Channel link when a signal was previously detected.

PrimSeqErr

The number of primitive sequence protocol error counts where an unexpected primitive sequence was received.

InvTxWordErr

The number of times a "bit" error was detected. Examples of a "bit" errors are a code violation, an invalid special code alignment, or a disparity error.

CRCErr

The number of times the CRC of a received frame is in error.

LRSent

The number of times the port changed from an active (AC) state to a Link Recovery (LR1) state.

LRRec

This count is the number of times the port that is changed from an active (AC) state to a Link Recovery (LR2) state.

IllegalFrame

The number of frames that violated the Fibre Channel protocol. One example of a violation is an invalid frame header, which occurs when the first frame of a data sequence is missing and a subsequent data frame is detected as illegal.

OutOrdData

The number of times that an out-of-order frame is detected. The frame is either missing from a data sequence or it is received beyond the sequence reassembly threshold of the port.

OutOrdACK

The number of times that an out-of-order ACK frame is detected. The frame is either missing from a data sequence or it is received beyond the sequence reassembly threshold of the port.

DupFrame

The number of times a frame was received that was detected as previously processed.

InvRelOffset

The number of times that a frame was received with bad relative offset in the frame header.

SeqTimeout

The number of times the port detected a timeout condition after receiving a sequence initiative for a Fibre Channel exchange.

BitErrRate

The number of the bit error (invalid transmission word) bursts for the previous 5-minute counting window. This number is reset every 5 minutes.

Read Diagnostic Parameters: Each of the following headers and value types is displayed:

ID

The fully qualified port ID.

TxPower

The measured coupled TX output power in dBm and uW. The maximum value is 18.1 dBm (6500 uW).

If value displays 0 when the link state is active, the function is not supported by the current level of microcode.

RxPower

The measured received optical power in dBm and uW. The maximum value is 18.1 dBm (6500 uW).

If value displays 0 when the link state is active, the function is not supported by the current level of microcode.

TransceiverTemp

The internally measured transceiver temperature. This value is reported in the range -128 C to + 128 C.

If value displays 0 when the link state is active, the function is not supported by the current level of microcode.

SupplyVolt

The internally measured supply voltage. This value is reported in mV and the value range is 0 - 6550 mV.

If value displays 0 when the link state is active, the function is not supported by the current level of microcode.

TxBiasCurrent

The measured transmitter laser bias current. This value is reported in mA and is in the value range of 0-131mA.

If value is 0 when the link state is active, the function is not supported by the current level of microcode.

ConnectorType

Indicates 1 of 3 connector type values:

SFP+

A transmit power level of small form factor pluggable device.

Unknown

The connector type might not be determined.

Dash (-)

The data was not available.

TxType

A value for the Port Tx type:

Laser-SW

A short-wave laser port.

Laser LC 1310-LW

A long-wave laser LC 1310 nm port.

Laser LL 1550-LW

A long-wave laser LotusLive 1550 nm port.

Non-Optical

The port is not optical or is of another type.

Unknown

The port type is not recognized.

Dash (-)

The data was not available.

CurrentSpeed

The current operating link speed:

- Inactive – Link not operational
- 200 Mb/s – ESCON
- 1 Gb/s – Fibre Channel 1 Gb/s
- 2 Gb/s – Fibre Channel 2 Gb/s
- 4 Gb/s – Fibre Channel 4 Gb/s
- 8 Gb/s – Fibre Channel 8 Gb/s
- 16 Gb/s – Fibre Channel 16 Gb/s
- 32 Gb/s - Fibre Channel 32 Gb/s

Note: A dash (-) specifies that data was not available.

FECStatus

The Forward Error Correction (FEC) process status on the link:

Active

FEC is active on the link.

Inactive

FEC is not active on the link.

UncorrectedBlks(RDP)

The number of bad data blocks that were not corrected by the Forward Error Correction (FEC) process. For more information, see the **showioport** command.

Note: A dash (-) means that the data is not available.

CorrectedBlks(RDP)

The number of bad data blocks that were corrected by forward error correction (FEC) process. For more information, see the **showioport** command.

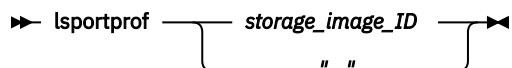
Note: A dash (-) means that the data is not available.

lsportprof

The **lsportprof** command displays a list of port profiles that are supported on a storage system and their recommended address discovery and logical block size values.

You can use this command to view known values for the block size (lbs) and address discovery (**addrdiscovery**) parameters in the **mkhostconnect** command.

Note: Use this command to get the recommended values for the **mkhostconnect** command.

**Parameters****storage_image_ID | -**

(Required) Displays list of port profiles for the specified storage image IDs. A storage image ID consists of manufacturer, type, and serial number.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

For example: IBM.2107-75FA120.

Example: Displaying a list of port profiles that are supported on a storage system

```
dscli> lsportprof IBM.2107-75FA120
```

Output

| Name | AddrDiscovery | LBS |
|----------------------|---------------|-----|
| IBM pSeries - AIX | ReportLUN | 512 |
| IBM pSeries - pLinux | LUNPolling | 512 |

Output definitions**Name**

The name of the host connection behavior profile. The port profile specifies a host or operating system type.

AddrDiscovery

The address discovery method. One of the following values is displayed:

LUN Polling

Host system LUN access is limited to a maximum of 256 LUNs.

Report LUN

Host system LUN access is limited to a maximum of 64000 LUNs.

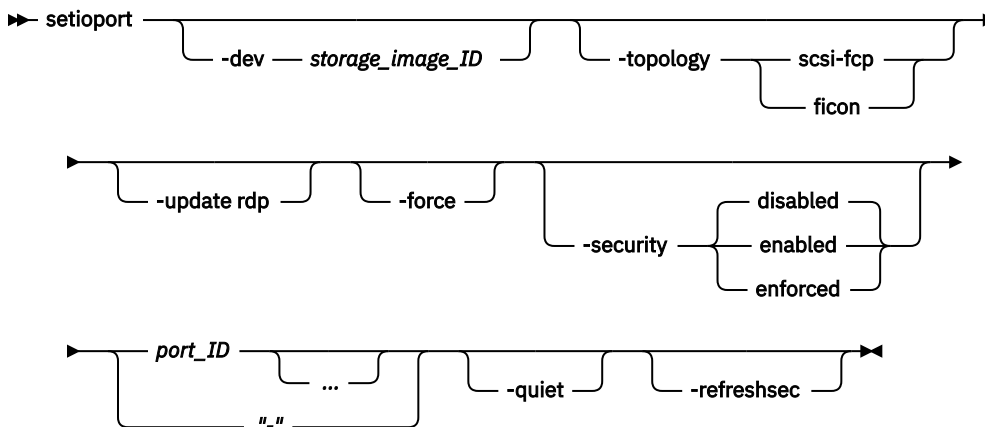
LBS

The logical block size. One of the following values is displayed:

- 512 - This value is displayed for all hosts except OS400.
- 520 - This value is displayed for an OS400 host.

setioport

The **setioport** command configures one or more I/O ports for open systems or IBM Z host system connections. This command cannot be used for ESCON ports.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-topology *scsi-fcp* | *ficon*

(Optional) The topology for an I/O port, either SCSI-FCP or FICON.

scsi-fcp

The SCSI-FCP topology setting enables the SCSI ULP with a point-to-point or switched fabric topology. PPRC path I/O operations are enabled for this setting.

ficon

The Ficon topology setting enables the FICON ULP with a point-to-point or switched fabric topology. PPRC path I/O operations are not supported for FICON ULP.

-update rdp

(Optional) Forces the port to send a request to the attached port to retrieve the current Read Diagnostic Parameters (RDP) data from the port.

-force

(Optional) Allows a topology change to an online I/O port even if a current topology is set. Use this option if you want to change a topology after it is already set.

-security *disabled* | *enabled* | *enforced*

The security setting for an I/O port.

Note: A port security change causes a port to be taken offline for a few seconds while processing the action so that the host will repeat the login process and detect the security change. To avoid I/O errors and to ensure path recovery, either take all operational paths to a modified port offline or stop using the port before changing its settings. Change only one port at a time; then, verify that the paths are online before proceeding to another port. Successive confirmations will be required for multiple ports.

disabled

(Default) Security is not enabled for the specified I/O port.

enabled

Security is enabled for the specified I/O port. In this state, the port allows security protocols to negotiate authentication but will not enforce it's use before allowing I/O.

enforced

Security is enforced for the specified I/O port. In this state, the port requires secure login and the use of security protocols before allowing I/O. Ports that do not support security or do not complete authentication will be logged out and denied login.

port_ID ... | -

(Required) The I/O port ID. Accepts a fully qualified port ID, which includes the storage image ID, or a shortened version without the storage image ID when the **-dev** parameter is specified.

A port ID is prefixed with the letter *I* and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 0, 1, 3, or 4.
- *P* is the port number (0 - 3).

To specify a range of port IDs, separate the port IDs with a hyphen.

You must separate multiple port IDs or ranges of port IDs by a blank space between each ID or range of IDs.

The ellipsis (...) indicates that you optionally can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

-quiet

(Optional) Turns off the confirmation prompt for -security parameter.

-refreshsec

(Optional) Forces the host to re-authenticate with the specified I/O port.

Example 1: Forcing the host to re-authenticate with the specified I/O port

```
dscli> setioport -refreshsec I0301
```

Output

```
CMUC00011I setioport: I/O Port I0301 successfully configured.
```

Example 2: Updating information for the specified I/O port that is enabled for security

```
dscli> setioport -security enabled I0230
```

Output

```
CMUC00590W setioport: A temporary interruption of I/O will occur on this port for a few seconds while its security is modified.
Are you sure that you want to modify the security of I/O Port I0230? [Y/N]: y
CMUC00011I setioport: I/O Port I0230 successfully configured.
```

Example 3: Updating data for the specified I/O port with a disabled security setting

```
dscli> setioport -quiet -security disabled I0230
```

Output

```
CMUC00011I setioport: I/O Port I0230 successfully configured.
```

Example 4: Updating the RDP data

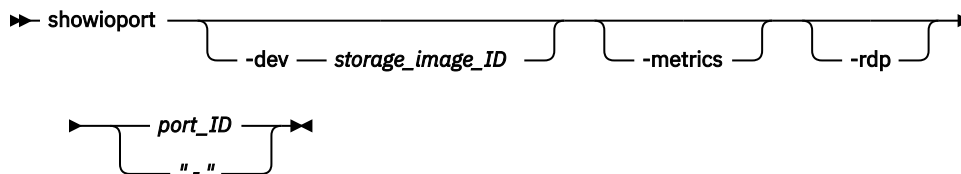
```
dscli> setioport -update rdp IBM.2107-I0201
```

Output

```
CMUC00011I setioport: Read Diagnostic Parameters of I/O Port I0201 and its attached port are successfully updated.
```

showioport

The **showioport** command displays properties of an I/O port. It optionally displays the performance metrics for a specific I/O port, or the Read Diagnostic Parameters (RDP) for a local port and an attached port.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID, do not set the *devId* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devId* for the current command.

-metrics

(Optional) Displays the port ID and the performance metrics for the specified I/O port.

Note: All performance counts are an accumulation since the most recent counter-wrap or counter-reset operation. I/O port performance counters are reset with a storage system power-on sequence.

-rdp

(Optional) Displays the Read Diagnostic Parameters (RDP) data for the specified local port and attached port. This data includes link statistics, current link speed and capabilities, buffer credit settings, and transceiver diagnostic information.

Note: This parameter is not available for I/O ports on 8Gb/s adapters. An error message is displayed to indicate if the function is not supported.

port_ID | -

(Required) Displays the property level details for the specified port IDs. This parameter accepts a fully qualified unique port ID that is represented in the following format: *manufacturer.machine type-serial number/portID*.

For example, IBM.2107-75FA120/I0110.

A port ID is prefixed with the letter *I* and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 1, 2, 4, or 5.
- *P* is the port number (0 - 3).

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying properties of an I/O port

```
dscli> showioport -dev IBM.2107-75DMC81 I0000
```

Output

```
ID          I0000
WWPN       500500763080005AE
State      Communication Established
Loc        U1400.1B1.1300025-P1-C1-T0
Type       Fibre Channel-SW
Speed      8 Gb/s
Topo       SCSI-FCP
Portgrp    0
UnkSCSIlog -
Physloc    R1-I1-C1-T0
Security   Disabled
```

Report field definitions (with the -port parameter)

ID

The fully qualified unique port ID.

WWPN

The Fibre Channel I/O port worldwide port number (WWPN). If the port type is not Fibre Channel, this value is specified as a " - ".

State

The current state of the I/O port. One of the following values is displayed:

Offline

The state of the port that is internal to the storage system and indicates that the port is not capable of processing I/O.

Resuming

The storage system is coming online.

Quiescing

The storage system is going offline.

Fenced

The storage system failed and is offline.

Deconfigured

The I/O port is being deleted.

No Light Detected

There is no light detected on the port and, therefore, the port is not capable of processing I/O.

Communication Established

The storage system can process all functions.

Loc

The storage enclosure location by identifying the storage unit frame that contains the storage enclosure. The location format is *Uttt.mmm.ppsssss*.

Type

The port type. The following values can be displayed:

- Fibre Channel-SW - (SW stands for short wave)
- Fibre Channel-LW - (LW stands for long wave, 10 KM)
- Fibre Channel-LW 4 KM - (LW stands for long wave, 4 KM)
- ESCON

Speed

The I/O port interface speed. The following values can be displayed:

- ESCON ports = 200 Mb/s
- FCP ports = 1 Gb/s, 2 Gb/s, 4 Gb/s, 8 Gb/s, 16 Gb/s, 32 Gb/s
- FICON ports = 1 Gb/s, 2 Gb/s, 4 Gb/s, 8 Gb/s, 16 Gb/s, 32 Gb/s

Topo

The port topology. If the port type is not Fibre Channel, then the displayed value is " - ". One of the following values is displayed:

- SCSI-FCP
- FICON
- " - " (if not Fibre Channel)

Portgrp

An identifier that associates a subset of the I/O port objects that are operating in anonymous access mode.

UnkSCSIlog

A list of unknown SCSI N-port WWPN identifiers that attempted to log in to this I/O port.

Physloc

The physical location of the I/O port. The I/O port location code is a combination of the rack, I/O enclosure, card, and port that provides the physical link. The value of the location uses the following format: R(1-2)-I(1-8)-C(1-6)-P(1-4).

- R is the rack location
- I is the I/O enclosure
- C is the card
- P is the port of the adapter

Note: R1-I3-C2-P1 is an example of this format.

Security

The current security setting of an I/O port. One of the following values is displayed.

disabled

(Default) Security is not enabled for the specified I/O port.

enabled

Security is enabled for the specified I/O port. In this state, the port allows security protocols to negotiate authentication but will not enforce it's use before allowing I/O.

enforced

Security is enforced for the specified I/O port. In this state, the port requires secure login and the use of security protocols before allowing I/O. Ports that do not support security or do not complete authentication will be logged out and denied login.

Example 2: Displaying port performance metrics

```
dscli> showiport -dev IBM.2107-75DMC81 -metrics I0000
```

Output

```
ID                I0000
Date              04/17/2017 11:02:45 MST
byteread (FICON/ESCON) 0
```

```

bytewrite (FICON/ESCON) 0
Reads (FICON/ESCON) 0
Writes (FICON/ESCON) 0
timeread (FICON/ESCON) 0
timewrite (FICON/ESCON) 0
bytewrit (PPRC) 0
byteread PPRC) 0
Writes(FICON/ESCON) 0
timeread (FICON/ESCON) 0
timewrite(FICON/ESCON) 0
CmdRetries (FICON) 0
TransferReady(FICON) 0
bytewrit (PPRC) 0
byteread (PPRC) 0
Writes (PPRC) 0
Reads (PPRC) 0
timewrite (PPRC) 0
timeread (PPRC) 0
byteread (SCSI) 1271326535
bytewrit (SCSI) 65721755
Reads (SCSI) 2479310687
Writes (SCSI) 1170136080
timeread (SCSI) 81426674
timewrite (SCSI) 407813158
LinkFailErr (FC) 8
LossSyncErr (FC) 45
LossSigErr (FC) 0
PrimSeqErr (FC) 0
InvTxWordErr (FC) 125
CRCErr (FC) 0
LRSent (FC) 0
LRRec (FC) 0
IllegalFrame (FC) 0
OutOrdData (FC) 0
OutOrdACK (FC) 0
DupFrame (FC) 0
InvRelOffset (FC) 0
SeqTimeout (FC) 0
BitErrRate (FC) 0
RcvBufZero (FC) 0
SndBufZero (FC) 0
RetQFullBusy (FC) 0
ExchOverrun (FC) 0
ExchCntHigh (FC) 0
ExchRemAbort (FC) 0
CurrentSpeed (FC) 0
%UtilizeCPU (FC) 0
TxPower (RDP) -2.8 dBm (525.2 uW)
RxPower (RDP) -3.6 dBm (440.5 uW)
TransceiverTemp (RDP) 65 C
SupplyVolt (RDP) 3304.7 mV
TxBias (RDP) 8.484 mA
Connector Type (RDP) SFP+
TxType (RDP) Laser-SW
FEC Status (RDP) Active
UncorrectedBlks(RDP) 315
CorrectedBlks(RDP) 250
Logins (FC) 0
SecCapableLogins (FC) 0
EncryptedLogins (FC) 0

```

Report field definitions (with the -metrics parameter)

ID

The fully qualified port ID.

Date

The current time stamp for the I/O port performance counters. For example, 08/11/05 02:23:49 is the way that this value is reported.

Byteread (FICON/ESCON)

The number of bytes that are read in increments of 128 KB.

Bytewrit (FICON/ESCON)

The number of bytes that are written in increments of 128 KB.

Reads (FICON/ESCON)

A value that is based on the extended count-key-data (ECKD) architecture data received operations.

Writes (FICON/ESCON)

A value that is based on the ECKD architecture data transferred operations.

Timeread (FICON/ESCON)

A value that is based on the ECKD data received (read-accumulated time) on a channel. The displayed value is based on increments of 16 milliseconds.

Timewrite (FICON/ESCON)

A value that is based on the ECKD data transferred (write-accumulated time) on a channel. The displayed value is based on increments of 16 milliseconds.

CmdRetries (FICON)

The number of retries that are requested for transport mode write operations because not enough buffers were available to receive unsolicited data.

Note: A dash (-) means that the data is not available.

TransferReady(FICON)

The number of transport mode operations from channels that require transfer ready and that were received from channels that support transport mode command retry operations.

Note: A dash (-) means that the data is not available.

Bytewrit (PPRC)

A value for the remote mirror and copy data transferred operation in increments of 128 KB.

Byteread (PPRC)

A value for the remote mirror and copy data received operations in increments of 128 KB.

Writes (PPRC)

A value for the remote mirror and copy data transferred operations.

Reads (PPRC)

A value for the remote mirror and copy data received operations.

Timewrite (PPRC)

A value that is based on the remote mirror and copy data transferred (write-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Timeread (PPRC)

A value for the remote mirror and copy data received (read-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Byteread (SCSI)

A value that is based on the SCSI data received operations. The displayed value is based on increments of 128 KB.

Bytewrit (SCSI)

A value that is based on the SCSI data transferred operations. The displayed value is based on increments of 128 KB.

Reads (SCSI)

A value that is based on the SCSI data received operations.

Writes (SCSI)

A value that is based on the SCSI data transferred operations.

Timeread (SCSI)

A value that is based on the SCSI data received (read-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

Timewrite (SCSI)

A value that is based on the SCSI data transferred (write-accumulated) time on a channel. The displayed value is based on increments of 16 milliseconds.

LinkFailErr (FC)

The total number of miscellaneous Fibre Channel link errors.

LossSyncErr (FC)

The number of loss of synchronization errors. These errors occur when there is a confirmed and a persistent synchronization loss on the Fibre Channel link.

LossSigErr (FC)

The number of times that a loss of signal was detected on the Fibre Channel link when a signal was previously detected.

PrimSeqErr (FC)

The number of primitive sequence protocol error counts where an unexpected primitive sequence was received.

InvTxWordErr (FC)

The number of times a bit error was detected. Examples of bit errors are a code violation, an invalid special code alignment, or a disparity error.

CRCErr (FC)

The number of times the CRC of a received frame is in error.

LRSent (FC)

The number of times the port that is changed from an active (AC) state to a Link Recovery (LR1) state.

LRRec (FC)

This count is the number of times the port that is changed from an active (AC) state to a Link Recovery (LR2) state.

IllegalFrame (FC)

The number of frames that violated the Fibre Channel protocol. One example of a violation is an invalid frame header. The violation occurs when the first frame of a data sequence is missing and a subsequent data frame is detected as illegal.

OutOrdData (FC)

The number of times that an out-of-order frame is detected. The frame is either missing from a data sequence or it is received beyond the sequence reassembly threshold of the port.

OutOrdACK (FC)

The number of times that an out-of-order ACK frame is detected. The frame is either missing from a data sequence or it is received beyond the sequence reassembly threshold of the port.

DupFrame (FC)

The number of times a frame was received that was detected as previously processed.

InvRelOffset (FC)

The number of times that a frame was received with bad relative offset in the frame header.

SeqTimeout (FC)

The number of times the port detected a timeout condition after it received a sequence initiative for a Fibre Channel exchange.

BitErrRate (FC)

The number of bit error (transmission words that are not valid) bursts for the previous 5-minute counting window. This number is reset every 5 minutes.

RcvBufZero (FC)

The number of 1-second intervals that the receive buffer credit was zero.

SndBufZero (FC)

The number of 1-second intervals that the send buffer credit was zero.

RetQFullBusy (FC)

The number of times that the FCP port returned "queue full" or "busy" status.

ExchOverrun (FC)

The number of Fibre Channel exchanges that were lost due to overdriving the host adapter port.

ExchCntHigh (FC)

The number of times that the Fibre Channel exchange count crossed the High Threshold.

ExchRemAbort (FC)

The number of times that a port received an abort.

CurrentSpeed (FC)

The current operating link speed.

%UtilizeCPU (FC)

The percentage of the CPU that is being used. The percentage is followed by a space and either "Average" or "Dedicated". "Average" means that the Host Adapter CPUs are being used as a shared resource for the Host Adapter ports. "Dedicated" means that the Host Adapter CPUs are a dedicated resource for each Host Adapter port.

TxPower (RDP)

The measured coupled TX output power in dBm and uW. The maximum value is 18.1 dBm (6500 uW).

If the value 0 displays when the link state is active, the function is not supported by the current level of microcode.

Note: A dash (-) means that the data is not available.

RxPower (RDP)

The measured received optical power in dBm and uW. The maximum value is 18.1 dBm (6500 uW).

If the value 0 displays when the link state is active, the function is not supported by the current level of microcode.

Note: A dash (-) means that the data is not available.

TransceiverTemp (RDP)

The internally measured transceiver temperature. This value is reported in range -128 C to + 128 C.

If the value 0 displays when the link state is active, the function is not supported by the current level of microcode.

Note: A dash (-) means that the data is not available.

SupplyVolt(RDP)

The internally measured supply voltage. This value is reported in mV and the value range is 0 - 6550 mV.

If the value 0 displays when the link state is active, the function is not supported by the current level of microcode.

Note: A dash (-) means that the data is not available.

TxBias (RDP)

The measured transmitter laser bias current. The value is reported in mA and the value range is 0 - 131 mA.

If the value 0 displays when the link state is active, the function is not supported by the current level of microcode.

Note: A dash (-) means that the data is not available.

ConnectorType (RDP)

The connector type displays one of the following values:

SFP+

A transmit power level of small form factor pluggable device.

Unknown

The connector type might not be determined.

Dash (-)

The data was not available.

TxType (RDP)

The port TX Type displays one of the following values:

Laser-SW

A short-wave laser port.

Laser LC 1310-LW

A long-wave laser LC 1310 nm port.

Laser LL 1550-LW

A long-wave laser LL 1550 nm port.

Non-Optical

The port is not optical or is of another type.

Unknown

The port type is not recognized.

Dash (-)

The data was not available.

FECStatus(RDP)

The forward error correction status. One of the following values displays:

Active

A forward error correction is active on the link.

Inactive

A forward error correction is not active on the link.

UncorrectedBlks(RDP)

The number of bad data blocks that were not corrected by the forward error correction (FEC).

Note: A dash (-) means that the data is not available.

CorrectedBlks(RDP)

The number of bad data blocks that were corrected by forward error correction (FEC).

Note: A dash (-) means that the data is not available.

Security Login Counts

Information about the security login counts. One of the following values is displayed:

ID

The fully qualified port ID.

Logins

The number of remote hosts or peer *N_ports* current logged in to the specified I/O port.

SecCapableLogins

The number of logins that are capable of Fibre Channel security protocols. If the port is security-enabled, the remote ports are expected to perform authentication.

AuthLogins

The number of security capable logins that have negotiated link authentication.

EncryptedLogins

The number of remote host or peer *N_ports* that are currently logged into the specified port. These ports successfully authenticated and negotiated an encryption algorithm for the IBM Fibre Channel Endpoint Security function.

Example 3: Displaying properties of an I/O port with the -rdp parameter

```
dscli> showioport -dev IBM.1400-1B1 -rdp I0103
```

Output

| | |
|---------------------------------|-------------------------|
| ID | I0103 |
| WWPN | 50:05:07:63:03:03:00:45 |
| Attached WWPN | 50:05:07:63:03:FF:C0:45 |
| Physical Type | FC-FS-3 |
| Link Failure Error | 0 |
| Loss of sync Error | 0 |
| Loss of Signal Error | 0 |
| Primitive Sequence Error | 0 |
| Invalid Transmission Word Error | 0 |
| CRC Error | 0 |

```

FEC Status Active
Uncorrected Blocks 0
Corrected Blocks 0
Port Speed Capabilities 4GFC 8GFC 16GFC (Configured to 16GFC)
Port Operating Speed 16GFC
Advertised B-B Credit 83
Attached Port B-B Credit 16
Nominal RTT Link Latency 5000 ns
ConnectorType SFP+
TxType Short Wave Laser
Transceiver Temperature 58.0 C [Operating Range -128 - +128 C]
TxBiasCurrent 14.0 mAmps [Operating Range 0 - 131 mAmps]
Transceiver Supply Voltage 3327.0 mV [Operating Range 0 - 3600mVolts]
RxPower [Operating Range 0 - 6550 uW]
TxPower [Operating Range 0 - 6550 uW]
Last SFP Read time 04/17/2017 20:17:44 CST

```

```

=====SFP Parameters Alarm Levels=====
Element High Warning Low Warning High Alarm Low Alarm
=====
Transceiver Temperature 0 0 0 0
Tx Bias Current 0 0 0 0
Transceiver Supply Voltage 0 0 0 0
Tx Power 0 0 0 0
Rx Power 0 0 0 0

```

```

=====Attached Port=====
ID N/A
WWPN 50:05:07:63:03:FF:C0:45
Attached WWPN 50:05:07:63:03:03:00:45
Physical Type FC-FS-3
Link Failure Error 0
Loss of Sync Error 0
Loss of Signal Error 0
Primitive Sequence Error 0
Invalid Transmission Word Error 0
CRC Error 0
FEC Status Active
Uncorrected Blocks 0
Corrected Blocks 0
Port Speed Capabilities 4GFC 8GFC 16GFC (Configured to 16GFC)
Port Operating Speed 16GFC
Advertised B-B Credit 83
Attached Port B-B Credit 16
Nominal RTT Link Latency 5000 ns
ConnectorType SFP+
TxType Short Wave Laser
Transceiver Temperature 58.0 C [Operating Range -128 - +128 C]
TxBiasCurrent 14.0 mAmps [Operating Range 0 - 131 mAmps]
Transceiver Supply Voltage 3327.0 mV [Operating Range 0 - 3600 mV]
RxPower [Operating Range 0 - 6550 uW]
TxPower [Operating Range 0 - 6550 uW]
Last SFP Read time 04/17/2017 20:17:44 CST

```

```

=====SFP Parameters Alarm Levels=====
Element High Warning Low Warning High Alarm Low Alarm
=====
Transceiver Temperature 0 0 0 0
Tx Bias Current 0 0 0 0
Transceiver Supply Voltage 0 0 0 0
Tx Power 0 0 0 0
Rx Power 0 0 0 0

```

Port Diagnostic Parameters (with the -rdp parameter)

ID

The port ID. Or the fully qualified port ID in the form `manufacturer.type-model.serial_number/portID`, when it is used with the **-fullid** parameter. For example, `I0201IBM.2107-75FA120/I0110`.

Note: The port ID component is four hexadecimal characters in the format `0xEEAP`, where `EE` is a port enclosure number (00-17 for 2107, 00-01 for 1750), `A` is the adapter number (1,2,4,5 for 2107, 0-3 for 1750), and `P` is the port number (0-3). The number is prefixed with the letter `I`.

WWPN

The worldwide port name of the port. For example, `50:05:07:63:03:03:00:45` is the way that this value is reported.

Note: A dash (-) means that the data is not available.

Attached WWPN

The worldwide port name of the attached port. For example, 50:05:07:63:03:FF:C0:45 is the way that this value is reported.

Note: A dash (-) means that the link is inactive, or the data is not available.

Physical Type

The physical type of the port, which includes one of the following types:

No Information

No information about the physical type is provided.

FC-FS-3

The sending VN_Port uses an FC-FS-3 PN_Port or PF_Port.

Lossless Ethernet MAC

The sending VN_Port uses a lossless Ethernet MAC.

Unknown

Unexpected values of physical type.

Note: A dash (-) means that the data is not available.

Link Failure Error

A link failure error count as a number value. This count is the number of miscellaneous Fibre Channel link errors. These errors might indicate that an unexpected NOS is received, or a link state machine failure is detected.

Note: A dash (-) means that the data is not available.

Loss of Sync Error

A loss of synchronization error count as a number value. This count is the number of loss of synchronization errors where it is a confirmed, persistent synchronization loss on the Fibre Channel link.

Note: A dash (-) means that the data is not available.

Loss of Signal Error

A loss of signal error count as a number value. This count is the number of times that a loss of signal was detected on the Fibre Channel link where a signal was previously detected.

Note: A dash (-) means that the data is not available.

Primitive Sequence Error

A primitive sequence error count as a number value. This count is the number of primitive sequence protocol error counts where an unexpected primitive sequence was received.

Note: A dash (-) means that the data is not available.

Invalid Transmission Word Error

An invalid transmission word error count as a number value. This count is the number of times that a *bit* error was detected. Examples of bit errors include a code violation, invalid special code alignment, or disparity errors.

Note: A dash (-) means that the data is not available.

CRC Error

A CRC error count as a number value. This count is the number of times a received frame CRC is in error.

Note: A dash (-) means that the data was not available.

FEC Status

The forward error correction (FEC) status. One of the following values is displayed:

Active

A forward error correction is active on the link.

Inactive

A forward error correction is not active on the link.

Note: A dash (-) means that the data is not available.

Uncorrected Blocks

The number of bad data blocks that were not able to be corrected.

Note: A dash (-) means that the data is not available.

Corrected Blocks

The number of bad data blocks that were corrected.

Note: A dash (-) means that the data is not available.

Port Speed Capabilities

The operating speed capabilities of the port. All possible port speed capabilities are listed. For example, 4GFC 8GFC 16GFC. If this setting is configured, it indicates that the speed is configured to a fixed speed. For example, 4GFC 8GFC 16GFC (Configured to 16GFC).

Note: A dash (-) means that the data is not available.

Port Operating Speed

The current port operating speed, if it is set. If the link is not active, Inactive is displayed.

Note: A dash (-) means that the data is not available.

Advertised B-B Credit

The FC_Port Buffer-to-Buffer Credit as a number value. This value is the advertised buffer-to-buffer credit for the Fx_Port or Nx_Port for which diagnostic parameters are being processed.

Note: A dash (-) means that the data is not available.

Attached Port B-B Credit

The attached FC_Port Buffer-to-Buffer Credit as a number value. This value is the advertised buffer-to-buffer credit that is received from the directly attached Fx_Port or Nx_Port.

Note: A dash (-) means that the link is inactive or the data is not available.

Nominal RTT Link Latency

The Nominal FC_Port Round Trip Time (RTT). This value is the nominal RTT of the link between the FC_Port and the attached FC_Port as determined by the FC_Port, where a value of zero indicates that the RTT is unknown. A nonzero value The RTT of the link in nanoseconds.

Note: A dash (-) means that the link is inactive or the data is not available.

Connector Type

The type of connector. The value is either:

SFP+

The connector type transmits the power level of a small form-factor pluggable (SFP) device.

Unknown

The connector type cannot be determined.

Note: A dash (-) means that the data is not available.

Tx Type

The port Tx type, which is one of the following values:

Not Optical or Other Type

The port is not optical or is of another type.

Short Wave Laser

A short-wave laser port.

Long Wave Laser LC 1310nm

A long-wave laser LC 1310 nm port.

Long Wave Laser LL 1530nm

A long-wave laser LL 1530 nm port.

Unknown

The port type is not recognized.

Dash (-)

The data was not available.

Transceiver Temperature

The internally measured temperature of the transceiver. The temperature range is -128 C to + 128 C.

Note: A dash (-) means that the data is not available.

Tx Bias Current

The measured current of the transmitter (Tx) laser bias. The range is 0 - 131 mAmps.

Note: A dash (-) means that the data is not available.

Transceiver Supply Voltage

The internally measured supply voltage of the transceiver. The range is 0 - 6.55 volts.

Note: A dash (-) means that the data is not available.

Rx Power

The Rx power. The range is 0 - 6.5 mW.

Note: A dash (-) means that the data is not available.

Tx Power

The Tx power. The range is 0 - 6.5 mW.

Note: A dash (-) means that the data is not available.

Last SFP Read time

The last time that the SFP was read. For example, 07-10-2015 UTC Fri 23:16:18.

Note: A dash (-) means that the data is not available.

Remember: The same port diagnostic parameters also apply to the attached port.

SFP Alarm Levels (with the -rdp parameter)**Element**

The SFP parameter name, which is one of the following values:

- Transceiver Temperature
- Tx Bias Current
- Transceiver Supply Voltage
- Tx Power
- Rx Power

High Warning

The high warning status. The possible values are:

0

The high warning flag is not set.

1

The high warning flag is set.

Dash (-)

The diagnostic parameters are not valid. The response does not include valid values for SFP diagnostic parameters.

Low Warning

The low warning status. The possible values are:

0
The low warning flag is not set.

1
The low warning flag is set.

Dash (-)

The diagnostic parameters are not valid. The response does not include valid values for SFP diagnostic parameters.

High Alarm

The high alarm status. The possible values are:

0
The high alarm flag is not set.

1
The high alarm flag is set.

Dash (-)

The diagnostic parameters are not valid. The response does not include valid values for SFP diagnostic parameters.

Low Alarm

The low alarm status. The possible values are:

0
The low alarm flag is not set.

1
The low alarm flag is set.

Dash (-)

The diagnostic parameters are not valid. The response does not include valid values for SFP diagnostic parameters.

Remember: The same SFP alarm levels also apply to the attached port.

Host commands

Various commands are available to help configure host connections and to display host connection information.

The following host connection commands are available:

chhost

Modifies the configuration of a host.

chhostconnect

Modifies a SCSI host port configuration. You must ensure that the host port is offline to the host system before you process the **chhostconnect** command.

lshost

Displays a list of hosts for a specified storage system and status information for each host in the list.

lshostconnect

Displays a list of host connections for a storage image and the status information for each host connection in the list.

lshosttype

Displays a list of known hosts, their associated port profiles, address discovery, and logical block size values.

lshostvol

Displays the mapping of host device names or volume names to machine type 2107 /242x volume IDs.

lsportprof

Displays a list of port profiles that are supported on a storage system and their recommended address discovery and logical block size values. This command is helpful to obtain the recommended values for the **mkhostconnect** command.

managehostconnect

Modifies the volume group assignment for a SCSI host port. Ensure that the host port is offline to the host system before you process the **managehostconnect** command.

mkhost

Configures an open systems host system.

mkhostconnect

Configures the open systems hosts port attachments to Fibre Channel ports that are configured for FC-AL or SCSI-FCP topology.

rmhost

Removes a host from a storage image.

rmhostconnect

Removes a SCSI host port connection from a storage image.

showhost

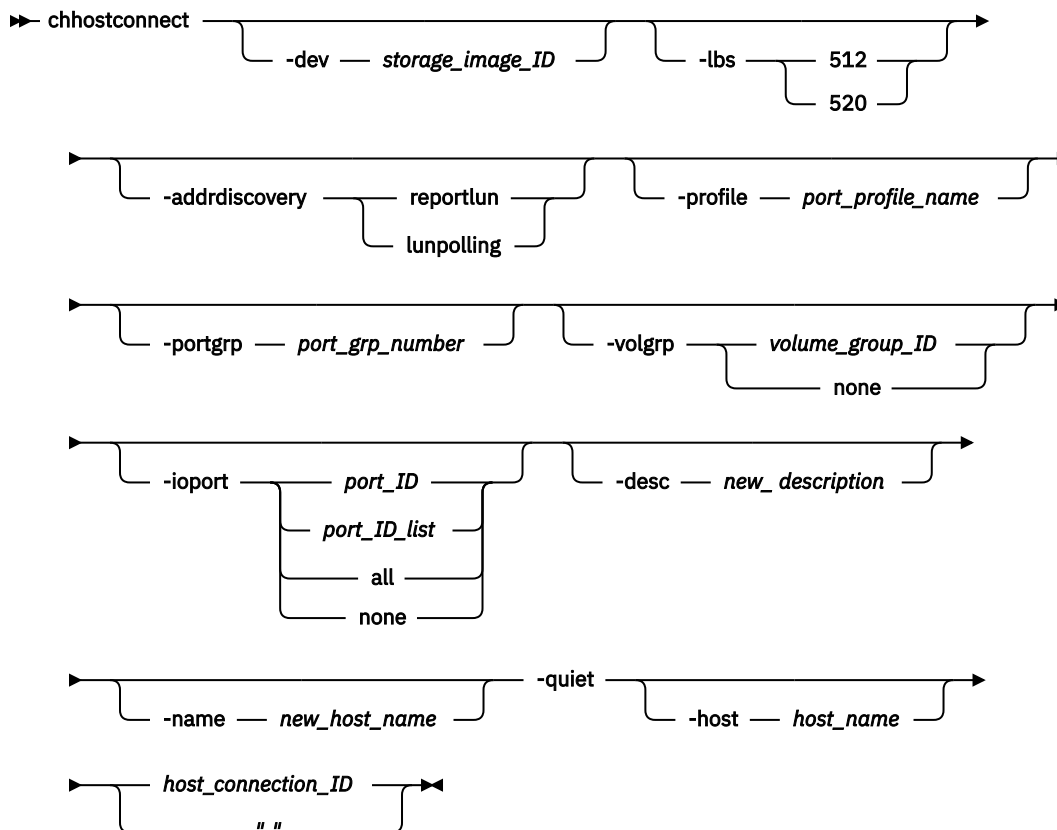
Displays detailed properties of an individual host.

showhostconnect

Displays the detailed properties of a specified storage image host connection.

chhostconnect

The **chhostconnect** command modifies a SCSI host port configuration.



Parameters

Notes:

1. The **chhostconnect** command can be disruptive to host system I/O operations if the affected host port is logged in to the target storage system. You must ensure that the host port is offline to the host system before you process the **chhostconnect** command.
2. Using the **-hosttype** parameter when you enter this command saves input and processing time. The **-hosttype** parameter supplies the same information as if you used the following three parameters:
 - **-profile**
 - **-addrdiscovery**
 - **-lbs**
3. If you are using the HP-UX operating system, see the volume restriction that is described under the **-addrdiscovery** parameter.

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host connection ID. It is also required if you do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

An example of a fully qualified storage image ID includes IBM.2107-75FA120.

-lbs 512 | 520

(Optional) The logical block size that is used by the host system. The block size must be compatible with the volume group type and the volume type configurations that apply to the host port connection. The 520 logical block size is typically used by the IBM System i models (OS/400).

Notes:

1. You cannot use the **-lbs** parameter and **-hosttype** parameter together, but you can use each one separately.
2. If you do not use the **-hosttype** parameter, use the **lspportprof** command to determine the block size that you need to specify for the **-lbs** parameter.

-addrdiscovery reportlun | lunpolling

(Optional) The method for identifying logical unit number (LUN) addresses.

- The **reportlun** method specifies that the host system can access up to 64 000 LUNs.
- The **lunpolling** method specifies that the host system can access up to 256 LUNs.

Notes:

1. You cannot use the **-addrdiscovery** parameter and **-hosttype** parameter together, but you can use each one separately.
2. For HP-UX operating systems, the number of volumes in the volume group must not exceed seven volumes. This restriction applies only when the **-addrdiscovery** parameter is set to *reportlun* and the associated volume group is of type **scsimap256**.

-profile port_profile_name

(Optional) The name of the host connection behavior profile. If the name includes a blank space, enclose the name with double quotation marks. For example, **-profile "IBM pSeries - Sun"**.

Notes:

1. You cannot use the **-profile** parameter and the **-hosttype** parameter together, but you can use each one separately.
2. If you do not use the **-hosttype** parameter, use the **lspportprof** command to obtain a list of available profiles.

-portgrp port_grp_number

(Optional) A user-assigned number that associates two or more host ports with access to a common volume group. Port group zero is reserved for ports that are not associated with a port group.

-volgrp volume_group_ID | none

(Optional) An available volume group or no volume group if the **none** subparameter is used. This command accepts a fully qualified volume group ID including the storage image ID or a shortened version if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeros, prefixed with the letter *V*.

A host connection can use only one volume group per storage image. (A single WWPN can access only one volume group per storage image.) Host operations cannot be initiated until a volume group ID is assigned.

If *none* is specified, the volume group ID assignment is removed from a SCSI host port object.

-ioport port_ID port_ID_list |all|none

(Optional) All, none, or, one or more I/O port IDs that allow host connection access to volumes. This command accepts a fully qualified port ID including the storage image ID or a shortened version if the **-dev** parameter is specified.

port_ID port_ID_list

Designate up to 128 ports for an open systems host attachment assignment. If you enter a list of I/O port IDs, access from the specified host connection to the specified volume group is allowed by using only the designated list of port IDs.

To specify a range of port IDs, separate the port IDs with a hyphen. You can list one or more port IDs or ranges of port IDs separated by commas with no spaces.

all

Add all I/O port IDs. This setting allows the specified host connection access to the designated volume group through all the associated I/O port IDs.

none

Do not add any I/O ports. If you do not specify I/O ports, the storage system is configured to allow host connection access to the specified volume group. The access is made by using any I/O port that is configured for SCSI-FCP topology.

Examples of -dev parameter use

If you specify the **-dev** parameter, you can use the shortened version of the **-ioport** parameter as follows:

```
dscli> chhostconnect -dev IBM.2107-75FA120 -ioport I0222 1
```

Where *1* represents the required parameter, **host_connection_ID**.

If you do not specify the **-dev** parameter and you specify the **-ioport** parameter, you must use the fully qualified version of the port ID with the **-ioport** parameter specified as follows:

```
dscli> chhostconnect -ioport IBM.2107-75FA120/I0222  
IBM.2107-75FA120/1
```

Where *IBM.2107-75FA120/1* represents the required parameter, **host_connection_ID**.

A port ID is prefixed with the letter *I* and consists of four hexadecimal characters in the format *EEAP*, where:

EE

The I/O port enclosure number in the range of 00 - 17.

A

The adapter number and is specified as 1, 2, 4, or 5.

P

The port number (0 - 3).

Note: Changing the I/O port values can result in a disruption of current logins by the host systems.

-desc new_description

(Optional) The description that you defined for the SCSI host port. The description is limited to 256 byte or 128 double-byte characters.

-name new_host_name

(Optional) The name that you assigned for host system or port. The name is limited to 32 characters.

-quiet

(Optional) Turns off the confirmation prompt for this command.

-host *host_name*

(Optional) The name of the host to which the host connection is assigned.

***host_connection_ID* | -**

(Required) The host connection ID, which is a unique identifier that uses any number from 0 - FFFE within the scope of a storage image. This parameter accepts a fully qualified ID or a shortened version if the **-dev** parameter is specified.

If you do not specify the **-dev** parameter and you specify the **host_connection_ID** parameter, you must use the fully qualified version of the host connection ID as follows:

```
dscli> chostconnect -desc newdescription IBM.2107-75FA120/1
```

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.



Attention: Use caution when you work with connection IDs to ensure that you specified the correct connection that you want to change. For example, if you intend to change connection ID 0005 and type 000, the system changes connection ID 0. Or, if you want to change connection ID 0020 and type 002, the system changes connection ID 2. The system does not recognize the leading zeros, and 000 is interpreted as connection ID 0 and 002 is interpreted as connection ID 2.

Example: Modifying a SCSI host port configuration

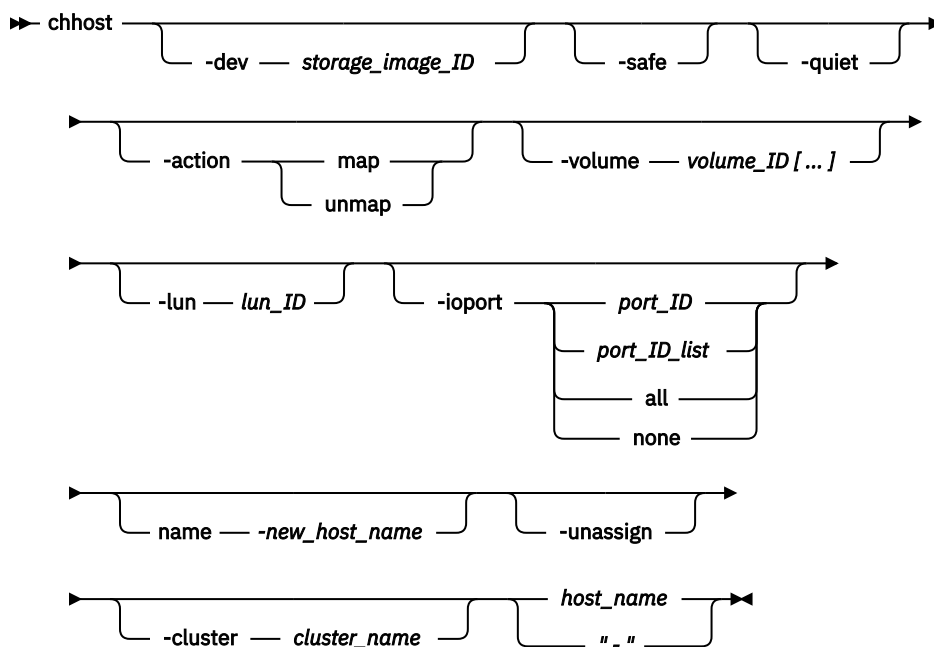
```
dscli> chostconnect -dev IBM.2107-75FA120 -name host_1_port_2 1
```

Output

Host connection 1 successfully modified.

chhost

The **chhost** command modifies the configuration of a host.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID. It is also required if you did not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-safe

(Optional) Enables checks for the safe removal of the volume from the host.

-quiet

(Optional) When volumes are mapped or unmapped from a host, and if more than one host share volume mappings, a prompt displays. You can confirm whether (Yes or No) to proceed mapping or unmapping the volumes from a host. This parameter turns off the confirmation prompt.

-action *map unmap*

(Optional) The type of action for volumes.

map

The volumes are added to the host.

unmap

The volumes are removed from the host.

Note: This **chhost** command fails if you specify the **-volume** without the **-action** parameter. You cannot specify the **-action** parameter with the **-cluster** or **-unassigned** parameters.

-volume *volume_ID [...]*

(Optional) An array of one or more volume IDs or volume ID ranges to be added or removed from the specified host. A volume ID range is defined by two volume IDs that are separated by a hyphen. Multiple volume IDs or volume ID ranges must be separated by comma. The volume IDs are entered as hexadecimal numbers in the range 0x0000-0xFEFF.

You must separate multiple volume IDs or ranges of volume IDs with a comma between each ID or range of IDs.

Notes:

1. For SCSI MAP 256, the array or ranges cannot exceed 256 volume ID entries. Otherwise, up to 64,384 entries are allowed.
2. The **chhost** command fails if you specify the **-volume** parameter and do not specify the **-action** parameter.

-lun *lun_ID*

(Optional) The LUN ID in hexadecimal value (00 - FF), which is mapped to the specified volume ID for an SCSI-MAP256 type host. If multiple volume IDs are specified by the **-volume** parameter, the LUN IDs are assigned consecutively in incremental order.

This parameter is only valid for a SCSI-MAP 256 type host. If you specify this parameter for any other type of host, the command fails.

-ioport *port_ID port_ID_list | all | none*

(Optional) All, none, one, or more I/O port IDs that allow host connection access to volumes.

all

You want to add all I/O port IDs to allow the specified host connection access to the designated volume group through all the associated I/O port IDs.

none

You do not want to add any I/O ports. If you do not specify I/O ports, then the storage system is configured to allow host connection access to the specified volume group. The access is through any I/O port that is configured for SCSI-FCP topology.

port_ID port_ID_list

You can designate up to 128 ports for an open systems host attachment assignment. You must separate multiple port IDs or ranges of port IDs with a comma between each ID or range of IDs. To specify a range of port IDs, separate the port IDs with a hyphen.

If you enter a list of I/O port IDs, access from the specified host connection to the specified volume group is allowed by using only the designated list of port IDs

A port ID is four hexadecimal characters in the format *EEAP*, where:

EE

The I/O port enclosure number in the range of 00 - 17.

A

The adapter number and is specified as 1, 2, 4, or 5.

P

The port number (0 - 3).

This number is prefixed with the letter *I*.

-name -new_host_name

(Required) The new host system name that you assign, limited to 32 byte, or 16 double byte characters. If the name contains a blank space, you must surround the name in double quotation marks.

-unassign

(Optional) Unassign the host from the cluster. You cannot use this parameter with **-cluster** or **-action** parameters.

-cluster cluster_name

(Optional) The cluster name.

Note: If the cluster name contains a blank space, you must surround the name in double quotation marks. You cannot use this option with **-unassign** or **-action** parameters.

host_name | -

(Required) The name of the host system to be modified.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Modifying the configuration of a host

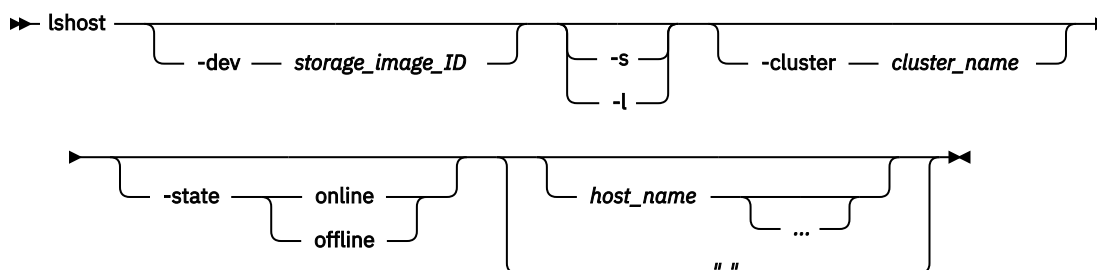
```
dscli> chhost -name host_1_port_2 host_1
```

Output

```
Sun Aug 11 02:23:49 PST 2016 DS CLI Version: 5.0.0.0 DS: IBM.2107-75FA120  
Host host_1 successfully modified.
```

lshost

The **lshost** command displays a list of hosts for a specified storage system and status information for each host in the list.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host connection ID. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-s

(Optional) Only the host name in the command output. You cannot specify the **-s** and **-l** parameters together.

-l

(Optional) The default output plus the description that you included for each host in the list. You cannot specify the **-s** and **-l** parameters together.

-cluster *cluster_name*

(Optional) All hosts under this cluster.

-state *online* | *offline*

(Optional) All hosts with the specified state of online or offline.

***host_name ...* | -**

(Optional) Host information for the host names that are specified. Multiple names must be separated with a white space between each name or ID. The ellipsis (...) indicates that you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of hosts for a specified storage system and status information for each host in the list

```
dscli> lshost -l
```

Output

| Name | Type | State | Cluster | AddrMode | Volumes | Host ports | I/O ports |
|--------|--------|---------|-----------|-------------|---------|------------|-----------|
| Host_1 | VMWare | Offline | cluster_1 | scsimap256 | 8 | 8 | 32 |
| Host_2 | VMWare | Offline | - | scsimap2566 | 6 | 8 | 32 |
| Host_3 | VMWare | Offline | - | scsimap2560 | 0 | 8 | 32 |

Report field definitions

Name*

The name that you assigned to the host.

Type

The name of the host type as defined by the operating system.

Unknown displays when the information is not available and indicates that the host type was not specified when the host connection was created or modified.

State

Specifies one of the states of the specified host.

online

If at least one host port is in the logged-in state, the state displays as online.

offline

If no host ports were added to the specified host, or if all of the added host ports are logged out, the state displays as offline.

Cluster

The name of the cluster that the specified host is assigned to.

AddrMode+

The method that is used by the host to discover the LUNs that are available to its host ports (for example, scsimask, scsimap256, os400mask).

Volumes+

The number of volumes that are mapped to the specified host.

Host ports+

The number of host ports that are mapped to the specified host.

I/O ports+

The number of I/O ports that the specified host is allowed to log in to. A value of *All* indicates that the specified SCSI host is allowed to log in to any I/O ports.

Key:

*

Displayed when the **-s** parameter is specified.

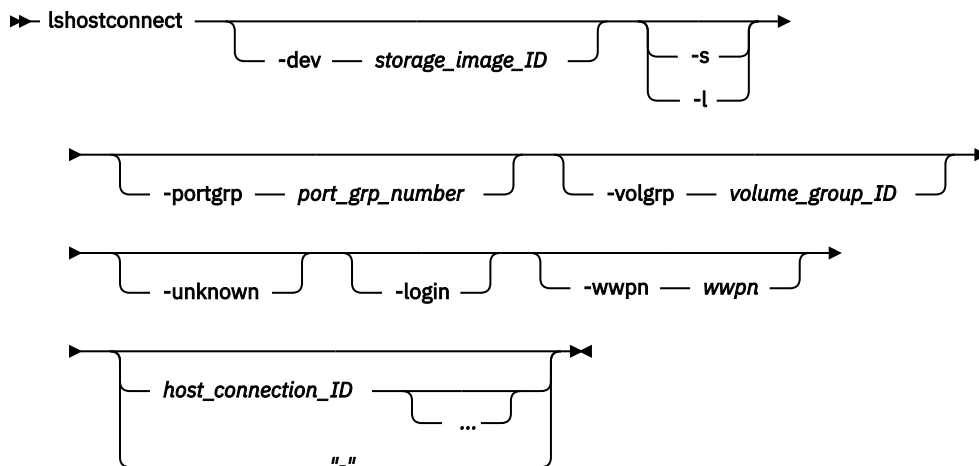
+

Displayed only when the **-l** parameter is specified.

lshostconnect

The **lshostconnect** command displays a list of host connections for a storage image and the status information for each host connection in the list.

You can also use this command to obtain a list of worldwide port numbers (WWPNs) from a system-detected-unknown host port. You can use these WWPNs to create a host connection by using the **mkhostconnect** command.



Parameters

-dev *storage_image_ID*

(Optional) The host connections for the specified storage image. A storage image ID consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host connection ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

An example of a fully qualified storage image ID: IBM.2107-75FA120.

-s

(Optional) The host connection IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) The default output and your description for each host connection in the list. You cannot use the **-l** and the **-s** parameters together.

-portgrp port_grp_number

(Optional) The host connections that have an associated group number.

Note: You cannot use the **-portgrp** parameter with the **-unknown** or **-login** parameters.

-volgrp volume_group_ID

(Optional) Only the host connections with the specified volume group ID are to be displayed. The volume group ID is a four-digit decimal number with no leading zeros, prefixed with the letter V.

Note: You cannot use the **-volgrp** parameter with the **-unknown** or **-login** parameters.

-unknown

(Optional) A list of logged in host ports (WWPNs), that are not recognized as being associated with the designated storage system, be displayed.

Note: The list of logged in host ports includes all of the host ports that the storage system detects. The list does not account for changes that the storage system did not detect. For example, the storage system cannot detect that a cable is disconnected from the port of the host device or that a fabric zoning change occurred. In these cases, the host might not be able to communicate with the storage device anymore. However, the storage device might not detect this condition and still views the host as logged in.

This parameter generates a list report that contains the following three information fields:

- WWNN
- WWPN
- ESSIOport

Note: You cannot use the **-unknown** parameter with the **-portgrp**, **-volgrp**, **-login**, or **host_connection_ID** parameters.

-login

(Optional) A list is to be displayed of host port (WWPNs) that are logged in and sorted by the ESS I/O port IDs for known connections. The report displays one line of information per connection. However, no information is displayed for a FICON connection.

Notes:

1. Known logins are logins that you created for host connection, and Remote Mirror and Copy paths and anonymous connections.
2. You cannot use the **-login** parameter with the **-unknown**, **-portgrp**, **-volgrp**, or **host_connection_ID** parameters.

-wwpn wwpn

(Optional) Only the host connect objects for the specified WWPN are displayed.

host_connection_ID ... | -

(Optional) Host connection information for the specified host connection IDs be displayed. This parameter accepts a fully qualified ID (includes *manufacture. machine type, serial number/ hostconnectID*) or a shortened version if the **-dev** parameter is specified.

Note: You cannot use the **host_connection_ID** parameter with the **-login** or **-unknown** parameters.

The ellipsis (...) indicates that, optionally, you can specify multiple values.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

An example of a fully qualified host connection ID: IBM.2107-75FA120/2.

Example of a shortened version host connection ID: 0002

Example 1: Displaying a list of host connections for a storage image and the status information for each host connection in the list, without the -unknown parameter

Note: You can receive different reports when you use the **lshostconnect** command, one for the **-unknown** parameter, one for the **-login** parameter, one for the **-l** parameter, and one for the **-s** parameter. The reports that are associated with the **-unknown**, **-login**, and **-l** parameters are provided in this description.

```
dsccli> lshostconnect -dev IBM.2107 75FA120 -l
```

Output

Note: For DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as tables.

The following tables represent the headers that are displayed on the output reports that are associated with the **lshostconnect** command.

The following table displays four ports, which is possible when you query a storage system model.

| Profile | portgrp | volgrpID | atchtopo | ESSIO port | Speed | Desc | host |
|----------------------|---------|----------|----------|----------------------------|---------|-------|--------------|
| IBM pSeries - AIX | 0 | V100 | - | I0111,I0121 I0211,I0221 | Unknown | SCSI1 | Production01 |
| IBM pSeries - AIX | 0 | V100 | - | All | Unknown | SCSI2 | Production |
| IBM pSeries - pLinux | 0 | V100 | - | I0111,I0121 I0211,I0221 | Unknown | SCSI3 | Production01 |
| IBM pSeries - pLinux | 0 | V100 | - | - | Unknown | SCSI4 | Production01 |

Report field definitions without the -unknown or -login parameter

Name

Host connection/SCSI port nickname.

The name is limited to 32-byte or 16 double-byte characters.

ID

A fully qualified host connection ID: *manufacturer.type-serial number/hostconnectID*.

The host connection ID component is a unique identifier (0 - FFFE) within the scope of a storage system.

WWPN

The worldwide port name (WWPN) for this host system port.

HostType

The name of the host type.

Unknown is displayed when the information is not available and indicates that the host type was not specified when the host connection was created or modified.

LBS

The logical block size that is used by the designated host system and host system port.

The logical block setting must be compatible with the volume group type that is configured for volume access. The 520 block size is typically used for IBM i host system attachments.

Addrdiscovery

The LUN address discovery method that is used by the designated host system and host system port.

The LUN Discovery method must be compatible with the volume group type that is configured for volume access.

The Poll LUNs method enables access to a maximum of 256 LUNs. The Report LUNs method enables access to a maximum of 64 000 LUNs.

Profile

The name of the host connection behavior profile.

Portgrp

The host port group ID. This ID ties together a group of SCSI host port objects that are accessing a common volume group. If the port group value is set to zero, the host port is not associated with any port group.

VolgrpID

The volume group ID. This ID is a unique identifier within the storage system for the SCSI volume group that the specified SCSI host port is assigned to.

Atchtopo

The atchtopo is an attribute of the I/O port and, under certain conditions, might display a value that is inconsistent with the value reported by the **lsioport** command. Because this inconsistency cannot be corrected in all cases, the atchtopo attribute always displays as a " - " value. To obtain the I/O port topology, use the **lsioport** or **showioport** commands.

ESSIOport

The array of port IDs that the designated host port is logged in to.

A port ID is prefixed with the letter "I" and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 1, 2, 4, or 5.
- *P* is the port number (0 - 3).

Speed

Speed is an attribute of the I/O port and, under certain conditions, might display a value that is inconsistent with the value reported by the **lsioport** command. Because this inconsistency cannot be corrected in all cases, the speed attribute always displays a value of "Unknown". To query the speed of an I/O port, use the **lsioport** or **showioport** commands.

Desc

The description that you defined for the SCSI host port. The description is limited to 256 byte or 128 double-byte characters.

host

The host name that is used in the Storage Management GUI, which is different from the nickname that is displayed in the **Name** column. If a name is not available, a value of "-" displays.

Example 2: Displaying a list of host connections for a storage image and the status information for each host connection in the list, with the -unknown parameter

```
dsccli> lshostconnect -dev IBM.2107 75FA120 -unknown
```

Output

| WWNN | WWPN | ESSIOport |
|------------------|------------------|----------------------------|
| 3007ACF30A239900 | 3007ACF30A2399E0 | I0111, I0121, I0211, I0221 |
| 3007ACF30A239900 | 3007ACF30A2399E1 | I0121 |

| WWNN | WWPN | ESSIOport |
|------------------|------------------|----------------------------|
| 3007ACF30A239900 | 3007ACF30A2399E2 | I0111, I0121, I0211, I0221 |
| 3007ACF30A239900 | 3007ACF30A2399E3 | I0111 |

Report field definitions with the -unknown parameter

WWNN

The worldwide node name for the designated host system.

WWPN

The worldwide port name for the designated host system port.

ESSIOport

The array of port IDs that the designated host port is logged in to.

A port ID is prefixed with the letter "I" and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 1, 2, 4, or 5.
- *P* is the port number (0 - 3).

Example 3: Displaying a list of host connections for a storage image and the status information for each host connection in the list, with the -login parameter

```
dscli> lshostconnect -dev IBM.2107-75FA120 -login
```

Output

| WWNN | WWPN | ESSIOport | LoginType | Name | ID |
|----------------------|----------------------|-----------|-----------|---------|----|
| 3007ACF3 0A239900 | 3007ACF3 0A2399E0 | I0111 | SCSI | MyHostA | 1 |
| 3007ACF3 0A239900 | 3007ACF3 0A2399E1 | I0111 | SCSI | MyHostB | 1 |
| 3007ACF3 0A239900 | 3007ACF3 0A2399E2 | I0221 | SCSI | - | - |

Report field definitions with the -login parameter

WWNN

The worldwide node name (WWNN) for this host system.

WWPN

The worldwide port name (WWPN) for this host system port.

ESSIOport

The port ID that the designated host port is logged in to.

A port ID is prefixed with the letter "I" and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 1, 2, 4, or 5.
- *P* is the port number (0 - 3).

LoginType

The type of login such as SCSI.

Name

The name that you assigned to the host. If a name is not assigned, a " - " value is displayed.

ID

A fully qualified host connection ID: *manufacturer, machine type, serial number/hostconnectID*.

The host connection ID component is a unique identifier (0 - FFFE) within the scope of a storage system.

lshosttype

The **lshosttype** command displays a list of known hosts, their associated port profiles, address discovery, and logical block size values. Use this command to get the available host types for the **mkhostconnect** command.

```
►► lshosttype -type volumeGroup_type ◄◄  
  -s  
  -l
```

Parameters

-s

(Optional) The host types only. You cannot use the **-l** and **-s** parameters together.

-l

(Optional) The default output for the specified host type. You cannot use the **-l** and **-s** parameters together.

-type volumeGroup_type

(Required) Only those host types that are associated with the specified volume group type.

volumeGroup_type

Only one type can be queried at a time. The following list provides the choices that can be specified.

- ficonall
- scsiall
- scsimask
- scsimap256
- os400all
- os400mask

Example: Displaying a list of known hosts, their associated port profiles, address discovery, and logical block size values

```
dscli> lshosttype -l -type scsiall
```

Output

Note: For DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as tables.

The following table represents the headers that are displayed on the output report that is associated with the **lshosttype** command.

| Host Type | Profile | AddrDiscovery | LBS | Description |
|-----------|-------------------|---------------|-----|---|
| pSeries | IBM pSeries - AIX | reportlun | 512 | IBM pSeries, RS/6000 and RS/6000 SP Servers (AIX) |

| Host Type | Profile | AddrDiscovery | LBS | Description |
|-----------|----------------------|---------------|-----|-----------------------------|
| zLinux | IBM zSeries - zLinux | lunpolling | 512 | IBM zSeries Servers (Linux) |

Report column definitions

Host Type*

The name of the specific host type.

Profile

The name of the host connection behavior profile. The port profile specifies a host or operating system type.

AddrDiscovery

The address discovery method. One of the following values is displayed:

LUN Polling

Host system LUN access is limited to a maximum of 256 LUNs.

Report LUN

Host system LUN access is limited to a maximum of 64 K LUNs.

LBS

The logical block size. One of the following values is displayed:

- 512 - This value is displayed for all hosts except OS400.
- 520 - This value is displayed for an OS400 host.

Description

More host type details.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

lshostvol

The **lshostvol** command displays the mapping of host device names or volume names to machine type 2107 volume IDs. (This command is not supported on the i5/OS).

►► lshostvol ◀◀

Parameters

This command has no parameters.

Notes:

1. The **lshostvol** command displays only volumes that are accessed by using a direct Fibre Channel path when you use the command on an OpenVMS host system that is a member of an OpenVMS cluster. The command output does *not* display information about the following OpenVMS cluster devices:

- Volumes to which the host system has only Mass Storage Control Protocol (MSCP) paths.

Note: Mass Storage Control Protocol uses two queues. Into one queue, packets are placed which fully describe the commands to be run by the mass storage subsystem. To start an I/O request, the creates a small data structure in memory and appends it to a "send" queue. If this packet is the first packet in the send queue, it wakes the MSCP controller. After the command is processed, an appropriate status packet is placed into the second queue to be read by the CPU.

- Volumes to which the host system uses only MSCP paths now even though it has both MSCP and direct paths.
2. If you did not install the IBM Multipath Subsystem Device Driver (SDD), the virtual path (vPath) name is not displayed.
 3. On a Red Hat Enterprise Linux system, attached devices might be detected by the HBA driver, but they are not registered with the operating system. Normally, the operating system is set up to automatically detect all LUNS. However, if this detection does not occur automatically, you must issue the following command for every volume (LUN):

```
echo
scsi add-single-device host# channel# lun# >/proc/scsi/scsi
```

If SDD is installed on your system, you can run the scsiscan script to detect all the LUNs.

4. If the user that is running the DS CLI on the host does not have permissions to view the host volumes, the **lshostvol** command returns no host volumes found.

Example: Displaying the mapping of host device names or volume names to machine type 2107 volume IDs

The information that is displayed on the report that is generated from the **lshostvol** command is different depending on whether you installed SDD. The following example tables indicate the differences.

Note: For DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as tables.

The following tables represent the headers that are displayed on the output reports that are associated with the **lshostvol** command.

```
dscli> lshostvol
```

Output

With SDD installed

| Disk Name | Volume ID | Vpath Name |
|---------------------|-----------------------|------------|
| my_vol_01,my_vol_04 | IBM.2107-75DA110/175D | vpath01 |
| my_vol_02,my_vol_05 | IBM.2107-75EA120/175E | vpath02 |
| my_vol_03,my_vol_06 | IBM.-75FA130/175F | vpath03 |

Without SDD installed

| Device/Volume Name | Volume ID | Vpath Name |
|--------------------|-----------------------|------------|
| Hdisk01 | IBM.2107-75DA110/175D | - |
| Hdisk02 | IBM.2107-75EA120/175E | - |
| Hdisk03 | IBM.2107-75FA130/175F | - |

Report column definitions

Device/Volume name

The nickname that you assigned to the device or volume. When SDD is installed, this column reports the volume name instead of the device name.

Volume ID

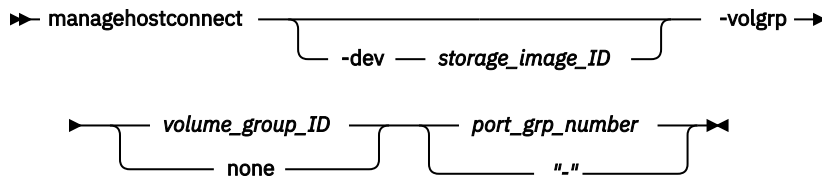
The ID of the storage system.

Vpath name

The virtual path name. When SDD is not installed, this value is reported as " - ".

managehostconnect

The **managehostconnect** command modifies the volume group assignment for a SCSI host port.



Parameters

Notes:

1. The **managehostconnect** command can be disruptive to host system I/O operations if the affected host port is logged on to the target storage unit. Ensure that the host port is offline to the host system before you process the **managehostconnect** command.
2. This command is used more effectively after you issue the **lshostconnect** or **showhostconnect** commands and analyze the reports that are generated by these commands. The information that is reported by these commands can help you ensure that you specify the correct port group number when you issue the **managehostconnect** command.

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume group ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *dev* for the current command.

-volgrp volume_group_ID | none

(Required) The SCSI host port connections that are associated with the specified port group number are modified to access this volume group ID. A volume group ID is a four-digit decimal number with no leading zeros, prefixed with the letter **V**.

If *none* is specified, the volume group ID assignment is removed from all SCSI host port objects that are associated with a common port group number.

Example: `-volgrp none`.

port_grp_number | -

(Required) The SCSI host port group number that associates two or more host ports as having access to a common volume group.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Modifying the volume group assignment for a SCSI host port

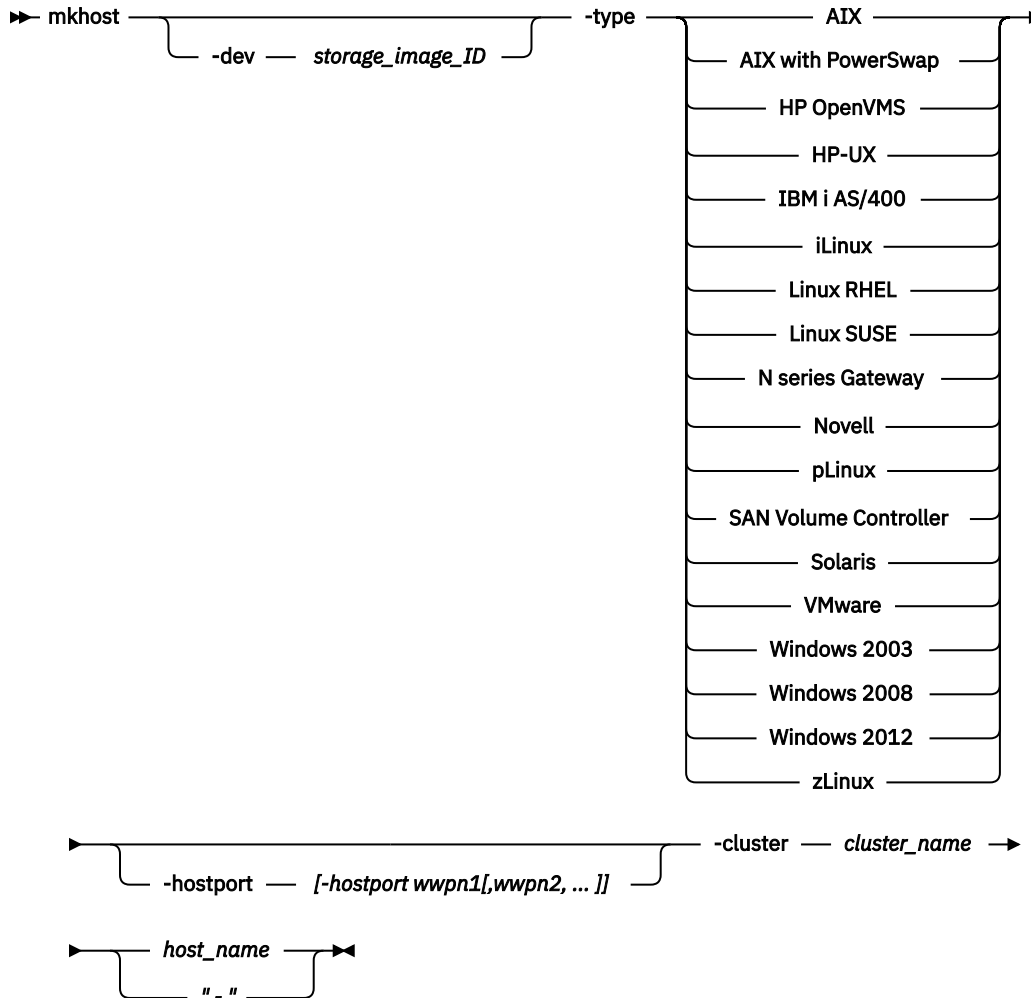
```
dscli> managehostconnect -dev IBM.2107-75FA120 -volgrp 11 1
```

Output

```
Port group number 1 successfully modified.
```

mkhost

The **mkhost** command configures an open systems host system.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host connection ID. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-type *AIX | AIX with PowerSwap | HP OpenVMS | HP-UX | IBMi AS/400 | iLinux | Linux RHEL | Linux SUSE | N series Gateway | Novell | pLinux | SAN Volume Controller | Solaris | VMware | Windows 2003 | Windows 2008 | Windows 2012 | zLinux*

(Required) The host type that is defined by the operating system.

-hostport *wwpn [...]*

(Optional) The worldwide port names (WWPNs) of a set of host ports that are mapped to the specified host. The ellipsis (...) indicates that you can specify multiple values.

-cluster *cluster_name*

(Optional) The name of the cluster that this host is assigned to.

Note: If cluster name contains a blank space, you must surround the name in quotation marks.

host_name | -

(Required) The name that you assigned to the host system. The name is limited to 32 byte or 16 double byte characters.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Configuring an open systems host system

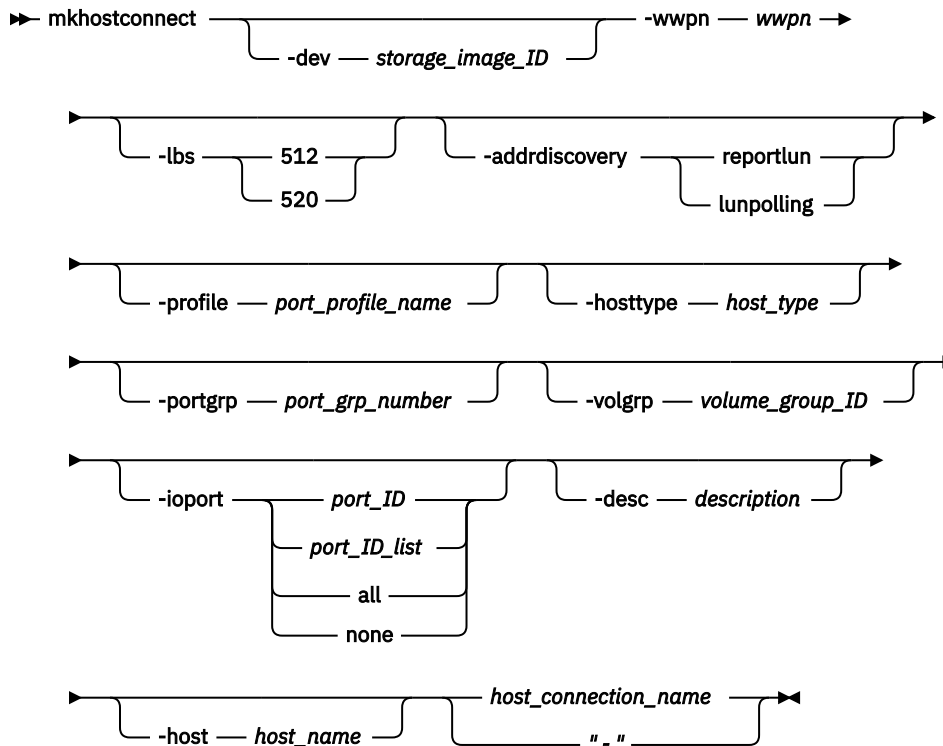
```
dscli> mkhost -type generic -hostport 210100E08B295F86 host_1
```

Output

```
Aug 11 02:23:49 PST 2016 IBM DS CLI Version: 5.0.0.0 DS:IBM.2107-75FA120  
Host host_1 successfully created.
```

mkhostconnect

The **mkhostconnect** command configures open systems hosts port attachments to Fibre Channel ports that are configured for SCSI-FCP topology.



Parameters

Open-systems host port attachments to Fibre Channel ports are configured for identified access mode and SCSI protocol.

Notes:

1. Ensure that you use the **-hosttype** parameter with this command to reduce input and processing time. The **-hosttype** parameter supplies the same information as if you used the following three parameters:
 - **-profile**
 - **-addrdiscovery**
 - **-lbs**

2. If you are using the HP-UX operating system, see the volume restriction that is described under the **-addrdiscovery** parameter.

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified WWPN, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-wwpn wwpn

(Required) The worldwide port name (WWPN). The WWPN is a 16-character hexadecimal ID or a colon-separated string. The names are host attachment specific, for example, 12341234000A000F or 12:34:12:34:00:0A:00:0F.

Note: Do not create more than one host connection per WWPN, except for SUN hosts. Creating more than one host connection per WWPN (each with a different volume group) is only supported for SUN.

-lbs 512 | 520

(Optional) The logical block size that is used by the specified host system, in bytes. The block size must be compatible with the volume group type and the volume type configurations that apply to the specified host port connection. The 520-byte size is typically used by IBM i models (OS/400).

Notes:

1. Do not use the **-lbs** parameter if you specify the **-hosttype** parameter.
2. If you do not use the **-hosttype** parameter, use the **lspportprof** command to determine the block size that you need to specify.

-addrdiscovery reportlun | lunpolling

(Optional) The method for discovering logical unit number (LUN) addresses.

- The reportlun method specifies that the host system can access up to 64 000 LUNs.

Note: Use the reportlun method only with volume groups that are designated as *mask* type. (This designation is assigned when you use the **mkvolgrp** command to create the volume group.) However, you can use the reportlun method for a *map* type, but more considerations exist if you are using an HP-UX operating system.

For HP-UX operating systems, the number of volumes in the volume group must not exceed seven volumes. This restriction applies only when the **-addrdiscovery** parameter is set to reportlun and the associated volume group is of type scsimap256.

- The lunpolling method specifies that the host system can access up to 256 LUNs. For Sun, Linux, and Windows operating systems, the lunpolling method is typically selected.

Notes:

1. Use the lunpolling method only with volume groups that are designated as *map* type. (This designation is assigned when you use the **mkvolgrp** command to create the volume group.)
2. Do not use the **-addrdiscovery** parameter if you specify the **-hosttype** parameter.

-profile port_profile_name

(Optional. If you specify the **-hosttype** parameter, this parameter is not used.) The name of the host connection behavior profile. If the name includes a blank space, enclose the name with double quotation marks. For example, -profile "IBM pSeries - AIX".

Notes:

1. Do not use the **-profile** parameter if you specify the **-hosttype** parameter.
2. If you do not use the **-hosttype** parameter, use the **lspportprof** command to obtain a list of available profiles.

-hosttype host_type

(Optional) Information about the following three parameters:

- **-profile**
- **-addrdiscovery**
- **-lbs**

Notes:

1. When the **-hosttype** parameter is specified, do not use the **-profile**, **-addrdiscovery**, or **-lbs** parameters.
2. Use the **lshosttype** command to obtain a list of known host types.

-portgrp *port_grp_number*

(Optional) The identifier that associates two or more host ports with access to a common volume group. Port group zero is reserved for ports that are not associated with a port group.

-volgrp *volume_group_ID*

(Optional) An available volume group. This parameter accepts a fully qualified volume group ID including the storage image ID or a shortened version. The shortened version is a four-digit decimal number with no leading zeros, prefixed with the letter *V*.

A host connection uses only one volume group per storage image; that is, a single WWPN can access only one volume group per storage image.

Note: If you do not specify a volume group when a host connection is created, the value for volume group is displayed as a "-" when you enter a **lshostconnect** or **showhostconnect** command.

-ioport *port_ID port_ID_list* |all|none

(Optional) All, none, one, or more I/O port IDs that allow host connection access to volumes. I/O ports cannot share WWPN. Ensure that no conflicts exist with the I/O ports of existing SCSI host connections.

port_ID port_ID_list

Designate up to 128 ports for an open systems host attachment assignment. If you enter a list of I/O port IDs, access from the specified host connection to the specified volume group is allowed by using only the designated list of port IDs.

Note: To specify a range of port IDs, separate the port IDs with a hyphen. You must separate multiple port IDs or ranges of port IDs with a comma between each ID or range of IDs.

all

Add all I/O port IDs to allow the specified host connection access to the designated volume group through all the associated I/O port IDs.

none

Do not add any I/O ports. If you do not specify I/O ports, the storage system is configured to allow host connection access to the specified volume group. You can use any I/O port that is configured for SCSI-FCP topology. A port ID is four hexadecimal characters in the format *EEAP*, where:

EE

The I/O port enclosure number in the range of 00 - 17.

A

The adapter number and is specified as 1, 2, 4, or 5.

P

The port number (0 - 3).

This number is prefixed with the letter *I*.

-desc *description*

(Optional) The description that you defined for the SCSI host port. The description is limited to 256 byte or 128 double-byte characters.

-host *host_name*

(Optional) The name of the host to which the host connection is assigned.

Note:

- If the host name includes a blank space, enclose the name with double quotation marks.
- You cannot use the **-host_name** parameter with the **-lbs**, **-addrdiscovery**, **-profile**, **-hosttype**, **-portgrp**, **-volgrp**, or **-ioport** parameters.

host_connection_name | -

(Required) The name that you assigned to the host port. The name you assign is limited to 32 byte or 16 double byte characters.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Configuring open systems hosts port attachments to Fibre Channel ports that are configured for SCSI-FCP topology.

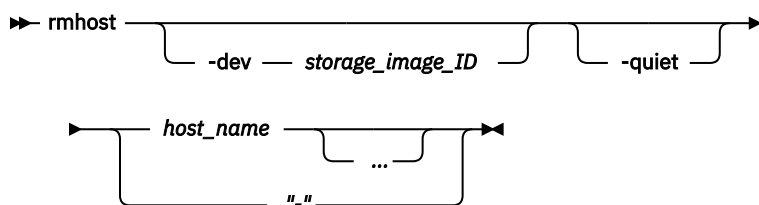
```
dscli> mkhostconnect -wwpn 12341234000A000F
-host host_1 my_host_connect
```

Output

Aug 11 02:23:49 PST 2017 DS CLI Version: 5.0.0.0 DS:IBM.2107-75FA120
Host connection 0001 successfully created.

rmhost

The **rmhost** command removes a host from a storage image.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host connection ID. It is also required if you did not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *dev* for the current command.

-quiet

(Optional) Turns off the confirmation prompt for this command.

host_name ... | -

(Required) The host name to be removed. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Removing a host from a storage image

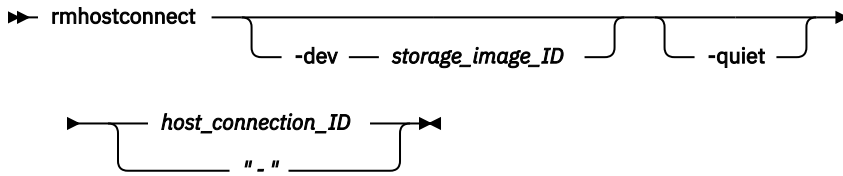
```
dscli> rmhost -quiet host_1
```

Output

Sun Aug 11 02:23:49 PST 2016 DS CLI Version: 5.0.0.0 DS: IBM.2107-75FA120
Host host_1 successfully deleted.

rmhostconnect

The **rmhostconnect** command removes a SCSI host port connection from a storage image.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all host connections, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-quiet

(Optional) Turns off the removal confirmation prompt.

host_connection_ID | -

(Required) The host connect ID, which is a unique identifier that uses any number from 0 - FFFE within the scope of a storage image. This parameter accepts a fully qualified ID (includes *manufacturer.machine type-serial number/hostconnectID*) or a shortened version if the **-dev** parameter is specified.

For a storage system, example of a fully qualified host connection ID: IBM.2107-75FA120/1.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Attention: Use caution when you work with connection IDs to ensure that you specified the connection that you want to delete. For example, if you intend to delete connection ID 0005 and type 000, the system deletes connection ID 0. Or, if you want to delete connection ID 0020 and type 002, the system deletes connection ID 2. The system does not consider the leading zeros, and 000 is interpreted as connection ID 0 and 002 is interpreted as connection ID 2.

Example: Removing a SCSI host port connection from a storage image

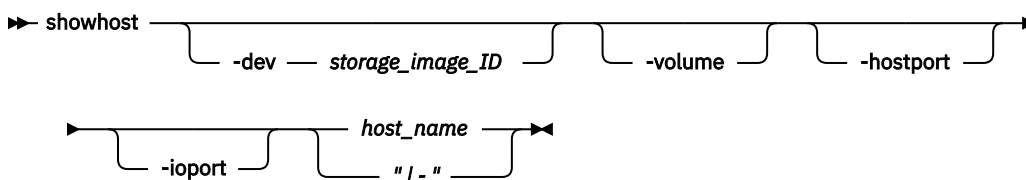
```
dscli> rmhostconnect -dev IBM.2107-75FA120 1
```

Output

```
Are you sure you want to delete Host Connection IBM.2107-75FA120/1?  
y/n Y  
Host Connection IBM.2107-75FA120/1 successfully deleted.
```

showhost

The **showhost** command displays detailed properties of an individual host.



Parameters

-dev storage_image_ID

(Optional) Specifies the storage image ID that consists of manufacturer, computer type, and serial number. The storage image ID is required if you don't specify a fully qualified host connection ID. It is also required if you did not set the *devId* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devId* for the current command.

-volume

(Optional) The volume and LUN ID map for the specified host.

-hostport

(Optional) The host port WWPNs and names under the specified host.

-ioport

(Optional) The I/O ports for the specified host.

host_name | -

(Required) The host information for the host names specified. Alternatively, the command accepts input from stdin when the dash (-) is specified. Fully qualified names or shortened versions are also accepted.

Example 1: Displaying detailed properties of an individual host

```
dsccli> showhost Host_1
```

Output

| | |
|---------------|--------------|
| Name | Host_1 |
| Type | Generic |
| State | Online |
| AddrMode | scsimask |
| Volumes | 3 |
| Host ports | 2 |
| I/O ports | 3 |
| AddrDiscovery | reportLUN |
| LBS | 512 |
| Cluster | Production01 |

Name

The host name that you assigned. The name is limited to 32 byte or 16 double-byte characters.

Type

The host type that is defined by the operating system. The value *Unknown* displays when the information is not available or was not specified when you created or modified the host.

State

The login state of the host (online or offline). If at least one host port is in the logged-in state, the state is displayed as *online*. If no host ports were added to this host, or if all of the added host ports are logged out, the state is displayed as *offline*.

AddrMode

The method that is used by the host to discover the LUNs that are available to its host ports (for example, *scsimask*, *scsimap256*, *os400mask*).

Volumes

The number of volumes that are mapped to this host.

Host ports

The number of host ports that are mapped to this host.

I/O ports

The number of I/O ports this host is allowed to log in to. *All* indicates that this SCSI host is allowed to log in to any I/O ports.

AddrDiscovery

The address discovery method used by this host system and host system port. One of the following values displays.

ReportLUN

Indicates that host system LUN access is limited to a maximum of 64 000 LUNs.

LUNPolling

Indicates that host system LUN access is limited to a maximum of 256 LUNs.

reportLUN16K

Indicates that host system LUN access is limited to a maximum of 16 000 LUNs.

LBS

The logical block size of the volumes that the host can access. Block size is determined by the host type. Possible values include 512 and 520 (for IBM® i).

Cluster

The name of cluster that the specified host is assigned to.

Example 2: Displaying detailed properties of an individual host with the volume parameter specified

```
dscli> showhost -volume Host_1
```

Output

```
Name           Host_1
Type           Generic
State          Online
AddrMode       scsimask
Volumes        3
Host ports     2
I/O ports     3
AddrDiscovery  reportLUN
LBS            512
Cluster        Production01
=====Volumes=====
ID             Lun          Access
=====
000D           8D          Public
000E           8E          Public
000F           8F          Public
```

When you specify the **-volume** parameter, the Volume IDs, Lun, and Access parameters also display.

ID

The volume ID.

Lun

The Lun ID that is mapped to the volume ID.

Access

The accessibility status of the volume. One of the following values displays.

Public

Indicates that volume is both under the host and its cluster. This volume is shared by other hosts under the cluster.

Private

Indicates that the volume is not visible to the host's cluster.

-

Indicates that if the volume is not under any cluster, the value always displays as "-".

Example 3: Displaying detailed properties of an individual host with the hostport parameter specified

```
dscli> showhost -hostport Host_1
```


Output

| Name | ID | WWPN | HostType | LBS | Addrdiscovery |
|----------------|--------------------|------------------|----------|-----|---------------|
| My host port 1 | IBM.2107-75FA120/1 | 3007ACF30A2399E0 | Unknown | 512 | reportLUN |

| Profile | Portgrp | VolgrpID | Atchtopo | ESSIOport | Speed | Desc | Host |
|-------------------|---------|----------|----------|----------------------------|---------|--------|---------------|
| IBM pSeries - AIX | 0 | 100 | - | I0111,I0121 I0211,I0221 | Unknown | SCSI 1 | Production 01 |

Report field definitions

Name

The host connection SCSI port nickname.

The name is limited to 32 byte or 16 double-byte characters.

ID

A fully qualified host connection ID.

The value that is represented by the *host_connection_ID* parameter is a unique identifier (0 - FFFE) within the scope of a storage system.

WWPN

The worldwide port name (WWPN) for the designated host system port.

HostType

The name of the host type.

"Unknown" is displayed when the information is not available, and indicates that the host type was not specified when the host connection was created or modified.

LBS

The logical block size that is used by this host system and the host system port.

The logical block setting must be compatible with the volume group type that is configured for volume access. The 520 block size is typically used for IBM System i® host system attachments.

Addrdiscovery

The LUN address discovery method that is used by this host system and the host system port.

The LUN Discovery method must be compatible with the volume group type that is configured for volume access.

The Poll LUNs method enables access to a maximum of 256 LUNs. The Report LUNs method enables access to a maximum of 64 000 LUNs.

Profile

The name of the host connection behavior profile.

Portgrp

The host port group ID. The ID ties together a group of SCSI host port objects that are accessing a common volume group. If the port group value is set to zero, the host port is not associated with any port group.

VolgrpID

The volume group ID. This ID is a unique identifier within the storage system for the SCSI volume group that the specified SCSI host port is assigned to.

Atchtopo

The atchtopo is an attribute of the I/O port and, under certain conditions, might display a value that is inconsistent with the value reported by the **lsioport** command. Because this inconsistency cannot be corrected in all cases, the atchtopo attribute always displays as a "-" value. To obtain the I/O port topology, use the **lsioport** or **showioport** commands.

ESSIOport

The array of port IDs that the designated host port is logged in to.

A port ID is prefixed with the letter "I" and consists of four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 17.
- *A* is the adapter number and is specified as 1, 2, 4, or 5.
- *P* is the port number (0 - 3).

Speed

Speed is an attribute of the I/O port and, under certain conditions, might display a value that is inconsistent with the value reported by the **lsioport** command. Because this inconsistency cannot be corrected in all cases, the speed attribute always displays a value of "Unknown". To query the speed of an I/O port, use the **lsioport** or **showioport** commands.

Desc

The description that you defined for the SCSI host port. The description is limited to 256 byte or 128 double-byte characters.

Host

The host name that is used in the Storage Management GUI, which is different from the nickname that is displayed in the **Name** column. If a name is not available, a value of "-" displays.

Host port commands

Use the host port commands to configure, modify, or delete, or display open system host ports.

The following host port commands are available.

chhostport

Modifies an open systems host port.

mkhostport

Configures an open systems host port.

lshostport

Displays a list of host ports for a specified storage image and status information for each host port in the list.

rmhostport

Deletes an open systems host port.

showhostport

Displays detailed properties of an individual host port.

chzhyperlink

Modifies the zHyperLink control switch for the specified storage image.

lszhyperlink

Displays the status of zHyperLink control switches for specified storage images.

lszhyperlinkport

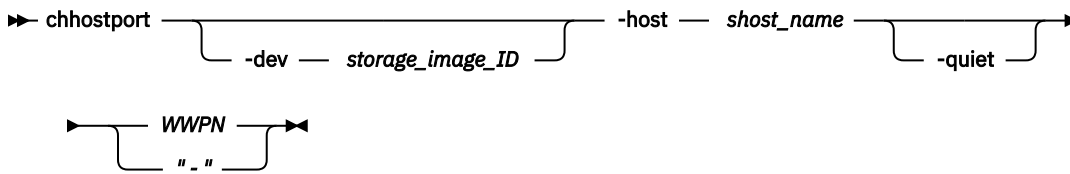
Displays a list of zHyperLink ports for the specified storage image.

showzhyperlinkport

Displays the detailed properties of an individual zHyperLink port.

chhostport

The **chhostport** command modifies an open systems host port.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host port. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-host *host_name*

(Required) The name of the host to which the host port is reassigned. If you specify a host name with a space, you must add double quotation marks around the host name.

-quiet

(Optional) Turns off the confirmation prompt for this command.

WWPN | -

(Required) The worldwide port name (WWPN) of the SCSI host port on the host system that is connected to the storage system, either directly or through a switch.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Modifying an open systems host port

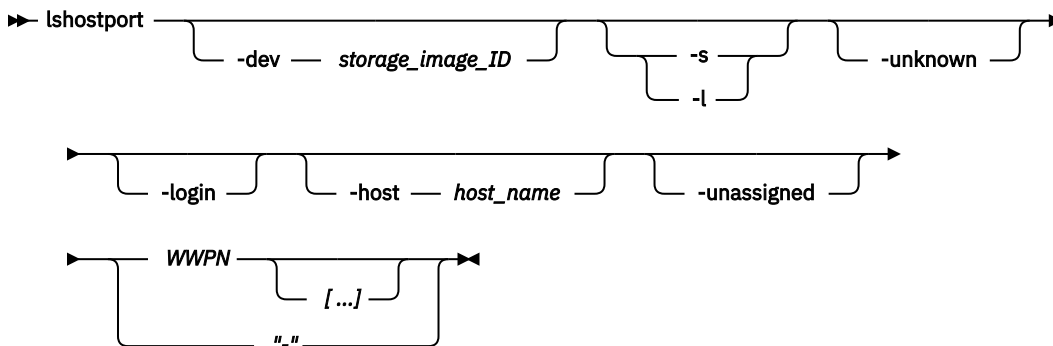
```
dscli> chhostport -host host_2 12341234000A000F
```

Output

```
Aug 11 02:23:49 PST 2018 DS CLI Version: 5.0.0.0 DS:IBM.2107-75FA120  
Host Port 12341234000A000F successfully modified.
```

lshostport

The **lshostport** command displays a list of host ports for a specified storage image and status information for each host port in the list.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host port. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-s

(Optional) Displays the worldwide port name (WWPN) of the host ports. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output and user-defined description for each host port in the list. You cannot use the **-l** and the **-s** parameters together.

-unknown

(Optional) Displays a list of logged in host ports (WWPNs) that are not recognized as being associated with the designated storage system.

Note: You cannot use the **-unknown** parameter with the **-login**, **-host**, **-unassigned**, or **WWPN** parameters.

-login

(Optional) Displays a list of host ports (WWPNs) that are logged in and sorted by the ESS I/O port IDs for known connections. The report displays one line of information per connection. However, no information is displayed for a FICON connection.

Notes:

1. Known logins are logins that you created for host connections, Remote Mirror and Copy paths, and anonymous connections.
2. You cannot use the **-login** parameter with the **-unknown**, **-host**, **-unassigned**, or **WWPN** parameters.

-host *host_name*

(Optional) Displays host port information that is associated with the specified host.

Notes:

1. If you specify a host name with a blank space, enclose the name with double quotation marks.
2. The **-host** parameter is not compatible with the **-unassigned** parameter.

-unassigned

(Optional) Displays host port information that is not associated with other hosts.

Note: The **-unassigned** parameter is not compatible with the **-host**, **-unknown**, or **-login** parameters.

WWPN [...] | -

(Optional) Displays host port information for one or more specified host ports (WWPNs). If you specify multiple WWPNs, separate each one with a blank space. You can specify the fully qualified WWPN or the shortened version of the WWPN.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying a list of host ports

```
dscli> lshostport -l
```

Output

| WWPN | Name | Type | State | Volumes | AddrMode | I/O ports | Host |
|----------------------|--------|--------|------------|---------|------------|-----------|--------|
| 210100E08B 295F86 | Name_1 | VMWare | logged in | 8 | scsimap256 | 32 (all) | host_1 |
| 310106E04 B2D5E45 | - | VMWare | logged out | 6 | scsimap256 | 3 | - |
| 310106E04B 2D5F10 | - | - | - | 0 | - | 0 | - |

Output definitions

WWPN*

WWPN for the specified host port.

Name

Name of the host port.

Type

Host type that is defined by the operating system and platform of the host.

When information is not available, the output displays "Unknown".

State

Login state of the host. One of the following values displays.

Logged in

A host port is created for an available physical connection.

Logged out

A host port is created but a physical connection is not established and the connection is not available.

unknown

A host port is created but the state is invalid (not logged in or logged out).

"_"

A physical connection is established but a host port is not created.

Volumes+

Number of volumes that are mapped to this host port.

AddrMode+

Method that is used by the host to discover the LUNs that are available to its host ports. One of the following values display.

scsimask

SCSI mask volume group. This option is available if the host adapter supports 4-byte LUN addresses.

scsimap256

Indicates a SCSI-MAP 256 volume group.

os400mask

OS/400 mask volume group. The IBM i host system typically uses fixed block volumes of 520-byte logical block size. This option is available only if the host adapter supports 4-byte LUN addresses.

Note: This volume group is also referred to as SCSI520-MASK. When an error message is displayed for the os400mask, SCSI520-MASK is referenced instead.

I/O ports+

Number of I/O ports that this host is allowed to log into. The value of "all" indicates that this SCSI host is allowed to log into any I/O port.

Host+

Name of the host that the specified host port is assigned to. The value of "-" indicates that the host port is not assigned to any host.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

Example 2: Displaying a list of logged in host ports (WWPNs) that are not associated with the storage system

```
dsccli> lshostport -dev IBM.2107-75FA120 -unknown
```

Output

| WWNN | WWPN | ESSIOport |
|------------------|------------------|-----------|
| 5005076306FFD341 | 5005076306FFD341 | I0221 |

Output definitions

When you specify the **-unknown** parameter, the WWNN and WWPN identifiers and ESSIOport IDs also display.

WWNN

WWNN for the specified host system.

WWPN

WWPN for the specified host port.

ESSIOport

Port ID to which the designated host port is logged in to. A port ID is prefixed with the letter I and consists of four hexadecimal characters in the format *EEAP*, where:

EE

An I/O port enclosure number in the range of 00 - 17.

A

The adapter number and is specified as 1, 2, 4, or 5.

P

The port number (0 - 3).

Example 3: Displaying a list of logged in host ports (WWPNs) that are associated with the storage system

```
dsccli> lshostport IBM.2107-75FA120 -login
```

Output

| WWNN | WWPN | Host | I/O ports | ESSIOport |
|------------------|------------------|------|-----------|-----------|
| 5005076306FFD341 | 5005076306FFD341 | - | 32 (all) | I0221 |

When you specify the **-login** parameter, the WWPN and WWPN identifiers, host, I/O ports and ESSIOport IDs also display.

Output definitions

WWNN

WWNN for the specified host system.

WWPN

WWPN for the specified host port.

Host

Name of the host that the specified host port is assigned to. A hyphen (-) displays if the host port is not associated with a host.

I/O ports

Number of I/O ports that this host is allowed to log into. *All* displays if the specified SCSI host is allowed to log into any I/O port.

ESSIOport

Port ID to which the designated host port is logged in to. A port ID is prefixed with the letter I and consists of four hexadecimal characters in the format *EEAP*, where:

EE

An I/O port enclosure number in the range of 00 - 17.

A

The adapter number and is specified as 1, 2, 4, or 5.

P

The port number (0 - 3).

mkhostport

The **mkhostport** command configures an open systems host port.

```
▶▶ mkhostport -dev storage_image_ID -host host_name WWPN " - "
```

Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host port. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-host host_name

(Required) The name of the host. If you specify a host name with a blank space, enclose the name with double quotation marks.

WWPN | -

(Required) The worldwide port name (WWPN) of the SCSI host port on the host system that is connected to the storage system, either directly or through a switch.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Configuring an open systems host port

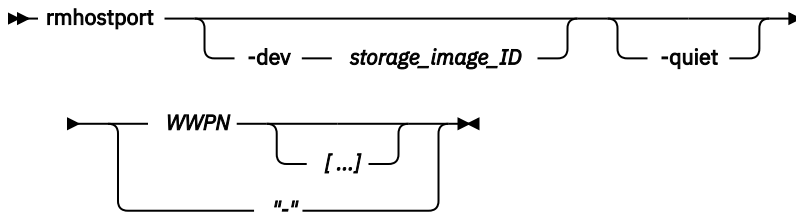
```
dscli> mkhostport -host host_1 12341234000A000F
```

Output

```
Aug 11 02:23:49 PST 2016 DS CLI Version: 5.0.0.0 DS:IBM.2107-75FA120  
Host Port 12341234000A000F successfully created.
```

rmhostport

The **rmhostport** command deletes an open systems host port.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host port. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-quiet

(Optional) Turns off the confirmation prompt for this command.

WWPN [...] | -

(Required) The worldwide port name (WWPN) of the SCSI host port on the host system that is connected to the storage system, either directly or through a switch. The ellipsis (...) indicates that you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting an open systems host port

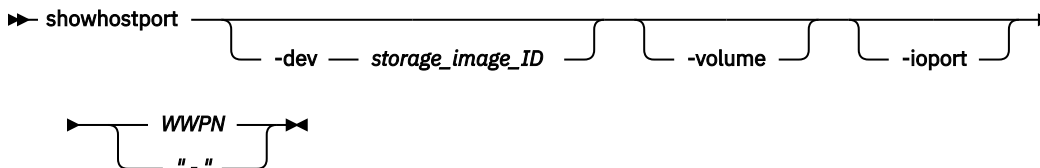
```
dscli> rmhostport -quiet 12341234000A000F
```

Output

```
Aug 11 02:23:49 PST 2018 DS CLI Version: 5.0.0.0 DS:IBM.2107-75FA120  
Host Port 12341234000A000F successfully deleted.
```

showhostport

The **showhostport** command displays detailed properties of an individual host port.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified host port. It is also required if you did not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-volume

(Optional) Displays volume and LUN ID map for the specified host port.

-ioport

(Optional) Displays I/O ports for the specified host port.

WWPN | -

(Required) Displays host port information for the specified host port WWPNs. Either the fully qualified WWPN or shortened name is acceptable. This parameter accepts input from stdin when the dash (-) is specified.

Example 1: Displaying detailed properties of an individual host port

```
dscli> showhostport 210100E08B295F86
```

Output

```
WWPN          210100E08B295F86
Name          Host_Port_1
Type          generic
State         logged in
Volumes       3
AddrMode      scsimask
I/O ports     3
AddrDiscovery reportLUN
LBS           512
Host          Host_1
```

Output definitions

WWPN

WWPN of the host port.

Name

Unique ID that is assigned by the user to the host port.

Type

Host type as defined by the operating system and platform. If the information is not available, the value always displays as unknown.

State

Login state of the host.

logged in

Indicates that a host port is created for an available physical connection.

logged out

Indicates that a host port is created, but no physical connection is established or the connection is not available.

unknown

Indicates that a host port is created, but the state is invalid (neither logged in or logged out).

-

A physical connection is established, but the host port is not created.

Volumes

Number of volumes that are mapped to the specified host.

AddrMode

Method that is used by the host to discover the LUNs that are available to its host ports; for example, scsimask, scsimap256, or os400mask.

I/O ports

Number of I/O ports that the specified host is allowed to log into (all indicates that the specified host is allowed to log into any I/O port).

AddrDiscovery

LUN address discovery method used by the host system and host system port; for example, reportLUN, LUNPolling, or reportLUN16K.

LBS

Logical block size of the volumes that the host can access. Block size is determined by the host type. For IBM i, the possible values include 512 and 520.

Host

Name of the host that the specified host port is assigned. If the host port is not associated with a host, the value always displays as "-".

Example 2: Displaying volume and LUN ID map of an individual host port

```
dscli> showhostport -volume 210100E08B295F86
```

Output

```
WWPN          210100E08B295F86
Name          Host_Port_1
Type         generic
State        logged
Volumes      3
AddrMode     scsimask
I/O ports    3
AddrDiscovery reportLUN
LBS          512
Host         Host_1
=====Volumes=====
ID           Lun       Access
=====
000D         8D       Public
000E         8E       Public
000F         8F       Public
```

When you specify the **-volume** parameter, the Volume IDs, Lun, and Access parameters also display.

ID

Volume ID.

Lun

Lun ID that is mapped to the volume ID.

Access

Accessibility status of the volume. One of the following values displays.

Public

Indicates that volume is both under the host and its cluster. This volume is shared by other hosts under the cluster.

Private

Indicates that the volume is not visible to the host's cluster.

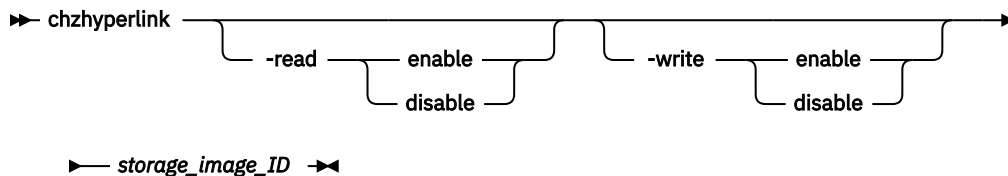
-

Indicates that if the port's host is not under any cluster, the value always displays as "-".

chzhyperlink

The **chzhyperlink** command modifies the zHyperLink control switch for the specified storage image.

Note: zHyperLink connections are not available on DS8882F systems.



Parameters

-read enable | disable

(Optional) The setting of the read control switch.

-write enable | disable

(Optional) The setting of the write control switch.

storage_image_ID

(Required) The storage image ID, which consists of the values for manufacturer, machine type, and serial number.

Note: If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Note: By default, the zHyperLink facility is disabled in z/OS. To enable z/OS for zHyperLink read or write processing, use the SETIOS MVS™ system command after an IPL, or use the IECIOSxx PARMLIB to enable zHyperLink processing during IPL.

SETIOS MVS Command

To enable zHyperLink read and write processing on the IBM z host system after an IPL, enter the following MVS commands:

```
SETIOS ZHPF=YES
SETIOS ZHYPERLINK,OPER={READ|WRITE|ALL}
```

For more information about the SETIOS MVS command, refer to the [z/OS MVS System Commands](#).

IECIOSxx parmlib

To enable zHyperLink read and write processing during an IPL, include the following statements in the IECIOSxx PARMLIB member on the IBM z host system:

```
ZHPF=YES
ZHYPERLINK,OPER={READ|WRITE|ALL}
```

For more information about the IECIOSxx PARMLIB member, refer to the [z/OS MVS Initialization and Tuning Reference](#).

Example: Modifying the zHyperLink control switch for the storage image

```
dsccli> chzhyperlink -read enable IBM.2107-75FA120
```

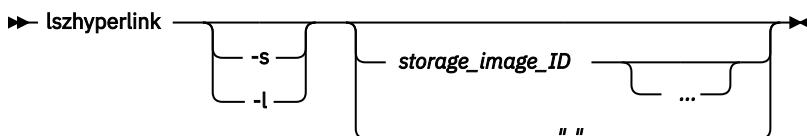
Output

```
CMUC00519I chzhyperlink: zHyperLink read is successfully modified.
```

lszhyperlink

The **lszhyperlink** command displays the status of zHyperLink control switches for specified storage images.

Note: zHyperLink connections are not available on DS8882F systems.



Parameters

-s

(Optional) Displays only the storage image IDs. You cannot use the -l and the -s parameters together.

-l

(Optional) Displays the default output for each storage image ID in the list. You cannot use the **-l** and the **-s** parameters together.

storage_image_ID ... | -

(Required) One or more storage image IDs, which consists of the values for manufacturer, machine type, and serial number. You must separate multiple IDs with a space between each ID.

Note: If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode. You cannot specify ID ranges.

Example: Displaying the status of zHyperLink control switches

```
dscli> lszhyperlink
```

Output

```
ID                Read    Write
=====
IBM.2107-75FA120  disable enable
```

Output definitions

ID

Storage image ID that consists of the manufacture, machine type, and serial number.

Read

State of the zHyperLink read control switch.

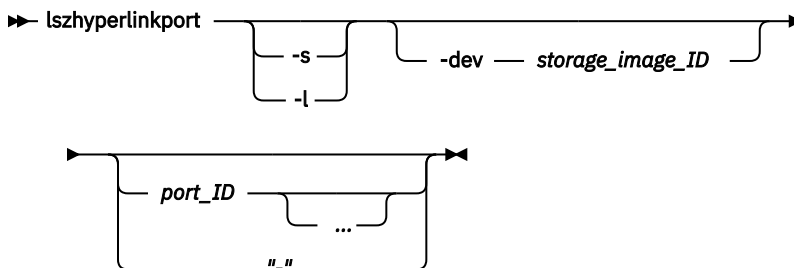
Write

State of the zHyperLink write control switch.

lszhyperlinkport

The **lszhyperlinkport** command displays a list of zHyperLink ports for the specified storage image.

Note: zHyperLink connections are not available on DS8882F systems.



Parameters

-s

(Optional) Displays only the port IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output for each port ID in this list. You cannot use the **-l** and the **-s** parameters together.

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

port_ID ... | -

(Optional) Displays the ports that match the specified IDs. A port ID is prefixed with the letter "HL" and consists of four hexadecimal characters.

Example: Displaying a list of zHyperLink ports for the storage image

```
dscli> lszhyperlinkport
```

Output

| ID | State | Loc | Speed |
|--------|--------------|----------------------------|--------|
| HL0028 | Connected | U1500.1B3.RJBAY03-P1-C7-T3 | 8 GB/s |
| HL0029 | Connected | U1500.1B3.RJBAY03-P1-C7-T4 | 8 GB/s |
| HL0038 | Disconnected | U1500.1B4.RJBAY04-P1-C7-T3 | 8 GB/s |
| HL0039 | Disconnected | U1500.1B4.RJBAY04-P1-C7-T4 | 8 GB/s |

Output definitions

ID

zHyperLink port ID.

State

State of the zHyperLink port in the I/O enclosure PCIe/PCN card. One of the following values display: Connected, Disconnected, Offline, or Fenced.

Loc

Location of the zHyperLink port in the I/O enclosure PCIe/PCN card.

Speed

Speed of the link of the zHyperLink port in the I/O enclosure PCIe/PCN card.

Width

Number of PCIe lanes operational on the zHyperLink port in the I/O enclosure PCIe/PCN card.

showzhyperlinkport

The **showzhyperlinkport** command displays the detailed properties of an individual zHyperLink port.

Note: zHyperLink connections are not available on DS8882F systems.

```
▶▶ showzhyperlinkport -dev storage_image_ID -metrics port_ID
```

Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-metrics

(Optional) Displays the port information and performance metrics for the specified port.

port_ID | -

(Required) Displays port information for the specified port.

Example 1: Displaying the detailed properties of an individual zHyperLink port

```
dscli> showzhyperlinkport -dev IBM.2107-75DMC81 HL0038
```

Output

```
ID          HL0038
State       Connected
Loc         U1500.1B8.RJBAY08-P1-C7-T9
Speed       8 GB/s
```

Output definitions

ID

zHyperLink port ID.

State

State of the zHyperLink port in the I/O enclosure PCIe/PCN card. One of the following values display: Connected, Disconnected, Offline, or Fenced.

Loc

Location of the zHyperLink port in the I/O enclosure PCIe/PCN card.

Speed

Speed of the link of the zHyperLink port in the I/O enclosure PCIe/PCN card.

Example 2: Displaying the port performance metrics of an individual zHyperLink port

```
dscli> showzhyperlinkport -metrics HL0006
```

Output

```
ID          IBM.2107-75NA901/HL6
Date        Wed Dec 31 17:00:00 MST 1969
Link ID     0060
Remote Link ID 0000
WWNN        5005075308FFC775
Remote WWN  0000000000000000
Oversubscription Status Normal
TxLayerErr  0
DataLayerErr 0
PhyLayerErr  0
=====
Lane RxPower (dBm) TxPower (dBm)
=====
0 0.0000 0.0000
1 0.0000 0.0000
2 0.0000 0.0000
3 0.0000 0.0000
4 0.0000 0.0000
5 0.0000 0.0000
6 0.0000 0.0000
7 0.0000 0.0000
```

Output definitions (with the -metrics parameter)

ID

zHyperLink port ID.

Date

Timestamp when the performance metrics were captured.

Link ID

ID of a link.

Remote Link ID

ID of a remote link.

WWNN

World Wide Node Name (WWNN) that is associated of the specified port ID.

Remote WWN

World Wide Name (WWN) that is associated with the remote port ID.

Oversubscription Status

Status of the specified port for optimized use.

TxLayerErr

Number of bad transaction layer packets.

DataLayerErr

Number of bad data layer packets.

PhyLayerErr

Number of bad physical layer packets.

Lane

Number of the lane.

RxPower (dBm)

Link transmit optical power in dBm.

TxPower(dBm)

Link receiver optical power in dBm.

Network port commands

Network port commands are available for configuring and displaying network ports information for your storage system.

lsnetworkport

Displays a report that lists all network ports that are installed in the specified storage system.

setnetworkport

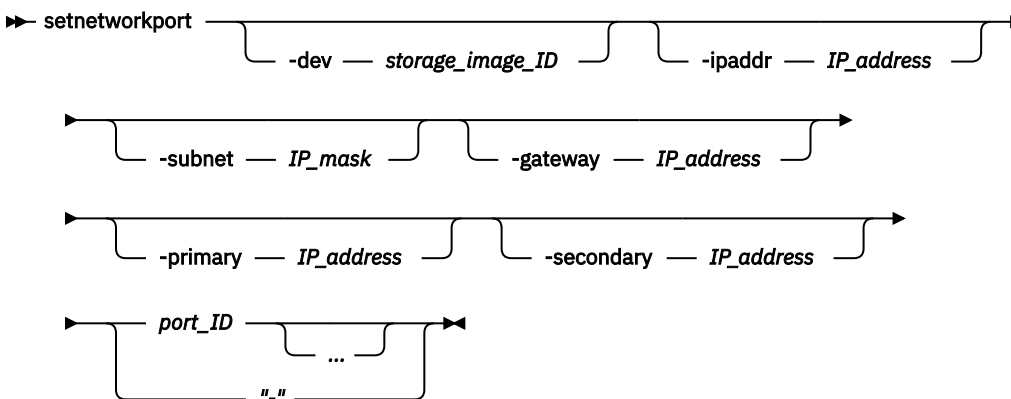
Configures one network port for TCP/IP connections.

shownetworkport

displays detailed properties of an individual network port ID.

setnetworkport

The **setnetworkport** command configures one network port for TCP/IP connections.



Parameters

Notes:

1. One or more of the optional parameters, **-ipaddr**, **-subnet**, **-gateway**, **-primary**, or **-secondary**, must be specified.
2. Only one port can be set or modified at a time.

-dev *storage_image_ID*

(Optional) A fully qualified storage image ID. The storage image ID consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID,

do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter will temporarily override any defined value for *dev* for the current command.

-ipaddr *IP_address*

(Optional) The TCP/IP address for the designated port.

Note: Ports that are on the same server must be on different subnets.

-subnet *IP_mask*

(Optional) The TCP/IP subnet mask for the designated port.

Note: Ports that are on the same server must be on different subnets.

-gateway *IP_address*

(Optional) The gateway TCP/IP address for the designated port.

-primary *IP_address*

(Optional) The primary DNS TCP/IP address for the designated port.

-secondary *IP_address*

(Optional) The secondary DNS TCP/IP address for the designated port.

port_ID ... | -

(Required) The network port ID. This parameter accepts a fully qualified port ID, which includes the storage image ID, or a shortened version without the storage image ID when the **-dev** parameter is specified.

A port ID is prefixed with letter *I* and consists of four hexadecimal characters with the binary bit definition of *trre eeee aaaa pppp* (value is separated for readability), where:

- *t* = port type (1= network port)
- *rr* = reserved bits and set to zero
- *eeee* = enclosure number (value specified is 18 - 1F)
- *aaaa* = adapter number
- *pppp* = port number

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Configuring a network port for TCP/IP connections

This example shows how to configure network port (IBM.2107-1300321/I9801) to use IP address 192.168.5.5.

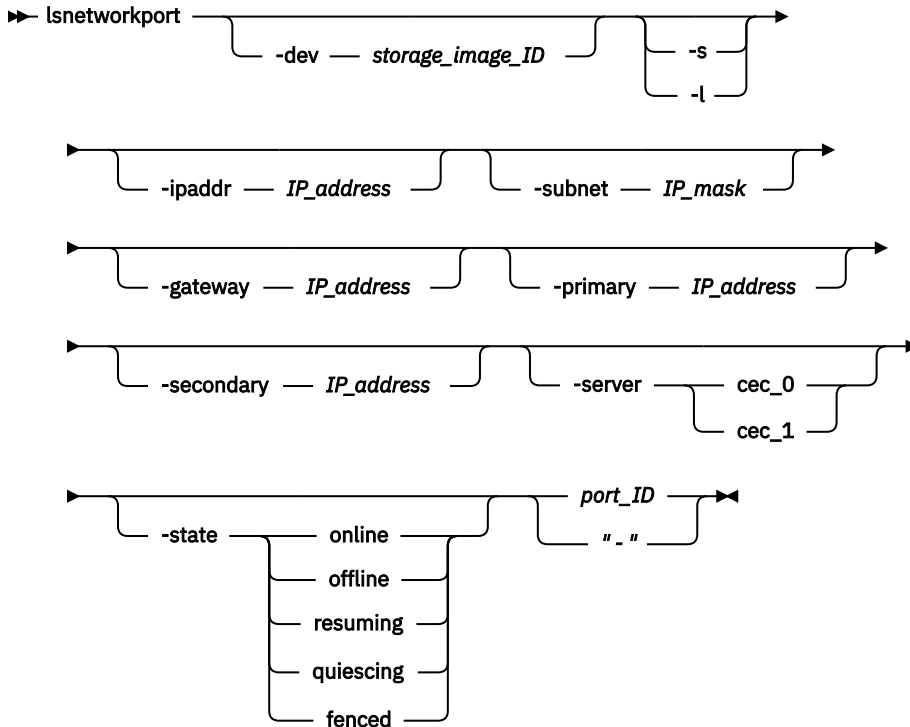
```
dsccli> setnetworkport -dev IBM.2107-1300321 -ipaddr 192.168.5.5 I9801
```

Output

```
CMUC00250I setnetworkport: Network port I9801 successfully configured.
```


lsnetworkport

The **lsnetworkport** command displays a report that lists all network ports that are installed in the specified storage system.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-s

(Optional) Displays only the port IDs for the designated storage system. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output and the values for the owning server, port speed, and port location. You cannot use the **-l** and the **-s** parameters together.

-ipaddr *IP_address*

(Optional) The TCP/IP address for the designated port.

Note: Ports that are on the same server must be on different subnets.

-subnet *IP_mask*

(Optional) The TCP/IP subnet mask for the designated port.

Note: Ports that are on the same server must be on different subnets.

-gateway *IP_address*

(Optional) The gateway TCP/IP address for the designated port.

-primary *IP_address*

(Optional) The primary DNS TCP/IP address for the designated port.

-secondary IP_address

(Optional) The secondary DNS TCP/IP address for the designated port.

-server cec_0 | cec_1

(Optional) Displays the server that is associated with the I/O port. One of the following values is displayed:

cec_0

The user port is connected to processor node 0 and that the I/O port is associated with server 0.

cec_1

The user port is connected to processor node 1 and that the I/O port is associated with server 1.

-state online | offline | resuming | quiescing | fenced

(Optional) Displays network ports that are in the specified state. One of the following values is displayed:

online

The network port is enabled.

offline

The network port is disabled.

resuming

The network port is in the process of becoming enabled.

quiescing

The network port is in the process of becoming disabled.

fenced

The network port is configured but there is a problem and the port cannot be used.

port_ID | -

(Required) Displays I/O ports that match the specified IDs. This parameter accepts a fully qualified port ID, which includes the storage image ID, or a shortened version without the storage image ID when the **-dev** parameter is specified.

A port ID is prefixed with letter *I* and consists of four hexadecimal characters with the binary bit definition of *trre eeee aaaa pppp* (value is separated for readability), where:

- *t* = port type (1= network port)
- *rr* = reserved bits and set to zero
- *eeee* = enclosure number (value specified is 18 - 1F)
- *aaaa* = adapter number
- *pppp* = port number

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a report listing all network ports that are installed in the storage system

```
dscli> lsnetworkport  
-dev IBM.2107-75FA120 -1
```

Output

| ID | IP Address | Subnet Mask | Gateway | Primary DNS |
|------------------------|-------------------|--------------------|----------------|--------------------|
| IBM.2107-75FA120/I9801 | 192.168.5.5 | 255.255.255.0 | 192.168.5.5 | 192.168.5.5 |

| Secondary DNS | State | Server | Speed | Type | Location |
|---------------|--------|--------|----------|-----------------|----------------------------|
| 192.168.5.5 | Online | 00 | 1 Gb/sec | Ethernet-Copper | U7879.001.03AA6D0-PO-C0-T0 |

Output definitions

ID

Port ID.

IP Address

TCP/IP address for the designated port.

Subnet Mask

TCP/IP subnet mask for the designated port.

Gateway

Gateway TCP/IP address for the designated port.

Primary DNS

Primary DNS TCP/IP address for the designated port.

Secondary DNS

Secondary DNS TCP/IP address for the designated port.

State

State of the network ports. One of the following values can be displayed in this field:

online

Network port is enabled.

offline

Network port is disabled.

resuming

Network port is in the process of becoming enabled.

quiescing

Network port is in the process of becoming disabled.

fenced

Network port is configured but there is a problem and the port cannot be used.

Server

Server that the I/O port is attached to.

Speed

Network port interface speed.

Type

Network port interface type.

Location

Network port location using the format: *Utttt.mmm.ppsssss-Pn-Cn-Tn*

- *Utttt.mmm.ppsssss* identifies the location of the processor node.
- *Pn* identifies the planer number.
- *Cn* identifies the card number.
- *Tn* identifies the port number.

shownetworkport

The **shownetworkport** command displays detailed properties of an individual network port ID.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified port ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

port_ID | -

(Required) Displays I/O ports that match the specified IDs. This parameter accepts a fully qualified port ID, which includes the storage image ID, or a shortened version without the storage image ID when the **-dev** parameter is specified.

A port ID is prefixed with letter *I* and consists of four hexadecimal characters with the binary bit definition of *trre eeee aaaa pppp* (value is separated for readability), where:

- *t* = port type (1= network port)
- *rr* = reserved bits and set to zero
- *eeee* = enclosure number (value specified is 18 - 1F)
- *aaaa* = adapter number
- *pppp* = port number

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying detailed properties of an individual network port ID

```
dsccli> shownetworkport -fullid -dev IBM.2107-1300321 I9801
```

Output

| ID | IP Address | Subnet Mask | Gateway | Primary DNS |
|------------------------|-------------|---------------|-------------|--------------|
| IBM.2107-1300321/I9801 | 192.168.5.5 | 255.255.255.5 | 192.168.5.5 | 192.168.5.55 |

| Secondary DNS | State | Server | Speed | Type | Location |
|---------------|--------|--------|----------|-----------------|----------------------------|
| 192.168.5.55 | Online | 00 | 1 Gb/sec | Ethernet-Copper | U7879.001.03AA6D0-PO-C0-T0 |

Output definitions

ID

Port ID.

IP Address

TCP/IP address for the designated port.

Subnet Mask

TCP/IP subnet mask for the designated port.

Gateway

Gateway TCP/IP address for the designated port.

Primary DNS

Primary DNS TCP/IP address for the designated port.

Secondary DNS

Secondary DNS TCP/IP address for the designated port.

State

State of the network ports. One of the following values can be displayed in this field:

online

Network port is enabled.

offline

Network port is disabled.

resuming

Network port is in the process of becoming enabled.

quiescing

Network port is in the process of becoming disabled.

fenced

Network port is configured but there is a problem and the port cannot be used.

Server

Server that the network port is attached to.

Speed

Network port interface speed.

Type

Network port interface type.

Location

Network port location in the format *Utttt.mmm.ppsssss-Pn-Cn-Tn* where

- *Utttt.mmm.ppsssss* identifies the location of the processor node.
- *Pn* identifies the planer number.
- *Cn* identifies the card number.
- *Tn* identifies the port number.

Offload file commands

Offload file commands are used to provide a report that contains information about who logged in, when they logged in and what the user did during their session. Also, the offload commands are used for offloading specified data files.

The following offload file commands are available:

offloadauditlog

Generates an activity report for a console that includes basic information, such as, a list of who logged in, when they logged in, and what they did during their session.

offloadfile

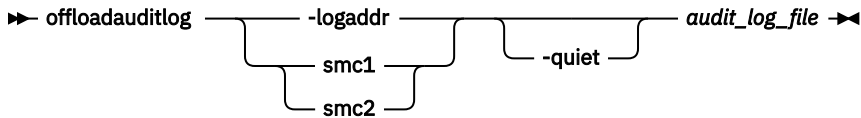
Offloads the specified set of data files.

offloadauditlog

The **offloadauditlog** command provides an activity report for a console (identified as smc1 or smc2).

The report includes basic information, such as, a list of who logged in, when they logged in, and what they did during their session. In addition, a log of service actions (phone connection started, phone connection ended management console session started, management console session ended) is appended to the end of the audit log.

Note: The **offloadauditlog** command cannot be run from the **Embedded DS CLI** window.



Parameters

Notes:

1. Only users with administrator or secadmin authority are authorized to use this command.
2. A separate log entry is added each time a resource is created, deleted, or modified. Entries are added to the audit file only after the operation has completed.
3. You must periodically extract the log using the **offloadauditlog** command and save the log file in a directory of your choice. The log file is automatically reduced (old entries removed first) by the subsystem so that it does not consume more than 50 megabytes of disk storage.

When the log is 60% full, an entry ("Audit_Log_At_60%") is placed in the audit log. Another entry is added when the log is 75% ("Audit_Log_At_75%") full. At 100%, the log is reduced to 50% full.

4. In the service actions section of the report, there might be cases where a management console session started entry might not have a corresponding management console session ended entry.
5. As noted in the report example, the service action report begins after the line of text that states:

"-----BEGIN SERVICE AUDIT LOG-----"

-logaddr smc1 | smc2

(Required) Storage management console that the audit log is to be offloaded for. The designated storage management console must be configured and available to offload the audit log successfully.

-quiet

(Optional) Turns off the confirmation prompt for replacing an existing audit log.

audit_log_file

(Required) The file name to which the audit log entries are extracted.

Note: If you specify a file name that contains prior log entries, these entries are overwritten with the current data.

Example: Providing an activity report for a console

Note: The following example displays only a portion of an actual Service action report appended to the end of the Audit log report.

```
dscli> offloadauditlog -logaddr smc1 auditlog-200509.txt
```

Output

Audit log successfully offloaded from smc1 to file auditlog-200509.txt.

Representative report

The following lines are an example of the report information that is extracted when you use the **offloadauditlog** command (the wrapping is done simply for clarity and is not representative of your actual report):

```

U,2005/10/04 15:08:46:834 MST,admin,1,,W,1002,User_Login_Fail,,1,
"IP = an_ip_address"
U,2005/10/04 15:29:37:432 MST,admin,1,,W,1001,User_Login_Expire,,0,
"IP = an_ip_address"
U,2005/10/04 15:32:56:979 MST,admin,1,,N,1000,User_Login,,0,
"IP = an_ip_address"
U,2005/10/04 15:34:21:020 MST,admin,1,,N,1000,User_Login,,0,
"IP = an_ip_address"
U,2005/10/05 16:54:32:171 MST,admin,1,,N,1103,
User_Password_Change,,be741104,"userName = admin"
S,2005/10/06 00:01:10:239 MST,,1,,W,1200,Audit_Log_At_60%,,, ""
U,2005/10/06 00:23:09:817 MST,admin,1,IBM.2107-AZ12341,N,2050,
Array_Create,A0,0,"A0"
U,2005/10/06 00:23:10:518 MST,admin,1,IBM.2107-AZ12341,N,2060,
Rank_Create,R0,-1,"R0"
U,2005/10/06 00:23:12:110 MST,admin,1,IBM.2107-AZ12341,N,2070,
XPool_Create,P0,0,"P0"
U,2005/10/06 00:23:12:761 MST,admin,1,,N,2073,XPool_Assign_Rank,,," ""
U,2005/10/06 00:23:16:947 MST,admin,1,IBM.2107-AZ12341,N,2090,
Volume_Create,1000,0,"1000"
U,2005/10/06 00:23:17:187 MST,admin,1,IBM.2107-AZ12341,N,2090,
Volume_Create,1001,, "1001"
S,2005/10/06 00:23:24:508 MST,,1,,W,1201,Audit_Log_At_75%,,, ""
U,2005/10/06 12:47:16:345 MST,admin,1,IBM.2107-AZ12341,N,2092,
Volume_Delete,2005,0,"2005"
U,2005/10/06 12:47:16:656 MST,admin,1,IBM.2107-AZ12341,N,2092,
Volume_Delete,2006,-1,"2006"

```

-----BEGIN SERVICE AUDIT LOG-----

```

U,2007/08/21 12:05:24:000 MST,CE,1,IBM.2107-75R0830,N,8020,
Web_SM_session_start,Web_SM_session_started,,,
U,2007/08/21 12:05:27:000 MST,CE,1,IBM.2107-75R0830,N,8022,
Web_SM_session_ended,,,,
U,2007/08/24 11:59:36:000 MST,CE,1,IBM.2107-75R0830,N,8020,
Web_SM_session_start,Web_SM_session_started,,,
U,2007/08/24 12:02:31:000 MST,CE,1,IBM.2107-75R0830,N,8022,
Web_SM_session_ended,,,,
U,2007/08/30 11:36:21:000 MST,CE,1,IBM.2107-75R0830,N,8020,
Web_SM_session_start,Web_SM_session_started,,,
U,2007/08/30 11:38:37:000 MST,CE,1,IBM.2107-75R0830,N,8022,
Web_SM_session_ended,,,,
U,2007/09/04 16:19:36:000 MST,,1,IBM.2107-75R0830,N,8022,
Web_SM_session_ended,,,,
U,2007/09/04 16:22:57:000 MST,hscroot,1,IBM.2107-75R0830,N,8020,
Web_SM_session_start,Web_SM_session_started,,,
U,2007/09/04 16:23:00:000 MST,hscroot,1,IBM.2107-75R0830,N,8022,
Web_SM_session_ended,,,,

```

Audit Log file definitions

Fields are output in comma-separated (CSV) format. This format makes it easy to import the file into a spreadsheet. The Input Parameters field is a special case. It uses the CSV format internally to separate one input field from the next. To manage this, the entire Input Parameters field is enclosed in double quotation marks.

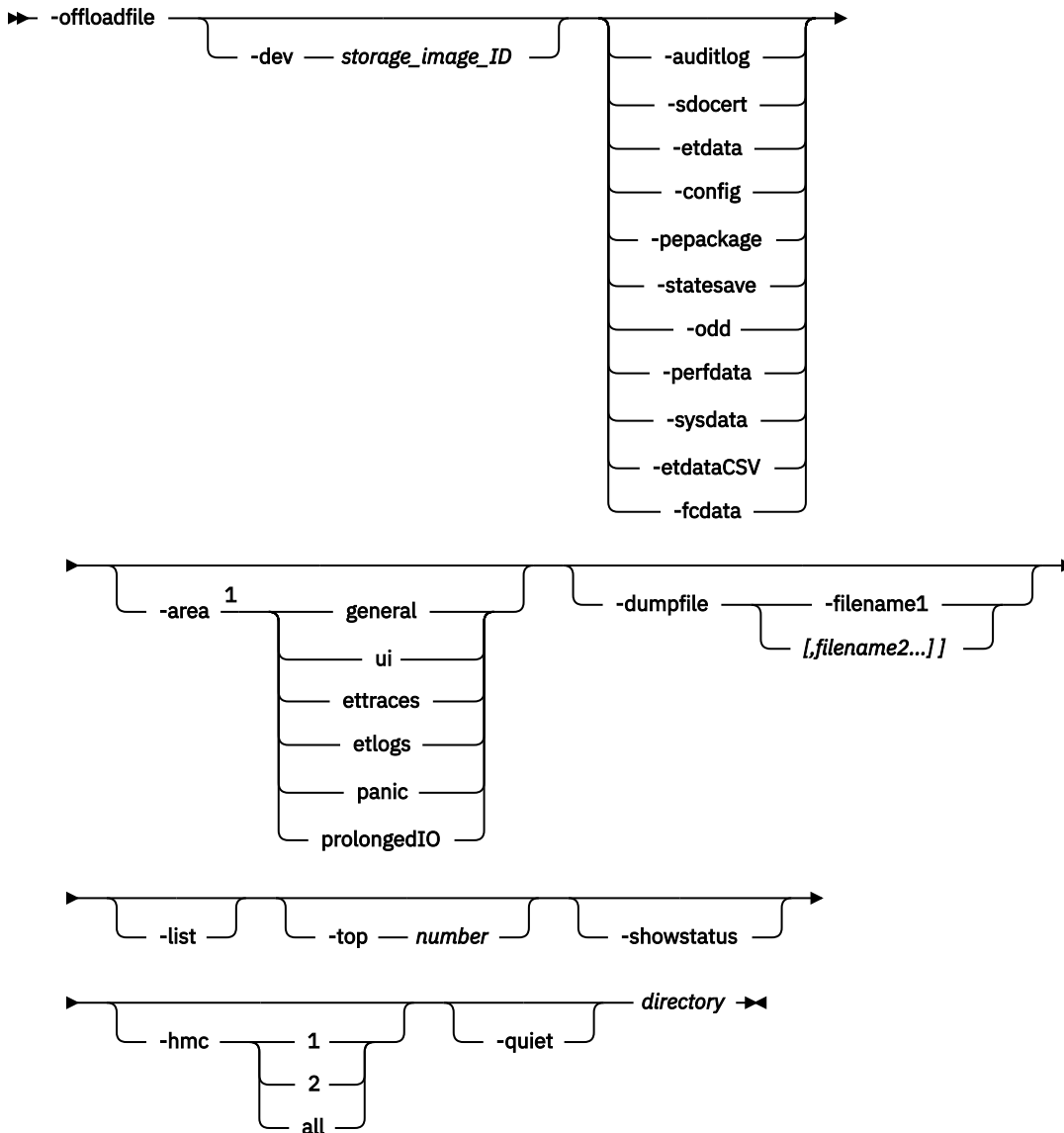
| Field | Format | Description |
|-----------|--------------------------------|--|
| Source | 1 char | Source of the log entry: <ul style="list-style-type: none"> S - Server event that is not associated with a user action. U - User-requested action. C - Continuation line for additional input attributes. There can be multiple C entries for a given user-requested (U) log entry. |
| Timestamp | YYYY/MM/DD HH:MM:SS:MMM TMZ | Date, time, and time zone of the log entry. |

| Field | Format | Description |
|------------------|----------------------|---|
| User | 1 - 16 char | User account that is making the request. |
| MC | 1 char, a "1" or "2" | Management console that processed the user request. |
| Device | 16 char | Storage image ID that consists of the following values: manufacture, type, and serial number. |
| NWC | 1 char | N = notification, W = warning, and C = critical. |
| Entry ID | 4 char | Unique identifier that is associated with the activity that is represented by the log entry. |
| Entry name | 20 char max | A text description that corresponds to the Entry ID. |
| Object ID | 5 char max | Unique identifier that identifies the object. |
| Exit code | 8 char | Final result code. |
| Input Parameters | 160 char max | Unformatted text that includes input parameters in the format: "attr1 = value1, attr2 = value2" with a comma (,) separator between parameters and double quotation marks around the entire field. |

offloadfile

The **offloadfile** command exports the specified set of data files.

Note: The **offloadfile** command cannot be run from the **Embedded DS CLI** window.



Notes:

¹ The **-area** parameter is only valid when the **-pepackage** parameter is specified.

Parameters

-dev storage_image_ID

(Optional) The storage image ID consists of the manufacturer, computer type, and serial number. The storage image ID is required if you do not specify a fully qualified storage image ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined dev id value for the current command.

-auditlog | **-sdocert** | **-etdata** | **-config** | **-pepackage** | **-statesave** | **-odd** | **-perfddata** | **-sysdata** | **-etdataCSV** | **-fcdata**

-auditlog

Exports one file that contains the audit log for the management console server.

-sdocert

Exports the SDO certificate for each storage facility.

-etdata

Exports two files that contain the IBM Easy Tier summary data.

-config

Offloads two files, one file that contains advanced settings, and another file that contains the Install Corrective Service settings.

Note: Only one file set parameter must be specified.

-pepackage

Generates a PE package and offloads it for use by product support teams, but only if you do not specify **-showstatus**. Specify only one file set.

-statesave

Exports a file set and offloads it for use by product support teams, but only if you do not specify **-showstatus** or **-list**. Specify only one file set.

-odd

Exports a file set and offloads it for use by product support teams, but only if you do not specify **-showstatus** or **-list**. Specify only one file set.

-perfdata

Downloads the performance summary CSV file.

-sysdata

Downloads the system summary file. Specify only one file set.

-etdataCSV

Downloads a zipped file that contains one or more Easy Tier CSV files and an Excel tool that is used for the CSV files. (The CSV files are Microsoft Excel files.) The zipped file is downloaded to a directory that you specify. Specify only one file set.

-fcdata

Exports the Fibre Channel (FC) Connectivity report as a CSV file that contains information about all logged in FC connections. This includes connections to Open System hosts, IBM Z / LinuxONE servers, or other storage systems.

Note: The FC Connectivity report does not include information about ports that are in fenced or quiesced state.

-area general | ui | ettraces | etlogs | panic | prolongedIO

(Optional) The following options are available.

Note: The **-area** parameter is only valid when the **-pepackage** parameter is specified.

general

Offloads a general PE package to product support teams.

ui

Sends an ESSNI/DSGUI/API PE package to product support teams.

ettraces

Sends Easy Tier debug traces to product support teams.

etlogs

Sends an automatic mode performance log to product support teams.

panic

Sends a panic log to product support teams.

prolongedIO

Sends long I/O traces to product support teams.

Note: A general package is generated and offloaded when you do not choose a parameter.

-dumpfile filename1 [,filename2 ...]

(Optional) Offloads the dump files that you specify. When you do not specify the parameter, the most current file is offloaded.

-list

(Optional) Lists the dump files on both LPARs that you can offload. An error message displays when you use the **-list** parameter but do not specify the **-statesave** or **-odd** parameters.

-top number

(Optional) Displays the number of dump files that you specify. An error message displays when you use the **-top number** parameter but do not specify the **-statesave** or **-odd** parameters.

-showstatus

(Optional) Displays status when used with the **-pepackage**, **-statesave**, or **-odd** parameters. An error message displays when you use the **-showstatus** parameter but do not specify the **-statesave** or **-odd** parameters.

-hmc 1 | 2 | all

(Optional) Exports files from the HMC that you specify. "-hmc 1" specifies the primary HMC, and "-hmc 2" specifies the secondary HMC. The default value "all" specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system.

If **-pepackage** is specified, "-hmc all" is not allowed. If the "-hmc" parameter is not specified, the default value is the primary HMC(HMC1). This option is ignored if "statesave" or "-odd" is specified.

-quiet

(Optional) Turns off the confirmation prompt for replacing an existing file.

directory

(Required) The local directory path that is used as the destination for offloading files.

Note: The User Access Control (UAC) settings for Windows Vista and later, or Windows Server 2008 and later, might not allow for the export files. (that use the **offloadfile** command) to a directory that requires elevated privileges. Unfortunately, the Windows operating system returns success and the **offloadfile** command show a message that states that the files were exported successfully, but the files do not exist in the specified directory. To work around this problem, you use one of the following options.

- Select a different directory that does not require elevated privileges to create a file.
- Click the DSCLI desktop shortcut and select **Run as Administrator**.

Example 1: Exporting Easy Tier heat data

```
dscli> offloadfile -dev IBM.2107-75FA120 -etdata C:\temp
```

Output:

```
Offloadfile - The etdata file is offloaded to c:\temp\SF1300860ESS01_heat.data.  
Offloadfile - The etdata file is offloaded to c:\temp\SF1300860ESS11_heat.data.
```

Example 2: Exporting an SDO certificate

```
dscli> offloadfile -dev IBM.2107-75FA120 -sdocert C:\temp
```

Output:

```
CMUC00428I offloadfile - File for sdocert is successfully  
copied to C:\temp\SDOCertificate_2107-941-1300860_2011-01-26_09_37_54.
```

Example 3: Exporting the audit logs

```
dscli> offloadfile -dev IBM.2107-75FA120 -auditlog C:\temp
```

Output:

```
CMUC00428I offloadfile - File for auditlog is  
successfully copied to c:\temp\IBM.-2107-75FA120_auditlog_HMC1.log.
```

Example 4: Offloading the general package

```
dscli> offloadfile -dev IBM.2107-1300861 -pepackage
```

Output:

```
CMUC00497I offloadfile: Offloading request has been successfully submitted.  
The system will complete the request momentarily.
```

Example 5: Displaying the status of the PE package

```
dscli> offloadfile -dev IBM.2107-1300861 -pepackage -showstatus
```

Output:

```
CMUC00492I offloadfile: Offload task is running.
```

Example 6: Offloading configuration files

```
dscli> offloadfile -dev IBM.2107-1300861 -config -hmc 1 c:\temp
```

Output:

```
CMUC00428I offloadfile: The config file has been offloaded to C:\temp\productSettings.  
CMUC00428I offloadfile: The config file has been offloaded to C:\temp\ICSInstall.history.
```

Example 7: Offloading the performance summary CSV file

```
dscli> offloadfile -dev IBM.2107-1300861 -perfdata c:\temp
```

Output:

```
CMUC00428I offloadfile: The perfdata file has been offloaded to  
C:\temp\FORMATTED_PERF_SAMPLES_1300861.csv.
```

Example 8: Offloading the Easy Tier CSV files

```
dscli> offloadfile -dev IBM.2107-1300861 -etdataCSV C:/temp
```

Output:

```
CMUC00428I offloadfile: The etdataCSV file has been offloaded to C:/temp/  
et_data_20170319083810.zip.
```

Example 9: Offloading the system summary file

```
dscli> offloadfile -dev IBM.2107-1300861 -sysdata C:/temp
```

Output:

```
CMUC00428I offloadfile: The sysdata file has been offloaded to  
C:/temp/ 2107IBM.-1300861_StgSysSummary_20170317013659.csv
```

Example 10: Exporting the fibre channel connectivity report

```
dscli> offloadfile -dev IBM.2107-75DMC01 -fcdata C:\temp
```

Output:

Physical resource information commands

Commands are provided to view information about the physical resources in your storage complex.

The following physical resource information commands are available:

lsframe

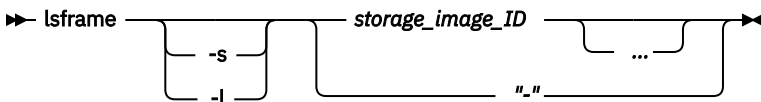
Generates a report that displays a list of the frame enclosures for a storage image.

lsserver

Displays all the servers in a storage complex or a list of specified servers. The displayed list also provides the status information for each server including the LIC version number, operating system version number, and bundle version.

lsframe

The **lsframe** command displays a list of frame enclosures for a storage image.



Parameters

-s

Displays the rack enclosure ID. You cannot use the **-l** and the **-s** parameters together.

-l

Displays default output plus the frame ID and location of the frame enclosure. You cannot use the **-l** and the **-s** parameters together.

storage_image_ID ... | -

Displays frame enclosure information for the specified storage image IDs. A storage image ID includes manufacturer, type, and serial number. You must separate multiple IDs with spaces. The ellipsis (...) indicates that, optionally, you can specify multiple values.

Note: ID ranges cannot be specified.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DSCLI interactive command mode.

Example

```
dsccli> lsframe -l IBM.2107-75FA120
```

Output

| ID | frm# | Frame | loc |
|---------------------|------|-------|---------------|
| IBM.2107-75FA120/R1 | R1 | 1 | U2107-75FA120 |
| IBM.2107-75FA120/R2 | R2 | 2 | U2107-75FA120 |

Output definitions

ID*

Unique identifier of the frame enclosure.

frm#

Frame number within a storage system that contains the specified frame enclosure.

Frame+

Unique identifier of the storage system equipment frame that contains the specified frame enclosure.

Loc+

Frame enclosure location.

The location format is *Uttt.mmm.ppsssss*.

Key:

*

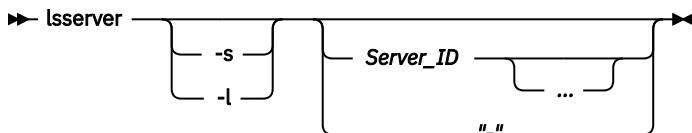
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

lsserver

The **lsserver** command displays all servers in a storage complex or a list of specified servers and it also displays the status information for each server in the list.



Parameters

-s

(Optional) Displays only the server ID. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output and the state of the servers. You cannot use the **-l** and the **-s** parameters together.

Server_ID ... | -

(Optional) Displays the server information for the specified server IDs. This parameter accepts a fully qualified server ID, which includes the storage image ID or a shortened version without the storage image ID. The shortened version is a two-digit decimal number with no leading zeros.

For example,

- IBM.2107-13AAV3A/0
- IBM.2107-13AAV3A/1

To specify a range of server IDs, separate the server IDs with a hyphen.

You must separate multiple server IDs or ranges of server IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying all servers in a storage complex or a list of specified servers, and status information for each server in the list

The following table represents the headers that are displayed on the output report that is associated with the **lsserver** command by using the **-l** parameter.

```
dscli> lsserver -l
```

The resulting output

| ID | Image ID | Image Name | Power Control SFI | State | LIC Version | OS Version | Bundle Version |
|-----------------------------|-----------------|----------------------------|--------------------------|--------------|--------------------|-------------------|-----------------------|
| IBM.2107 -75FA120 /00 | 1 | SF1300 3 20ESS0 1 | 0 | Online | 5.3.0.83 2 | - | - |
| IBM.2107 -75FA120 /01 | 1 | SF1300 3 20ESS1 1 | 0 | Online | 5.3.0.83 2 | - | - |

Output definitions

ID*

The unique identifier of the server. This value includes the storage image ID and the server ID.

Image ID

The image ID for the designated storage server.

Image Name

The image name for the designated storage server.

Power Control SFI

The storage server power control SFI.

State⁺

The current state of the designated server.

LIC Version

The LIC version for the designated storage server.

OS Version

The operating system version for the designated server.

Bundle Version

The bundle version for the designated storage server.

Key:

*

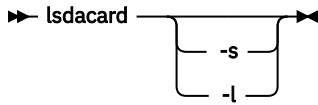
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

lsdacard

The **lsdacard** displays a list of device adapters (DA) for each storage system. You can use this command to display the status of each device adapter in the list.



Parameters

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying device adapters of a specified storage system

```
dscli> lsdacard
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

ID I/O enclosure  Frame  State
=====
6  4                1      Online

DA pair      Location code          S/N
=====
18           U1500.1B4.GUIBAY4-P1-C6  0089J283
```

Output definitions

ID

The ID number of the device adapter.

I/O enclosure

The number of the I/O enclosure that contains the device adapter.

Frame

The number of the frame that contains the device adapter.

State

The current state of the device adapter. One of the following values is displayed:

- Online
- Service in Progress
- Service Required Offline
- Service Required

Location code

A unique value that is assigned by the storage system to identify the component.

DA pair

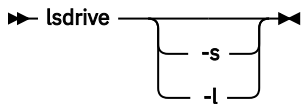
The serial number of the device adapter.

S/N

The serial number of the device adapter.

lsdrive

The **lsdrive** command displays detailed information for a list of drives.



Parameters

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying drives' detailed information

```
dscli> lsdrive
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641
ID Storage      Frame  State  Class          Capacity  Array
  enclosure
=====
0   G5           1      Normal Enterprise 15K  146 GB  MA1

Location                Interface  Firmware  S/N
=====
U2107.D02.RJ011KG-P1-D12 SAS        E207
```

Output definitions

ID

The drive number in the storage enclosure.

Storage enclosure

The ID of the storage enclosure that contains the drive.

Frame

The number of the frame that contains the drive.

State

The current state of the drive.

Array

The ID of the array that the drive belongs to.

Class

The class and speed of the drive.

Raw capacity

The raw capacity of the drive.

Interface

The type and speed of the interface that is used by the drive.

Firmware

The level of firmware that is installed on the drive.

Location code

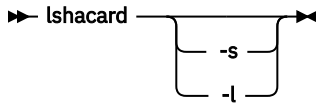
A unique value that is assigned by the storage system to identify the component.

S/N

The serial number of the drive.

lshacard

The **lshacard** displays a list of storage system host adapters enclosures and status information for each host adapter.



Parameters

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying host adapters of a specified storage system

```
dscli> lshacard
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

ID I/O      Frame State  Type    Speed  Fibre
  enclosure                                Channel
-----
1  5         1     Online Fibre   16 Gbps 4
Channel
                               (LW)

Encryption  Location          S/N
capable     code
-----
No          U1500.1B4.GUIBAY4-P1-C1 YM11RJ5CN034
```

Output definitions

ID

The ID number of the host adapter.

I/O enclosure

The number of the I/O enclosure that contains the host adapter.

Frame

The number of the frame that contains the host adapter.

State

The current state of the host adapter.

Type

The interface type of the host adapter.

Speed

The speed of the host adapter.

Fibre Channel ports

The number of Fibre Channel ports on the host adapter.

Encryption capable

The yes or no answer about the encryption capability of the host adapter.

Location code

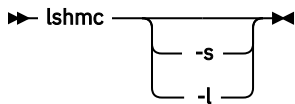
A unique value that is assigned by the storage system to identify the component.

S/N

The serial number of the host adapter.

lshmc

The **lshmc** command displays detailed information for a list of HMCs.

**Parameters****-s**

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying HMCs' detailed information

```
dscli> lshmc
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

Name      State   Role           Release
=====
R8gui1h2  Online  Secondary(2)   R8.5 bundle 88.51.45.0

Management IP   Location
=====
9.11.210.60     U8100LI7.P230143
```

Output definitions**Name**

The name of the HMC as defined by the user.

State

The status of the HMC.

Role

The version of the licensed machine code (LMC) installed on the HMC.

Release

The IP address for the host system of the HMC.

Management IP

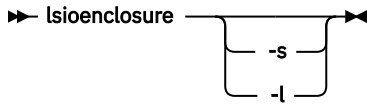
The primary or secondary HMC.

Location

A unique value that is assigned by the storage system to identify the component.

lsioenclosure

The **lsioenclosure** displays a list of storage enclosures and status information for each enclosure in the list.



Parameters

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying I/O enclosures of a specified storage system

```
dscli> lsioenclosure
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

ID   Frame  State      Host adapters  Device adapters
=====
4    1      Online     1              1

Location code      S/N
=====
U1500.1B4.GUIBAY4  GUIBAY4
```

Output definitions

ID

The enclosure number for the I/O enclosure.

Frame

The number of the frame that contains the I/O enclosure.

State

The current state of the I/O enclosure.

Host-adapters

The number of host adapters in the I/O enclosure.

Device adapters

The number of device adapters in the I/O enclosure.

Location code

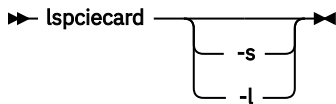
The serial number of the I/O enclosure.

S/N

A unique value that is assigned by the storage system to identify the component.

lspciocard

The **lspciocard** displays a list of PCIe cards for the storage system.



Parameters

- s**
(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.
- l**
(Optional) Displays the long output for the command.

Example: Displaying PCIe cards of the storage system

```
dscli> lspciocard
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

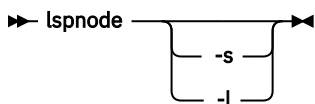
ID   State   S/N
=====
1    Online  0089J283
```

Output definitions

- ID**
The ID number for the PCIe card.
- State**
The current state of the PCIe card.
- S/N**
The serial number of the PCIe card.

lspnode

The **lspnode** command displays detailed information for a list of nodes.



Parameters

- s**
(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.
- l**
(Optional) Displays the long output for the command.

Example: Displaying nodes' detailed information

```
dscli> lspnode
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

ID   State                Release                Processor
=====
0    Service required     R8.5 bundle 88.51.45.0  Power8 (8-way)

Memory  Location
=====
64 GB   U78C9.001.WZS08VD
```

Output definitions

ID

The node identifier. There are two nodes on the storage system (Node 0 and Node 1).

State

The current state of the nodes.

Release

The version of the licensed machine code (LMC) or hardware bundle on the node.

Processor

The type and configuration of the processor on the node.

Memory

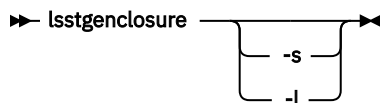
The amount of raw cache memory that is installed in the node.

Location

A unique value that is assigned by the storage system to identify the component.

lsstgenclosure

The **lsstgenclosure** displays a list of storage enclosures and status information for each enclosure in the list.



Parameters

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying storage enclosures' status information

```
dscli> lsstgenclosure
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLIDSLI Version: 0.0.0.0 DS: IBM.2107-75NR641

ID  Frame  State  Drive      Drive      Installed
=====
T1  1      Online Flash Tier 0 400 GB    05/28/2019
                                05:58:11 PM

Location                S/N
```

Output definitions

ID

The identification number of the storage enclosure.

Frame

The number of the frame that contains the storage enclosure.

State

The current state of the storage enclosure.

Drive class

The classification and speed of a drive in the storage enclosure.

Drive capacity

The raw capacity of the drives in the storage enclosure.

Installed

The time stamp that indicates when the storage enclosure was installed.

Location

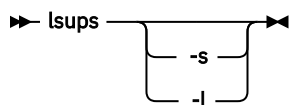
A unique value that is assigned by the storage system to identify the component.

S/N

The serial number of the storage enclosure.

lsups

The **lsups** displays a list of UPSs for the storage system.



Parameters

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

Example: Displaying UPSs of the storage system

```
dscli> lsups
```

Output

```
Date/Time: January 27, 2020 10:18:49 AM MST
IBM DSCLI Version: 0.0.0.0 DS: IBM.2107-75NR641

ID Frame State Input power EPLD Switch
=====
2 1 Online Single-phase Default Remote

Location S/N
=====
U2831.AE6.75DMC80-E2 0089J283
```

Output definitions

ID

The enclosure number for the UPS.

Frame

The number of the frame that contains the UPS.

State

The current state of the UPS.

Input power

The type of electric power that is supplied to the storage system.

EPLD

The extended power line disturbance protection feature. This option enables a storage facility to continue operation through a power outage that lasts either 4 seconds or 50 seconds, depending on the following settings:

Default

Operation can continue through a power outage that lasts up to 4 seconds

EPLD (50 sec)

Operation can continue through a power outage that lasts up to 50 seconds.

Switch

The setting of the physical local/remote power control switch that is on the back of the frame. The switch controls whether the system is to be turned off locally or by remote means.

Location

A unique value that is assigned by the storage system to identify the component.

S/N

The serial number of the UPS.

Remote event notification commands

Use the remote event notification commands to forward logs automatically and securely to a central repository for auditing.

The following remote event notification commands are available:

chsyslogserver

Modifies a Syslog server.

lssyslogserver

Displays a list of Syslog servers.

mksyslogserver

Creates a Syslog server.

rmsyslogserver

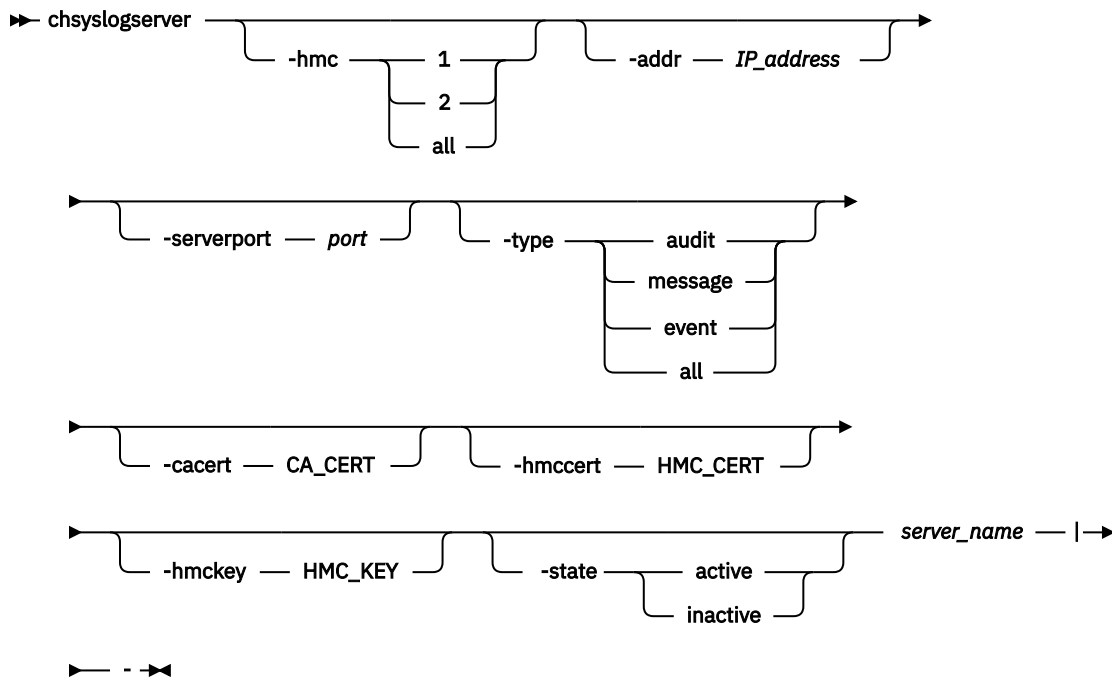
Removes a Syslog server.

chsyslogserver

The **chsyslogserver** command modifies a Syslog server.

Syslog servers for each HMC can be created separately. For the parameter **-hmc**, the default value all specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system. If any of HMCs fails, an error is returned and rollback is done on both HMCs.

Note: The **chsyslogserver** command cannot be run from the **Embedded DS CLI** window.



Parameters

`-hmc 1 | 2 | all`

(Optional) The HMC on which you want to modify the server.

- `-hmc 1` specifies the primary HMC
- `-hmc 2` specifies the secondary HMC.
- The default value **all** specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system.

`-addr IP_address`

(Optional) The TCP/IP address for the Syslog server.

`-serverport port`

(Optional) The communications port of the Syslog server. If you do not specify this parameter, the port of the Syslog server is not changed.

`-type audit | message | event | all`

(Optional) An array of one or more types of logs to be forwarded to the Syslog server. You can specify one or more types of logs, which are separated by commas.

audit

Specifies that audit log information is forwarded to the Syslog server.

message

Specifies that system messages are forwarded to the Syslog server.

event

Specifies that system event information is forwarded to the Syslog server.

all

Specifies that all types of logs (audit, message, and event) are forwarded to the Syslog server. The default value is **all**.

`-cacert CA_CERT`

(Optional) The location for CA certificates. This option is only valid when the protocol is TLS.

`-hmccert HMC_CERT`

(Optional) The location for HMC certificates. This option is only valid when the protocol is Transport Layer Security (TLS).

-hmckey HMC_KEY

(Optional) The location for HMC private keys. This option is only valid when the protocol is TLS.

-state active|inactive

(Optional) Whether the current server is active or not.

server_name | -

(Required) The Syslog server. Alternatively, the command accepts input from stdin when the dash (-) is specified.

Example: Modifying a Syslog server

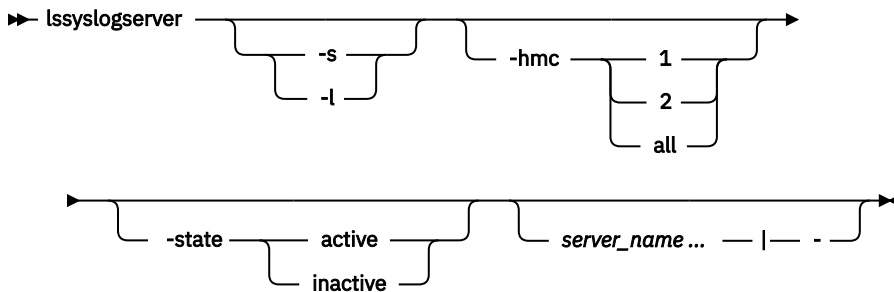
```
chsyslogserver -state active syslog_1
```

Output

```
Syslog server syslog_1 successfully modified.
```

lssyslogserver

The **lssyslogserver** command displays a list of Syslog servers.



Parameters

-s | -l

(Optional) Displays a shorter version of the command output. The output includes the server name, IP address, state, and HMC. This value is the default.

Note: The **-s** and **-l** parameters cannot be used together.

The optional **-l** (long) parameter displays default output plus more attributes.

-hmc 1 | 2 | all

(Optional) The HMC that you want to query.

- **-hmc 1** specifies the primary HMC
- **-hmc 2** specifies the secondary HMC.
- The default value **all** specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system.

-state active|inactive

(Optional) Whether the current server is active or not.

server_name | -

(Optional) The Syslog server. Alternatively, the command accepts input from stdin when the dash (-) is specified.

Example: Displaying a list of Syslog servers

```
dscli> lssyslogserver
```

Output

```
Fri Aug 17 17:23:49 PST 2017 IBM DSCLI Version 5.0.0.0 DS: IBM.2107-75A128
name      IP address      port    state    access    HMC
syslog1   9.100.75.7      514     active  online    2
syslog2   9.123.236.180  514     inactive online    1
```

Example: Displaying a list of Syslog servers

```
dscli> lssyslogserver -1
```

The resulting output

```
Fri Aug 17 17:23:49 PST 2016 IBM DSCLI Version 5.0.0.0 DS: IBM.2107-75A128
name      IP address      port    state    access    type      protocol  HMC
syslog1   9.100.75.7      514     active  online    audit     tls       2
syslog2   9.123.236.180  514     inactive online    event message  tls       1
```

Output definitions

name

Name of the Syslog server.

IP_address

IP address of the Syslog server.

port

Communication port of the Syslog server.

state

Whether the Syslog server is active or not.

access

Whether the Syslog server is accessible or not. Unknown displays when the information is not available.

protocol tcp | tls

Protocol type.

HMC

Which HMC forwards its audit log to the Syslog server. The primary HMC is indicated by "1" and the secondary is indicated by "2". The output displays this value only when you specify the -l parameter.

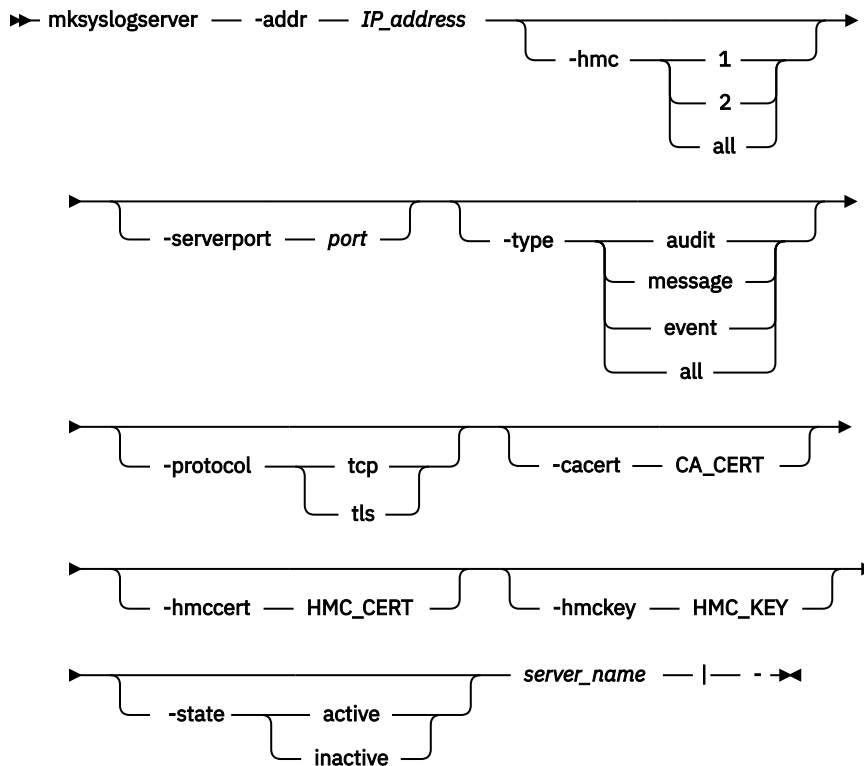
mksyslogserver

The **mksyslogserver** command creates a Syslog server.

Syslog servers for each HMC can be created separately. For the parameter **-hmc**, the default value all specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system. If any of HMCs fails, an error is returned and rollback is done on both HMCs.

Note: The **mksyslogserver** command cannot be run from the **Embedded DS CLI** window.

You can now forward one or more types of logs, including events and messages to the Syslog server.



Parameters

-addr *IP_address*

(Required) The TCP/IP address for the Syslog server.

-hmc **1** | **2** | **all**

(Optional) The HMC on which you want to forward audit logs.

- **-hmc 1** specifies the primary HMC
- **-hmc 2** specifies the secondary HMC.
- The default value **all** specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system.

-serverport *port*

(Optional) The communications port of the Syslog server. The default value is 514.

-type **audit** | **message** | **event** | **all**

(Optional) An array of one or more types of logs to be forwarded to the Syslog server. You can specify one or more types of logs, which are separated by commas.

audit

Specifies that audit log information is forwarded to the Syslog server.

message

Specifies that system messages are forwarded to the Syslog server.

event

Specifies that system event information is forwarded to the Syslog server.

all

Specifies that all types of logs (audit, message, and event) are forwarded to the Syslog server. The default value is **all**

-protocol tcp | tls

(Optional) The type of protocol. All Syslog servers that are configured for the storage system must use the same protocol. The protocols include the Transmission Control Protocol (TCP) specified with the **-tcp** parameter or the Transport Layer Security (TLS) specified with the **-tls** parameter.

If you specify TLS, all Syslog server configuration use the same following certificate files in all Syslog server configurations to ensure that Syslog messages are encrypted when processed on the server.

CA certificate file

Specified with the **-cacert CA_CERT** parameter.

HMC certificate file

Specified with the **-hmccert HMC_CERT** parameter.

HMC private key

Specified with the **-hmckey HMC_KEY** parameter.

Note: If this is the first Syslog server for the storage system and the protocol is TLS, the **-cacert**, **-hmccert**, and **-hmckey** parameters are required. If this Syslog server is not the first server defined for the storage system and its protocol is TLS, then do not specify the **-cacert**, **-hmccert**, and **-hmckey** parameters. Otherwise, the parameters will replace the existing ones on the HMCs.

-cacert CA_CERT

(Optional) The location for the CA certificates. This option is only valid when the protocol is TLS.

-hmccert HMC_CERT

(Optional) The location for the HMC certificates. This option is only valid when the protocol is TLS.

-hmckey HMC_KEY

(Optional) The location for the HMC private keys. This option is only valid when the protocol is TLS.

-state active | inactive

(Optional) Whether the current server is active or not.

server_name | -

(Required) The Syslog server. Alternatively, the command accepts input from stdin when the dash (-) is specified.

Example: Creating a Syslog server

```
dscli> mksyslogserver -ipaddr 9.110.75.7 -serverport 514 -type all syslog_1
```

Output

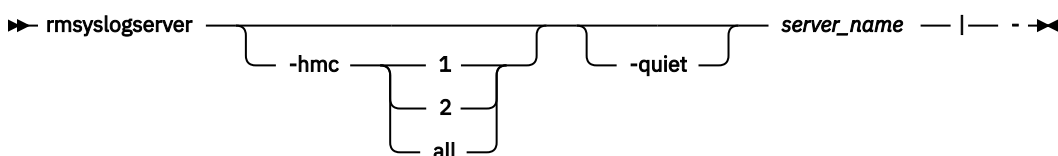
```
Date/Time: Sun Aug 11 02:23:49 PST 2016 IBM DSCLI Version: 5.0.0.0
DS: IBM.2107-75FA120
Syslog server syslog_1 successfully created.
```

rmsyslogserver

The **rmsyslogserver** command removes a Syslog server.

Note: A warning is displayed when the server to be deleted is active.

For parameter **-hmc**, the default value **all** specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system. If any of HMCs fails, an error is returned and rollback is done on both HMCs.



Parameters

-hmc 1 | 2 | all

(Optional) The HMC on which you want to delete a server.

- **-hmc 1** specifies the primary HMC
- **-hmc 2** specifies the secondary HMC.
- The default value **all** specifies the primary HMC on a single HMC system, and specifies both the primary and secondary HMCs on a dual HMC system.

-quiet

(Optional) Turns off the confirmation prompt for this command.

server_name| -

(Required) The Syslog server. Alternatively, the command accepts input from stdin when the dash (-) is specified.

Example: Removing a Syslog server

```
dscli> rmsyslogserver syslog_1
```

Output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DSCLI Version: 5.0.0.0  
DS: IBM.2107-75FA950 Syslog server syslog_1 successfully removed.
```

Resource Group commands

Commands that are used to specify policy-based limitations on the access and use of resources are referenced.

The following Resource Group commands are available:

chresgrp

Changes a resource group object on a storage image.

lsresgrp

Displays a list of resource group objects on the storage image.

manageresgrp

Manages the contents of a resource group object on a storage image.

mkresgrp

Creates a resource group object on a storage image.

rmresgrp

Removes a resource group object on a storage image.

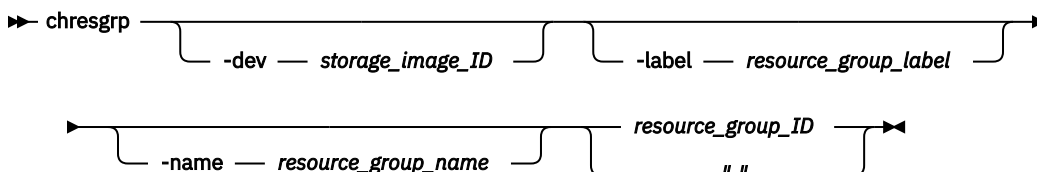
showresgrp

Displays detailed properties for an individual volume.

chresgrp

The **chresgrp** command is used to change a resource group object on a storage image.

Note: Resource Group 0 (zero) is predefined and cannot be created, deleted, or modified. By default, all resources belong to this group unless otherwise specified.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified resource group ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-label *resource_group_label*

(Optional) The resource group label. The resource group label is 1 to 32 characters and is limited to upper and lower case alphabetic and numeric characters, and the special characters (-, _), and (.). Label names must be unique.

-name *resource_group_name*

(Optional) Specifies the user-assigned nickname for this resource group object. The maximum length is 64 single-byte or 32 double-byte characters.

resource_group_ID | -

(Required) The resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number. If you use the dash (-), the specified value is read from standard input.

Example: Changing a resource group object on a storage image

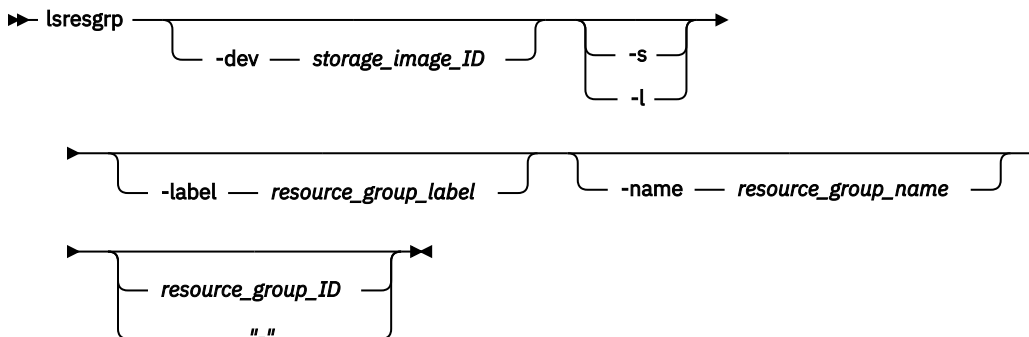
```
dscli> chresgrp -dev IBM.2107-75FA120 -name "A_Group" RG1
```

Output

```
Resource Group RG1 successfully modified.
```

lsresgrp

The **lsresgrp** command displays a list of resource group objects on the storage image.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-s

(Optional) Displays only the resource group IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays default output. You cannot use the **-l** and the **-s** parameters together.

-label *resource_group_label*

(Required) Displays the specified resource group label. The resource group label is 1 to 32 characters and is limited to upper and lower case alphabetic and numeric characters, and the special characters (-), (_), and (.).

-name *resource_group_name*

(Optional) Displays the specified user assigned nickname for this resource group object. The maximum length is 64 single-byte or 32 double-byte characters.

***resource_group_ID* | -**

(Optional) The resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number. If the resource group ID is not specified, one will be assigned. If you use the dash (-), the specified value is read from standard input.

Example: Displaying a list of resource group objects on the storage image

```
dscli> lsresgrp
```

Output

| ID | Name | State | Label |
|-----------|-----------------|--------------|----------------|
| RG1 | ProductA_admins | normal | Product_A |
| RG2 | ProductA_group1 | normal | Product_A.grp1 |
| RG3 | ProductA_group2 | normal | Product_A.grp2 |

Output definitions

ID*

Unique identifier that is assigned to this resource group ID.

name

Nickname that you assigned for this resource group object.

state

Current configuration state of this resource group. One of the following values is displayed:

Normal

The resource group is not being configured.

Configuring

The resource group is being configured.

Configuration Error

The resource group configuration process failed to complete successfully.

Deconfiguring

A resource group is in the process of being deleted.

Deconfiguration Error

The resource group deletion process failed to complete successfully.

Label

The resource group label. The resource group label is 1 to 32 characters and is limited to upper and lower case alphabetic and numeric characters, and the special characters (-), (_), and (.).

Key:

*

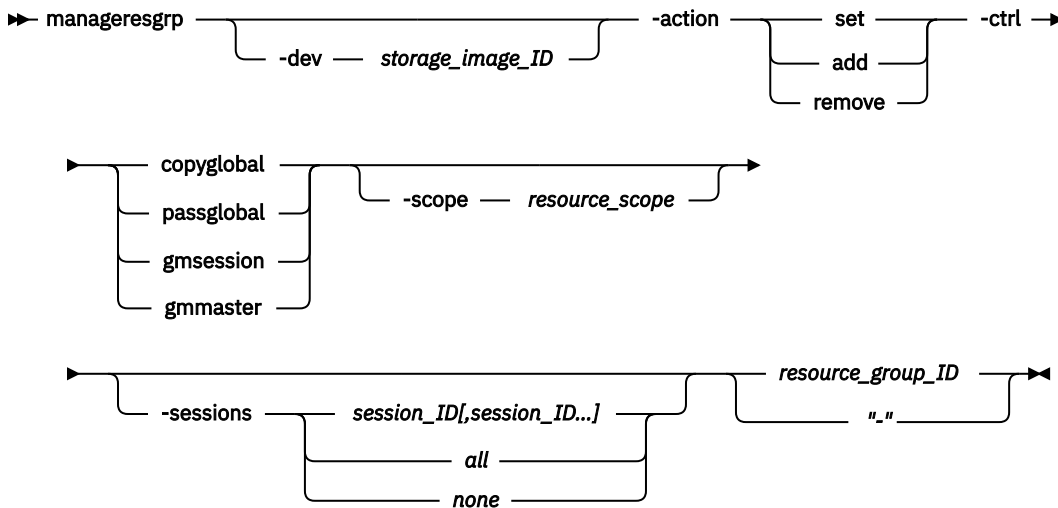
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

managersgrp

The **managersgrp** command allows you to manage the contents of any resource group object on a storage image, except resource group 0 (RG0). RG0 is predefined and cannot be created, deleted, or modified. By default, all resources belong to RG0 unless otherwise specified.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-action **set** | **add** | **remove**

(Required) The action to apply to the specified resource control.

set

Explicitly sets the value of a particular control to the specified value. For example, on the *copyglobal* control, it indicates that the Resource Scope specified by the **-scope** parameter replaces the existing value for the *copyglobal* control.

add

Adds the specified values to the existing values for a particular control. For example, on the **gmmaster** control, it indicates that the session IDs specified by the **-sessions** parameter are added to the existing list of session IDs that are allowed to be Global Mirror Master sessions for this resource.

remove

Removes the specified values from the existing values for a particular control. For example, on the **gmmaster** control, it indicates that the session IDs specified by the **-sessions** parameter are removed from the existing list of session IDs that are allowed to be Global Mirror Master sessions for this resource.

-ctrl **copyglobal** | **passglobal** | **gmmaster** | **gmssession**

(Required) The resource group control that is the object of the specified action. These controls can be physical (for example, a volume), logical (for example, a Global Mirror relationship), or they can be behavioral (for example, the allowed Copy Services behavior between two resources).

copyglobal

Copy Services Global Resource Scope (CS GRS). This resource scope applies to the Establish PPRC Pair (mkpprc) and Establish FlashCopy Pair (mkflash) operations that are issued from any source (a network user ID or a host system). The primary/source logical volume of the volume

pair verifies that the secondary/target logical volume is within the scope of the CS GRS in its associated resource group and the secondary/target logical volume of the volume pair verifies that the primary/source logical volume is within the scope of the CS GRS in its associated resources group. If either check fails, the requested operation is rejected.

passglobal

Pass-Through Global Resource Scope (PGRS). Some host-issued commands can be issued to a given logical volume but operate on a different logical volume or logical subsystem that is specified in the command parameters. In this case, the logical volume that receives the command is called the pass-through device and the logical volume or the logical subsystem that the command operates on is called the destination device (logical volume or logical subsystem). This resource scope applies to any Copy Services commands from any source (network user ID or a host system) that result in a pass-through operation. In this case, the resource group label of the destination device must be within the scope of the pass-through logical volume PGRS. Pass-through occurs for the following situations:

1. A Copy Services request is issued to a CKD logical volume that operates on either a fixed block logical volume or logical subsystem. In cases where the Copy Services request establishes a pair or a path, it is the primary/source logical volume or logical subsystem that the must be within the scope of the pass-through logical volume.
2. A Copy Service request is issued to a CKD logical volume that is a PPRC primary of a PPRC pair, the request specifies that the request is issued to the PPRC secondary of the PPRC pair, and the request operates on either a fixed block logical volume or logical subsystem. In cases where the Copy Services request establishes a pair or a path, it is the primary/source logical volume or logical subsystem that the must be within the scope of the pass-through logical volume.

gmmaster

Global Mirror Masters Allowed control, which specifies one or more session numbers whose associated global mirror master is allowed to be managed through an LSS or LCU associated with this resource group. Each global mirror session has one and only one master and it may be run on any storage image that has an LSS associated with the session. The Global Mirror Masters Allowed control allows the user to select which storage image the GM master for a given session is allowed to run on by allowing the GM master in a resource groups on one or more storage images and disallowing it in the resource groups on one or more other storage images. In order for a GM master to managed through an LSS or LCU associated with this resource group, both the Global Mirror Master Allowed and the Global Mirror Sessions Allowed controls must both allow the session number associated with the GM master.

gmsession

Global Mirror Sessions Allowed control, which specifies one or more session numbers that are allowed to be managed through an LSS or LCU associated with this resource group. Each LSS or LCU has one at most one assigned session number. The logical volumes associated with the LCU or LSS are either associated with the session number of the LCU or LSS, or with no session number. The Global Mirror Sessions Allowed control allows the user to partition the available GM session numbers between the set of resource groups that are each associated with a given tenant in a multi-tenancy environment.

-scope *resource_scope*

(Optional) The resource scope, which must meet the following criteria:

- Must be 1 to 32 characters long.
- The characters are limited to upper and lower-case alphabetic, numeric, and the special characters dash (-), underscore (_), and period (.).

Required when the **-ctrl** specifies *copyglobal* or *passglobal*.

-sessions *session_ID[,session_ID] | all | none*

(Optional) (Required when the **-ctrl** parameter specifies *gmmasterl* or *gmsession*.) One or more Global Mirror session IDs for the specified control. A Session ID is a hexadecimal number in the 01 - FF range. To specify a range of session IDs, separate the session IDs with a hyphen (-). You must

separate multiple session IDs or ranges of session IDs with a comma between each ID or range of IDs. If you specify **-sessions all**, session IDs 01-FF are used. If you specify **-sessions none**, no sessions are used.

resource_group_ID | -

(Optional) The resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number. If the resource group ID is not specified, one will be assigned. If you use the dash (-), the specified value is read from standard input.

The table below includes all of the valid combinations of the `managesgrp` command and parameter combinations and their effects on the storage system. Commands with the same control and action can be combined.

| managesgrp command | Effects |
|--|---|
| <code>-ctrl copyglobal -action set -scope (RS)</code> | All Copy Services tasks that establish, or re-establish, a relationship are subject to the specified resource scope (RS) |
| <code>-ctrl gmmaster -action add -sessions (list)</code> | Specifies (list) of Global Mirror sessions that are allowed to be a Global Mirror Master sessions for this resource. The specified list is added to any existing list for Global Mirror Master sessions. |
| <code>-ctrl gmmaster -action remove -sessions (list)</code> | Specifies (list) of Global Mirror sessions that are allowed to be a Global Mirror Master sessions for this resource. The specified list is removed from any existing list for Global Mirror Master sessions. |
| <code>-ctrl gmmaster -action set -sessions (list)</code> | Specifies (list) of Global Mirror sessions that are allowed to be a Global Mirror Master sessions for this resource. The specified list replaces any existing list for Global Mirror Master sessions. |
| <code>-ctrl gmsession -action add -sessions (list)</code> | Specifies (list) of Global Mirror sessions that are allowed to be a Global Mirror sessions for this resource. The specified list is added to any existing list for Global Mirror sessions. |
| <code>-ctrl gmsession -action remove -sessions (list)</code> | Specifies (list) of Global Mirror sessions that are allowed to be a Global Mirror sessions for this resource. The specified list is removed from any existing list for Global Mirror sessions. |
| <code>-ctrl gmsession -action set -sessions (list)</code> | Specifies (list) of Global Mirror sessions that are allowed to be a Global Mirror sessions for this resource. The specified list replaces any existing list for Global Mirror sessions. |
| <code>-ctrl passglobal -action set -scope (RS)</code> | All Copy Services tasks that establish, or re-establish, a relationship through a pass through device are subject to the specified resource scope (RS) |

Notes:

1. When a Copy Services command is rejected as a result of a resource group policy attribute, the indicated error code or error message specifies which resource involved in the operation has caused the operation to be rejected. As such, the policy that cause the rejection would be in the resource group that is associated with that resource. For example, an Establish PPRC Pair (`mkpprc`) operation causes a PPRC to be established between a primary volume A and a secondary volume B. If the request is rejected with an error that indicates that the primary volume has rejected the operation because of a target resource scope error, then it is the resource group of volume A that contains the `CS_GRS` parameter that caused the operation to be rejected.

- The combination of the CS_GRS and P_GRS controls allow the user to limit the set of resources that can be accessed by Copy Services operations issued to a given logical volume. A host (by volume group or other host dependent mechanism) or user ID (by URS) is limited to a specific set of connection logical volumes. The CS_GRS limits what target/secondaries the connection volume is allowed to have. The P_GRS limits what destination volumes can be accessed from either the connection volume or its associated secondary, when the command is issued to the secondary through the primary. For example a FICON host can only issue commands to volumes defined in the HCD of the host. If it issues a command to logical volume A that requests volumes A and B to establish a PPRC pair, the CS GRS in the RGs of volumes A and B are checked to see whether the relationship is allowed. If the relationship is established and the host then issues a command to the PPRC secondary that request that fixed block volumes C and D establish a flash copy pair, the PGRS of volume B is checked to see whether it allows volume B to passthrough to volume C, and then subsequently the CS_GRS in the RGs of volumes C and D are checked to see whether the relationship is allowed.

Example: Managing the contents of a resource group object on a storage image

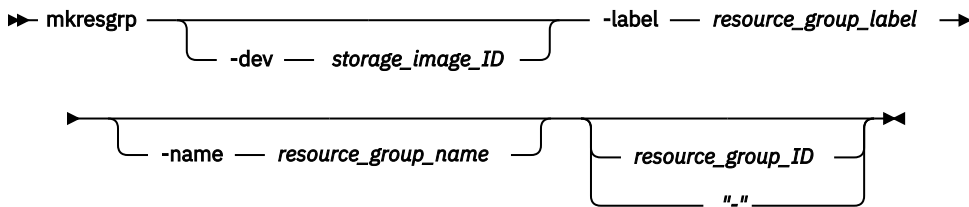
```
dscli> manageresgrp
-dev IBM.2107-75FA120 -action set -ctrl copyglobal -scope Product_A RG1
```

Output

```
Resource Group RG1 successfully modified.
```

mkresgrp

The **mkresgrp** command creates a resource group object on a storage image.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified resource group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-label resource_group_label

(Required) The resource group label. The resource group label is 1 to 32 characters and is limited to upper and lower case alphabetic and numeric characters, and the special characters (-, _), and (.). Resource group labels must be unique within the domain of the specified device.

-name resource_group_name

(Optional) The user assigned nickname for this resource group object. The maximum length is 64 single-byte or 32 double-byte characters.

resource_group_ID | -

(Optional) The resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number. If the resource group ID is not specified, one will be assigned. If you use the dash (-), the specified value is read from standard input.

Example: Creating a resource group object on a storage image

```
dscli> mkresgrp -dev IBM.2107-75FA120  
-label Product_A -name "A_Group" RG1
```

Output

```
CMUC00133I mkresgrp: Resource Group RG1 successfully created.
```

rmresgrp

The **rmresgrp** command removes a resource group object on a storage image.

Notes:

1. Resource Group 0 (zero) is predefined and cannot be created, deleted, or modified. By default, all resources belong to this group unless otherwise specified.
2. You cannot delete a resource group if there are resources still assigned to that resource group. For example, if a volume or LCU has a resource group ID of RG4, then you cannot delete RG4 until you remove those volumes or LCUs from the resource group.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified resource group ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-quiet

(Optional) Turns off the resource group removal confirmation prompt.

resource_group_ID | -

(Required) An array of one or more resource group IDs or resource group ID ranges to be removed. A resource group ID range is defined by two resource group IDs that are separated by a hyphen. Multiple resource group IDs or resource group ID ranges must be separated with a blank space between each ID.

The resource group ID begins with the letters *RG* and ends with a decimal number. If you use the dash (-), the specified value is read from standard input.

Example: Removing a resource group object on a storage image

```
dscli> rmresgrp -quiet -dev IBM.2107-75FA120 RG1
```

Output

```
Resource Group RG1 successfully deleted.
```

showresgrp

The **showresgrp** command displays detailed properties of a resource group.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

resource_group_ID | -

(Optional) The resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number. If the resource group ID is not specified, one will be assigned. If you use the dash (-), the specified value is read from standard input.

Example: Displaying detailed properties of a resource group

```
dscli> showresgrp RG1
```

Output

| Attribute | Value |
|---------------------|------------------|
| ID | RG1 |
| Name | Product_A.admins |
| State | Normal |
| Label | Product_A |
| CS_Global_RS | Product_A |
| Passthru_Global_RS | PUBLIC |
| GM_sessions_allowed | 01-FF |
| GM_masters_allowed | 7,20-2F,A0 |

Output definitions

ID

Unique identifier that is assigned to this resource group ID.

name

Nickname that you assigned for this resource group object.

state

Current configuration state of this resource group. One of the following values is displayed:

Normal

The resource group is not being configured.

Configuring

The resource group is being configured.

Configuration Error

The resource group configuration process failed to complete successfully.

Deconfiguring

A resource group is in the process of being deleted.

Deconfiguration Error

The resource group deletion process failed to complete successfully.

Label

Resource group label. The resource group label is 1 to 32 characters and is limited to upper and lower case alphabetic and numeric characters, and the special characters (-), (_), and (.).

CS_Global_RS

All of the Copy Services requests that establish or re-establish a relationship, and are subject to this resource scope including FlashCopy and PPRC relationships.

Passthru_Global_RS

All of the Copy Services requests that are issued though a pass-through logical volume are treated as a relationship between the pass-through logical volume and source logical volume and are subject to this resource scope.

GM_Sessions_Allowed

An array of Global Mirror session IDs that are allowed to be used for the volumes in this resource.

GM_Masters_Allowed

An array of Global Mirror session IDs that are allowed to be used as a master session for volumes in this resource.

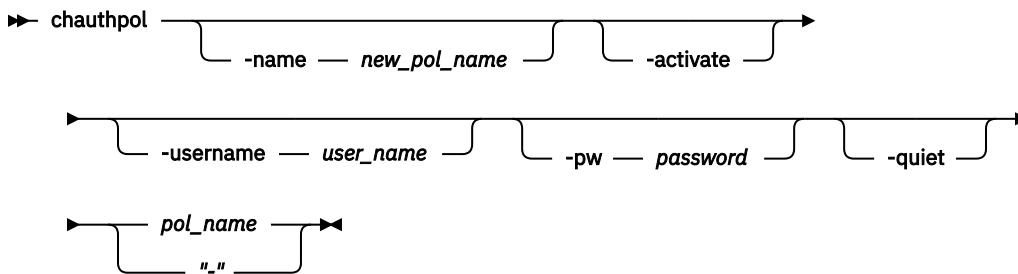
Security commands

Commands that are used to maintain security, including user accounts and security and private network security are provided for DS command-line interface.

chauthpol

The **chauthpol** command changes the general attributes of an authentication policy, such as the policy name and the activation state.

General attributes are attributes that apply to every policy type. To change specific attributes that apply only to some policy types, use the **setauthpol** command.



Parameters

-name new_pol_name

(Optional) The new name for the authentication policy. This parameter cannot be used with the **-activate** parameter.

-activate

(Optional) Activates the specified authentication policy. This parameter requires the **-username** and **-pw** parameters, and optionally the **-quiet** parameter. This parameter cannot be used with the **-name** parameter. To use this parameter, you must be logged in with the currently active authentication policy with storage administrator authority. The name that is specified by the **-username** parameter must have storage administrator authority in the specified authentication policy to be activated.

-username user_name

(Optional) A valid user name in the policy that is being activated.

Note: You must have administrator privileges in the current policy to modify the user name in the new policy.

This parameter is required when the **-activate** parameter is specified.

-pw password

(Optional) The password of the user name that is specified in the **-username** parameter.

Note: You must have administrator privileges in the current policy to modify the password in the new policy.

This parameter is required when the **-activate** parameter is specified.

-quiet

(Optional) Turns off the modification confirmation prompt for this command.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Changing the attributes of an authentication policy.

```
dscli> chauthpol -quiet -name my_policy1 my_policy_01
```

Output:

```
Authentication policy my_policy_01 successfully modified.
```

Example 2: Changing the attributes of an authentication policy.

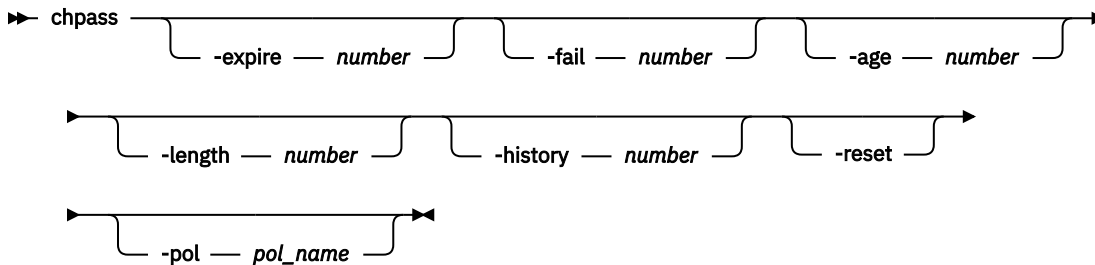
```
dscli> chauthpol -quiet  
-activate -username admin -pw test2 my_policy2
```

Output:

```
Authentication policy my_policy_2 successfully modified.
```

chpass

The **chpass** command changes the password expiration time, minimum password age, minimum password length, password history, and the number of login attempts for a basic user account.



Parameters

-expire number

(Optional) The number of days a user account password is valid before it expires and needs to be changed by the user. The default number of days is 90. If you do not want the password to expire, enter a value of zero. After the password expires, the user is not allowed to log in unless the password is changed.

Note: Though the expiration range is 0 - 9999, a nonzero must also be greater than or equal to the minimum age value. So, to avoid a possible password problem, do not allow the password to expire before you change the value. For example, assuming an age value of 7 (meaning you cannot change the password more than once a week), but the expiration is set to 5 days, there would be two days in which you could not use the account.

-fail number

(Optional) The number of login attempts allowed on any given user account. The number of login attempts can be zero to twenty-five. The default number of login attempts is 5. If you do not want a limit on the number of login attempts, enter zero. After the number of login attempts is exceeded, the user account is locked.

-age number

(Optional) The number of days that a user must wait before changing a password. A zero disables the age requirement of the password, and the default age is 1.

Note: The range is 0 - *expiration value*, inclusive. The real check is that the age value should not exceed the password expiration value, for the reason explained under the `-expire` parameter.

-length number

(Optional) The minimum length (from 6 to 64 characters) for passwords. The default is 8.

-history number

(Optional) The number of unique passwords (from 1 to 16) that a user must go through before reusing a password. The default is 8.

-reset

(Optional) Resets all of the password rule values to their default values.

Note: The `-reset` parameter can only be specified by itself and not with any other parameters.

-pol pol_name

(Optional) The name of the basic authentication policy. This parameter is optional if you have authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

Example: Defining password values for a user.

```
dscli> chpass -pol my_policy1  
-expire 20 -fail 0 -age 0 -length 8 -history 10
```

Output:

```
Password parameters with my_policy1 successfully changed.
```

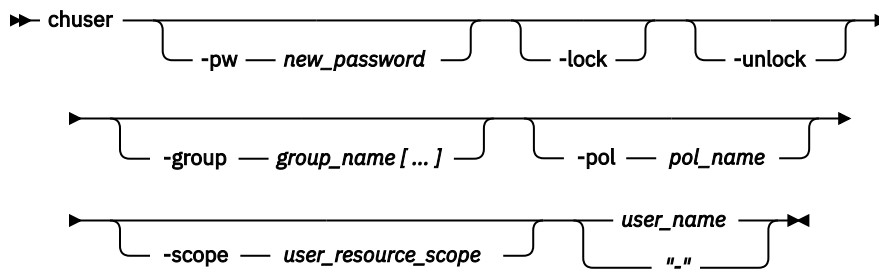
chuser

The **chuser** command modifies and locks or unlocks a DS CLI or a DS8000 Storage Management GUI basic user account.

All users can use this command to change their own password. However, users with administrator authority can use this command to update any user's account password to modify user group authority, or lock or unlock a user account. Users with administrator authority can also modify passwords and user groups that are based on IBM Engineering and IBM Service roles.

Users with security administrator authority can only modify the attributes of a user ID in the security administrator group role. Users with administrator authority can modify the attributes of a user ID in any user role except security administrator.

Note: When a person with administrator authority designates the password, the password is set to expire upon its initial use. The user of the password must use the **chuser** command to establish a new password before access to the rest of the DS CLI can be granted.



Parameters

-pw *new_password*

(Optional) The new designated password that is to be assigned to the user.

Notes:

1. When a person with administrator authority uses this parameter in association with the **-unlock** parameter, the new password is temporary and expires upon the initial use.
2. When a person without administrator authority uses this parameter, the new password becomes the valid password and replaces the prior password.

new_password

The new password.

The new password must meet the following criteria:

- Must be at least the minimum length as set by an administrator and no longer than 64 characters.
- Must contain at least two types of characters from the three groups: alphabetic, numeric, and symbols.
 - Allowable characters include a-z, A-Z, 0-9, and the symbols!@#\$%&*().
- Cannot contain the user ID of the user.

Note: If symbols are contained in your password, you might be required to enclose the password in quotation marks. This prevents any special interpretations or expansions by the operating system shell program.

Note: Even with a valid password, a user cannot interactively log in when all of the following conditions are present:

- The version of DS CLI used is pre-R6.1
- Entering the password without either the `-passwd` or `-pwfile` parameters
- The DS CLI is operating in the Windows (all versions) or NetWare environments
- The password contains anything other than alphabetic or numeric characters (that is, symbols)

But if any of these conditions are not present, then the user should not encounter any problems in logging in with a valid password.

-lock

(Optional) Locks a user account.

A person with administrator authority can use this parameter to lock a user account. The locking action occurs when the user authenticates the account. If a user is already active (authenticated) and is using the DS CLI, the lock does not occur until logout.

-unlock

(Optional) Unlocks a user account.

A person with administrator authority can use this parameter to unlock a user account when the user can no longer log in to the DS CLI. A person might not be able to log in to the DS CLI for the following reasons:

- The user forgot the password and in an attempt to log in went beyond the set number of allowable attempts. Going beyond the set limit locks the user account.

Note: When unlocking a user account for this scenario, the administrator must also assign a new password to the user using the **-pw** parameter. The new password is temporary and immediately expires after its initial use. The administrator must notify the user of this new password.

- Someone with administrator authority has locked the user account.

-group *group_name* [...]

(Optional) A user's access authority group or groups. A user can be assigned to many of the following user groups:

- admin (Administrator)
- ibm_engineering (Engineer)
- op_storage (Physical Operator)
- op_volume (Logical Operator)
- op_copy_services (Copy Services Operator)
- secadmin (Security Administrator)
- ibm_service (Service)
- monitor (Monitor)
- no_access (No Access)

-pol *pol_name*

(Optional) The name of the basic authentication policy. This parameter is optional if you have authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

-scope *user_resource_scope*

(Optional) The user resource scope, which must meet the following criteria:

- Must be 1 to 32 characters long
- The characters are limited to upper and lower case alphabetic, numeric, and the special characters, dash (-), underscore (_), and period (.). You can also define the scope as a single asterisk (*).

***user_name* | -**

(Required) The name of the user account.

Notes:

1. The administrator inserts the name of the user account that is affected by the changes (that is, group name, lock, or unlocking).
2. Users who are changing their passwords can insert their user names.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Changing a password.

```
dscli> chuser -pw xy0abcde testuser
```

Output:

```
User testuser successfully modified.
```

Example 2: Assigning a user group.

```
dscli> chuser -group ibm_service cuscus
```

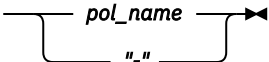
Output:

```
CMUC00134I User cuscus successfully modified.
```

cpauthpol

The **cpauthpol** command copies an existing authentication policy to a new policy. You can only copy a policy within the same storage complex. Copying between different storage complexes is not supported.

```
➔ cpauthpol -name new_pol_name pol_name
```



Parameters

-name new_pol_name

(Required) The new name for the (copied) authentication policy.

pol_name | -

(Required) The name of the existing authentication policy that is being copied. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Copying an existing authentication policy to a new policy.

```
dscli> cpauthpol -name my_policy4 my_policy2
```

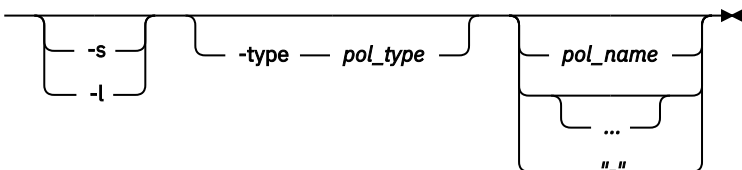
Output:

```
New authentication policy my_policy4 successfully copied.
```

lsauthpol

The **lsauthpol** command displays a list of all the authentication policies on the storage complex.

```
➔ lsauthpol
```



Parameters

-s

(Optional) Displays only the policy name. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional) Displays the default output and location. You cannot use the **-s** and the **-l** parameters together.

-type pol_type

(Optional) The type of authentication policy that you want to list. For example, SAS.

LDAP

Remote authentication through a direct connection to an LDAP repository.

SAS

The storage authentication service (SAS) authentication type uses the authentication service that is provided by the IBM System Storage Productivity Center.

RSA

The RSA authentication type provides Multi-Factor Authentication with RSA Authentication Manager Servers.

RSA+LDAP

The RSA+LDAP authentication type provides remote authentication through a direct connection to an LDAP repository plus Multi-Factor Authentication with RSA Authentication Manager Servers.

Basic

The Basic authentication type uses the storage system Basic authentication service.

***pol_name ...* | -**

(Optional) The name of the authentication policy that you want to list. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of all the authentication policies on the storage complex.

```
dscli> lsauthpol -l
```

Output:

| Name | Type | State | Location |
|------------------|----------|----------|---|
| Pol1 | SAS | inactive | http://yoursite.com |
| GUILDAPPolicy | LDAP | inactive | ldaps://ldapServer.com:636 |
| GUIRSALDAPPolicy | RSA+LDAP | active | ldaps://ldapServer.com:636, https://rsa.server.lab.com:5555 |
| GUIRSAPolicy | RSA | inactive | https://rsa.server.lab.com:5555 |
| initialPolicy | Basic | inactive | 9.11.155.155 |

Output definitions

Name*

The name of the authentication policy.

Type

The authentication policy type. For example, SAS, LDAP, or RSA.

State

The state of the authentication policy, either active or inactive.

Location*

Authentication server URL when policy type is SAS, LDAP, RSA, or RSA+LDAP. The HMC IP address when policy type is Basic. Multiple locations are separated by commas without spaces.

Key:

*

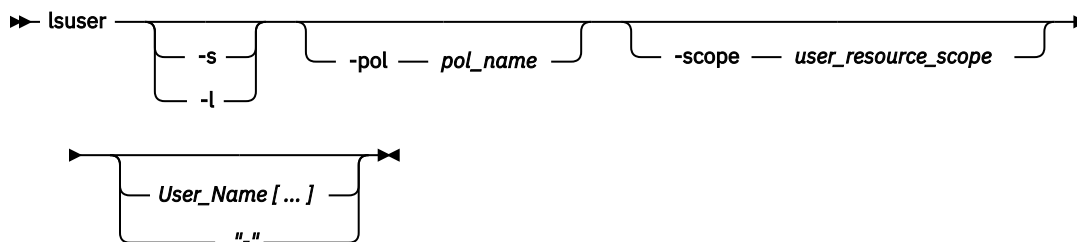
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

lsuser

The **lsuser** command returns a list of basic user account names and access authority levels.



Parameters

-s

(Optional) Displays only the user names. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output. You cannot use the **-l** and the **-s** parameters together.

-pol pol_name

(Optional) The name of the basic authentication policy. This parameter is optional if you authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

-scope user_resource_scope

(Optional) Displays only the user accounts that have the specified user resource scope. If you do not specify the scope, users with any user resource scope might be displayed.

User_Name ... | -

(Optional) Displays the user accounts with the specified user names. Separate multiple user names with a blank space between each name.

Example: Listing users associated with an authentication policy.

Note: For this command and all other DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as table.

```
dsccli> lsuser -l -pol my_policy1
```

Output:

| Name | Group | State |
|-------------|----------------------------|--------|
| admin | admin | active |
| engineering | ibm_engineering | active |
| inge | ibm_engineering | active |
| monitor | monitor | active |
| nick | op_volume,op_copy_services | active |
| noaccess | no_access | active |
| opvol | op_volume | active |
| physicalop | op_storage | active |
| robmel | admin | active |
| service | ibm_service | active |

Output definitions

Name*

The user name that is assigned to the user account.

Group

The access authority group of the user. One or more of the following group designations is displayed:

- admin (Administrator)
- secadmin (Security Administrator)
- ibm_engineering (Engineer)
- op_storage (Physical Operator)
- op_volume (Logical Operator)
- op_copy_services (Copy Services Operator)

- `ibm_service` (Service)
- `monitor` (Monitor)
- `no_access` (No Access)

State

The status of the user account for the designated user group, either active or locked.

Scope⁺

The user resource scope. A dash (-) is displayed if the storage unit does not support resource groups.

Key:

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

lsusergroup

The **lsusergroup** command displays user groups and permissions by user roles.

►► lsusergroup ◀◀

Parameters

This command has no parameters.

Example: Listing user groups and permissions by user roles.

```
dsccli> lsusergroup
```

Output:

```
Name
=====
123321
admin
ibm_engineering
ibm_service
monitor
no_access
op_copy_services
op_storage
op_volume
secadmin
```

Output definitions

Name

The name of the user group.

Roles

The user roles and the permissions by user role.

admin (Administrator)

This user role (also referred to as the storage administrator) has the highest level of authority. It allows a user to add or remove user accounts. This role has access to all service functions and storage system resources, and all system storage image resources except those functions that are reserved for Security Administrator users. Users in this role cannot be assigned to any other role, and users in any other role might not be assigned to this role.

The administrator role can name and define custom roles by selecting individual tasks that are permitted to each custom role. For example, the output of this command includes "123321," which is an example of a custom role created by the administrator.

ibm_engineering

This user role is typically assigned to IBM support personnel who perform all service functions and other functions that might be needed. This role does not have access to the logical configuration or data on the storage system.

ibm_service

This user role is typically assigned to IBM support personnel who service the hardware (install, remote, or repair) and update firmware. This role does not have access to the logical configuration or data on the storage system. Users in this role cannot be assigned to any other role, and users in any other role cannot be assigned to this role.

monitor

This user role has access to all read-only, non-security service functions and all storage system resources. Users in this role cannot be assigned to any other role, and users in any other role cannot be assigned to this role.

no_access

This user role has no access to any service functions or storage system resources. This role is the default selection and is assigned to a user account that is not associated with any other user role. Users in this role cannot be assigned to any other role, and users in any other role cannot be assigned to this role.

op_copy_services (Copy Services operator)

This user role has access to all Copy Services functions and resources, excluding security functions. This role might be assigned in combination with the Logical Operator role, but not in combination with any other role.

op_storage (Physical operator)

This user role has access to resources that are related to physical configuration, including storage complex, storage unit, storage image, management console, arrays, ranks, and extent pools. The Physical Operator role does not have access to security functions. Users in this role cannot be assigned to any other role, and users in any other role cannot be assigned to this role.

op_volume (Logical operator)

This user role has access to resources that relate to logical volumes, hosts, host ports, logical subsystems, and volume groups, excluding security functions. This role can be assigned in combination with the Copy Services Operator role, but not in combination with any other role.

op_volume + op_copy_services (Logical and copy operator)

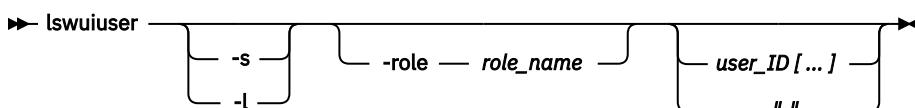
This user role includes the permissions for both the logical operator and copy operator roles. This role has access to resources that relate to logical volumes, hosts, host ports, logical subsystems, and volume groups, excluding security functions. This role also has access to all Copy Services functions and resources, excluding security functions.

secadmin (Security administrator)

This user role allows users to initiate recovery key operations, and add other users to this role. Users in this role cannot be assigned to any other role, and users in any other role cannot be assigned to this role.

lswuiuser

The **lswuiuser** command displays users who have access to the DS Service GUI on the HMC.



Parameters

-s

(Optional) Displays only the user IDs. You cannot use the **-l** and the **-s** parameters together.

-1

(Optional) Displays the default output. You cannot use the **-1** and the **-s** parameters together.

-role role_name

(Optional) Displays only users with access to the DS Service GUI on the HMC, with a specific task role. If you do not specify a task role, users with access to the DS Service GUI, with any task role, might be displayed.

user_ID ... | -

(Optional) Displays one or more user IDs of the users with access to the DS Service GUI on the HMC. Specify multiple user IDs with a blank space between each name.

Example: Displaying users who have access to the DS Service GUI on the HMC.

Note: For this command and all other DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as table.

```
dscli> lswuiuser -1
```

Output:

| User ID | Task Role | Authentication Type | Description |
|----------|-----------------|----------------------|-------------|
| PE | ibm_engineering | Local authentication | |
| CE | ibm_service | Local authentication | HMC user |
| Customer | | Local authentication | Customer |

Output definitions

User ID*

The user ID of the user on the DS Service GUI on the HMC.

If you specify the **-s** parameter, then this is the only column that displays.

Task Role

The task roles of the users that have access to the DS Service GUI on the HMC. This column displays with or without the **-1** parameter specified.

Authentication Type

The authentication type of the users that have access to the DS Service GUI on the HMC. This column displays with or without the **-1** parameter specified.

Description

The description that is associated with the user that has access to the DS Service GUI on the HMC. This column displays if you specify the **-1** parameter.

Key:

*

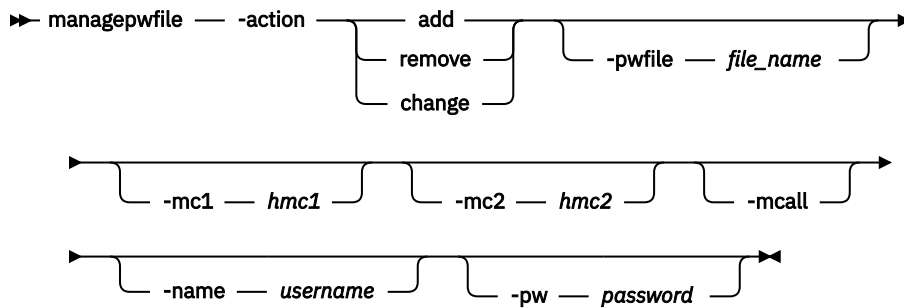
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-1** parameter is specified.

managepwfile

The **managepwfile** command manages a security file that contains passwords for any existing DS user account. This password security file can then be used with the **-pwfile** parameter of the **dscli** command instead of the **-passwd** parameter. Although using a security file is not required, it is strongly recommended as a more secure method of entering the user's password when invoking the **dscli** command. The security file method does not require entering the password on the command line, nor is it contained in any script files.



Parameters

-action

(Required) A process that is enacted on the password file. Specify one of the following options:

add

Creates an entry for the user and the specified primary HMC in the password file. If the password file does not exist, it will be created.

remove

Removes the password file entry for the designated user.

change

Changes the password file entry for the designated user.

-pwfile file_name

(Optional) The name for the password file. You can specify the password file as an absolute path or a relative path. The relative path is obtained from the current working directory.

-mc1 hmc1

(Optional) The DNS name or the IP address. *hmc1* designates the Model 2107 primary HMC, Model 1750 primary SMC, Model 2105 primary Copy Services server DNS or IP address.

Note: If you do not specify this parameter, the DS CLI will use the value that was specified for **-hmc1** in the current CLI session connection, or the default value, if specified, for HMC1 in your profile file. This value, as entered and converted to lower case, along with the value of the **-name** parameter is used as a key in the password file. If the values for **-mc1** and **-mc2** are equivalent, then only one key is generated.

-mc2 hmc2

(Optional) The DNS name or the IP address of the secondary HMC.

Note: If you do not specify this parameter, the DS CLI will use the value that was specified for **-hmc2** in the current CLI session connection, or the default value, if specified, for HMC2 in your profile file. This value, as entered and converted to lower case, along with the value of the **-name** parameter is used as a key in the password file. If the values for **-mc1** and **-mc2** are equivalent, then only one key is generated.

-mcall

(Optional) Any existing DNS name or IP address in the password file. The specified action is applied to any entry in the password file that is identified only by the **-name** value as the lookup key. You can use this parameter to change all of the passwords for a particular user in one command.

For the remove and change actions, you can specify this value instead of the **-mc1** parameter, the **-mc2** parameter, or both. For the add action, this parameter is ignored.

-name username

(Optional) The user name that you use to access the DS CLI. This information, along with the **-mc1** and **-mc2** parameter information, is used as keys in the password file.

-pw password

(Optional) A user-assigned password. The password is case-sensitive.

Notes:

1. The primary or secondary Storage Manager IP addresses, along with the user name, are used to form a key to locate the user's password in the security file. However, these values are stored as character strings. Therefore, either use the same string every time for the IP addresses, or use **managepwfile** to store all variations of the IP addresses. In other words, the IP address of 9.11.64.211 and the DNS name of myds.chicago.abc.com would form different keys even though they identify the same machine.
2. A password file is created with a user's default protection mask. The user can update the protection mask to allow access only to the owner of the file. Also, you must write down the directory name where the password file is contained in case you need to use it later.
3. The password file has a default value of `<user_home>/dscli/security.dat`.

The home directory `<user_home>` is defined by the Java system property named "user.home" The location of your password file is determined by your operating system. The following examples are home directories in different operating systems:

Windows XP operating system

For a Windows XP operating system, the property value defaults to the environment variable **%USERPROFILE%**. As a result, your personal profile is `C:\Documents and Settings\<username>\dscli\security.dat`.

UNIX or Linux operating system

For an UNIX or Linux operating system, the property value defaults to the environment variable **\$HOME**. As a result, your personal profile is `~/dscli/security.dat`.

i5/OS

For the i5/OS, your personal profile is `/home/<username>/dscli/security.dat`.

Note: The values of the Java system properties can be redefined by JRE options. If you are having problems, check to see whether you have an environment setting like the following on your local system:

```
_JAVA_OPTIONS=-Duser.home=...
```

4. In some circumstances this command might return more than one error/informational message.

Example: Managing a password security file.

```
dscli> managepwfile -action add -mc1 myess.ibm.com -mc2 myess2.ibm.com  
-name testuser -pw AB9cdefg
```

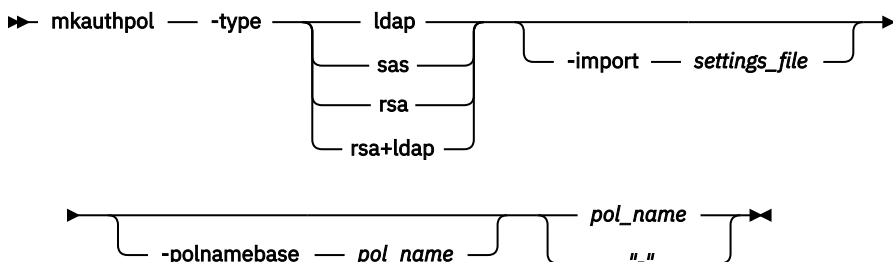
Output:

```
Record myess.ibm.com/testuser successfully added to password file  
c:\Documents and Settings\testuser\dscli\security.dat  
Record myess2.ibm.com/testuser successfully added to password file  
c:\Documents and Settings\testuser\dscli\security.dat
```

mkauthpol

The **mkauthpol** command creates an empty authentication policy.

After you create an authentication policy, use the **setauthpol** command to configure it, and the **chauthpol** command to enable it.



Parameters

-type *ldap* | *sas* | *rsa* | *rsa+ldap*

(Required) The authentication policy type.

ldap

Remote authentication through a direct connection to an LDAP repository.

sas

The storage authentication service (SAS) authentication type uses the authentication service that is provided by the IBM System Storage Productivity Center.

rsa

The RSA authentication type provides Multi-Factor Authentication with RSA Authentication Manager Servers.

rsa+ldap

The RSA+LDAP authentication type provides remote authentication through a direct connection to an LDAP repository plus Multi-Factor Authentication with RSA Authentication Manager Servers.

-import *settings_file*

(Optional) Imports the authentication policy settings file, which is available for LDAP authentication only. Specify the path and name for the file.

You can export the authentication policy settings file by using the **offloadauthpol** command.

polnamebase *pol name*

(Optional) This is required only for the RSA+LDAP policy type. The “*pol name*” is the LDAP policy that will be used to create the RSA+LDAP policy.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Creating an SAS authentication policy.

```
dscli> mkauthpol -type sas my_policyname
```

Output:

```
Authentication policy my_policyname successfully created.
```

Example 2: Creating an LDAP authentication policy.

```
dscli> mkauthpol -type ldap my_policyname
```

Output:

```
The authentication policy my_policyname has been created.
```

Example 3: Creating an RSA+LDAP authentication policy.

```
dscli> mkauthpol -type rsa+ldap -polnamebase ldap_pol_name my_policyname
```

Output:

```
The authentication policy my_policyname has been created.
```

Example 4: Importing an authentication policy settings file.

```
dscli> mkauthpol -import /tmp/settings.zip -type ldap my_policyname
```

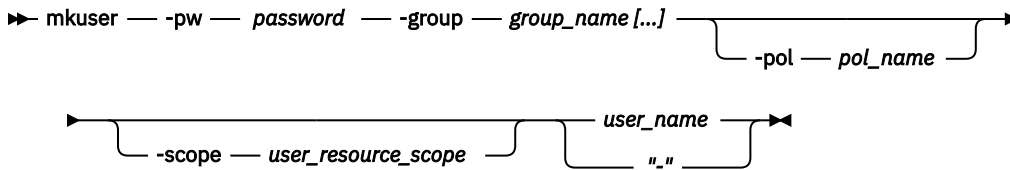
Output:

```
The authentication policy my_policyname has been imported.
```

mkuser

The **mkuser** command creates a DS CLI or a DS Storage Manager Basic authentication policy user account with a password and user group authority.

Only users with security administrator authority can create user IDs in the security administrator role and cannot create an ID in any other group role. A user with administrator authority can create user IDs in any group role except security administrator. A user with administrator authority can also create users with Service and Engineering roles, which are typically assigned to IBM support personnel.



Parameters

-pw password

(Required) The password that is assigned to the user that allows their use of the DS CLI command-line function. This password is temporary and expires after the initial use. The user must assign themselves a new password using the **chuser** command before they can use any other commands in the DS CLI.

password

The password that is assigned by the administrator to a user.

The password must meet the following criteria:

- Must be at least the minimum length as set by an administrator and no longer than 16 characters.
- Must contain at least two types of characters from the three groups: alphabetic, numeric, and symbols.
- Allowable characters are: a-z, A-Z, 0-9, and the symbols !@#\$%&*().
- Cannot contain the user ID of the user.

Note: If symbols are contained in your password, you might be required to enclose the password in quotation marks to prevent any special interpretations or expansions by the operating system shell program.

Note: Even with a valid password, a user cannot interactively login when all of the following conditions are present:

- The version of DS CLI used is pre-R6.1
- Entering the password without either the `-passwd` or `-pfile` parameters
- The DS CLI is operating in the Windows (all versions) or Netware environments
- The password contains anything other than alphabetic or numeric characters (that is, symbols)

But if any of these conditions is not present, then the user should not encounter any problems in logging in with a valid password.

-group group_name [...]

(Required) The user's access authority group.

- admin (Administrator)
- ibm_engineering (Engineer)
- op_storage (Physical Operator)
- op_volume (Logical Operator)
- op_copy_services (Copy Services Operator)

- secadmin (Security Administrator)
- ibm_service (Service)
- monitor (Monitor)
- no_access (No Access)

Note: An ellipsis [...] signifies that multiple comma-separated values can be specified.

-pol *pol_name*

(Optional) The name of the basic authentication policy. This parameter is optional if you have authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

-scope *user_resource_scope*

(Optional) The user resource scope, which must meet the following criteria:

- Must be 1 to 32 characters long
- The characters are limited to upper and lower case alphabetic, numeric, and the special characters, dash (-), underscore (_), and period (.). You can also define the scope as a single asterisk (*).

The default scope is * for users in both the administrator and the security administrator groups, and *PUBLIC* for users in all other authority groups.

Example: Product_A

Note: The user resource scope is matched to one or more resource group IDs that are assigned to resource groups. If the resource group ID of a resource group matches the user resource scope, the user is authorized to issue Copy Services requests to a logical volume, LSS, or LCU that is assigned to the resource group. To issue a Copy Services request to establish a volume pairing, an LSS-pairing, or LCU-pairing, the user must be authorized to access the source volume, source LSS, or source LCU, respectively. To issue a Copy Services request that operates on an LSS or LCU or has a session parameter, the user must be authorized to access that LSS or LCU.

***user_name* | -**

(Required) The user name of the new user that you are creating.

An account name must be between 1 and 64 characters in length and can include the alphanumeric characters (a-z, A-Z, 0-9), the period(.), the hyphen (-), the underscore (_), and letters from any other languages. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Creating a user account.

```
dscli> mkuser -pw AB9cdefg
-group service,op_copy_services -pol my_policy1 testuser
```

Output:

```
CMUC00133I mkuser: User testuser with my_policy1
successfully created.
```

Example 2: Creating a user account.

```
dscli> mkuser -pw ***** -group ibm_engineering ingeniero
```

Output:

```
CMUC00133I mkuser: User ingeniero successfully created.
```

offloadauthpol

The **offloadauthpol** command exports the active authentication policy settings into a compressed file (`settings.zip`). Available for LDAP authentication only. You can import the file with the **mkauthpol** command to create an authentication policy.

Note: The authentication policy settings file does not include the following information:

- Mappings for the security administrator (`secadmin`) role.
- The bind password.

► `offloadauthpol` — *file_path* ◄

Parameters

file_path

(Required) The path for the output file.

Example: Exporting the active authentication policy.

```
dscli> offloadauthpol /home/user/export
```

Output:

```
offloadauthpol: completed successfully.
```

rmauthpol

The **rmauthpol** command allows you to remove an authentication policy.

► `rmauthpol` — *-quiet* — *pol_name* ... | - — *"_"* ◄

Parameters

-quiet

(Optional) Turns off the removal confirmation prompt for this command.

pol_name ... | -

(Required) The name of the authentication policy that you want to remove. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Removing an authentication policy.

```
dscli> rmauthpol my_policy3
```

Output:

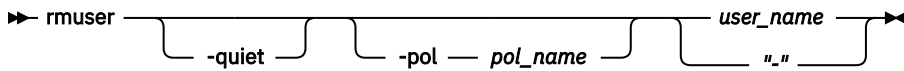
```
Are you sure you want to delete Authentication policy my_policy3? y/n y
```

```
Authentication policy my_policy3 successfully removed.
```

rmuser

The **rmuser** command removes a basic user account.

Only users with administrator authority can use this command to delete a user ID. Users with only security administrator authority can delete a user ID in the security administrator group role. Users with administrator authority can delete a user ID in any group role except security administrator.



Parameters

-quiet

(Optional) Turns off the removal confirmation prompt for this command.

-pol *pol_name*

(Optional) The name of the basic authentication policy. This parameter is optional if you authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

***user_name* | -**

(Required) The user name of the user account to be removed.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Removing a user account.

```
dscli> rmuser -pol my_policy1 testuser
```

Output:

```
Are you sure you want to delete User_Name testuser? y/n
Y
User_Name testuser within my_policy1 successfully deleted.
```

Example 2: Removing a user account.

```
dscli> rmuser engineering
```

Output:

```
Are you sure you want to delete user engineering? y/n
Y
User engineering successfully deleted.
```

Example 3: Removing a user account.

```
dscli> rmuser service
```

Output:

```
Are you sure you want to delete user service? y/n
Y
User service successfully deleted.
```

Example 4: Removing a user account.

```
dscli> rmuser ingeniero
```

Output:

```
Are you sure you want to delete user ingeniero? y/n
Y
User ingeniero successfully deleted.
```

setauthpol

The **setauthpol** command modifies policy attributes that apply to a specific type of authentication policy, changing the contents of the policy. To change attributes that are independent of the policy type, use the **chauthpol** command.

With the **setauthpol** command, you can map external users and groups to one or more authority groups and to a user resource scope. Only users with security administrator authority can map a user ID or group to the security administrator group role. Users with security administrator authority cannot be mapped to

any other group role. A user with administrator authority can map a user ID, or group, to any group role except security administrator.

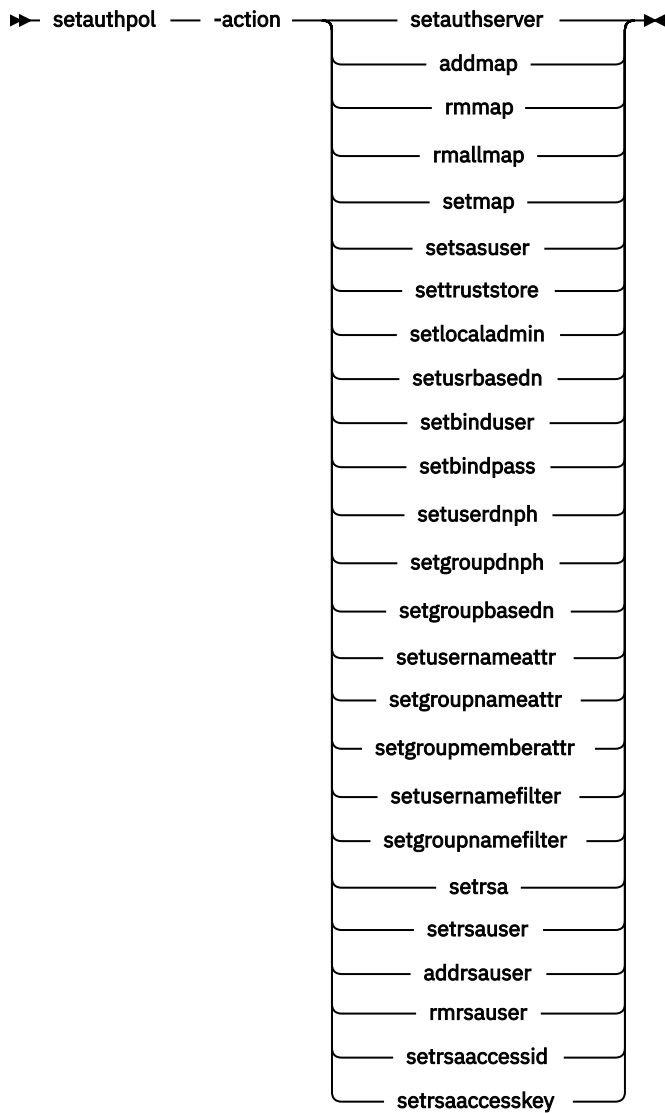
Note: The **setauthpol** command cannot be run from the **Embedded DS CLI** window.

Using the **setauthpol** command, storage administrators with global resource scope authority can enable or disable a local administrator for the authentication policy. The local administrator is a specified user account in the local security repository who can log in to the system when a given remote user directory policy is configured and the remote user directory server is not accessible.

Depending on the policy type and the action that is selected, all of the other parameters can vary in meaning. For this reason, the syntax diagrams and the parameter descriptions are separated by policy types and actions. If a parameter is not found under a specific policy type, then it does not apply to that policy type.

Notes:

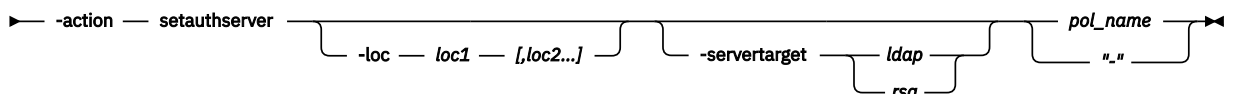
- You must have administrator or security administrator authority and a user resource scope of '*' in the current policy to use this command.
- If an external user belongs to several external groups that map to more than one user resource scope, other than DEFAULT, the user cannot log on unless there is also a mapping between the external user and one specific user resource scope.
- The previous parameters -groupmap and -usermap, used with the addmap, rmmmap, and setmap actions, are now deprecated but are still valid for use in commands. The new parameters -extgroup, -extuser, and -dsgroup replace the deprecated parameters, and cannot be used in the same command line with them.
- Multi-Factor Authentication policies like RSA and RSA+LDAP support mappings for users but does not support mappings for group.



Each of the following sections shows the options for one of the listed **-action** parameters:

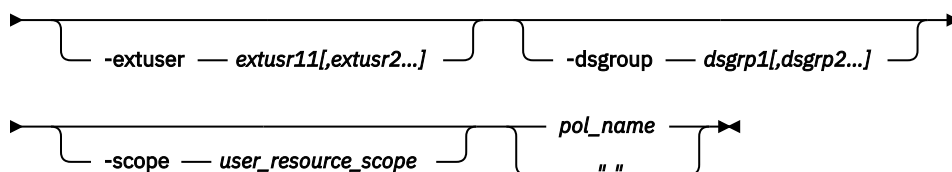
-action setauthserver

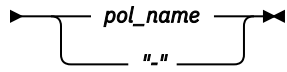
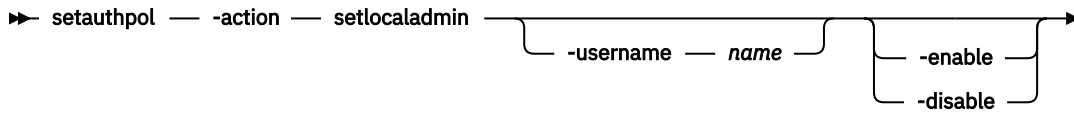
►► setauthpol →



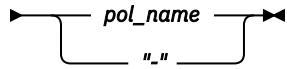
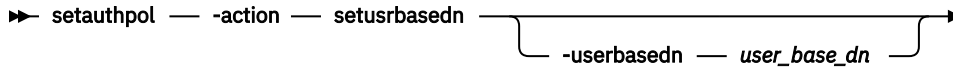
-action addmap

►► setauthpol -action addmap

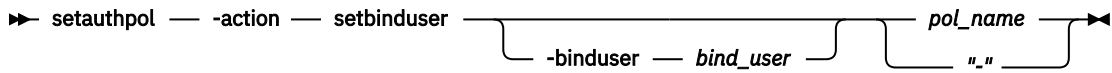




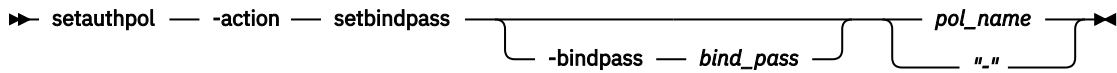
-action setusrbasedn



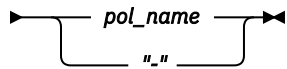
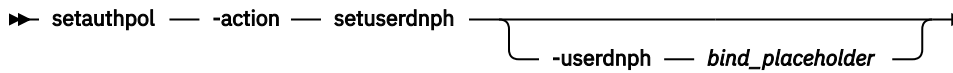
-action setbinduser



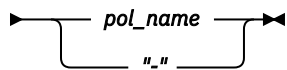
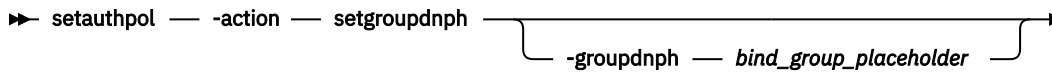
-action setbindpass



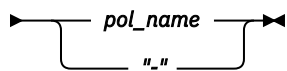
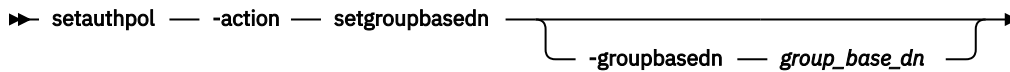
-action setuserdnph



-action setgroupdnph



-action setgroupbasedn



-action setusernameattr

Note: Any, or all, of the **-extgroup**, **-extuser**, **-dsgroup**, or **-scope** parameters can be used to remove all mapping pairs with any of the specified parameters. Any existing mappings that are not part of the specified parameters are not removed.

-action setmap

(Required) Maps external users or groups to storage system authority group roles. If previous mappings are defined, the *setmap* action replaces them. Use the *addmap* action to add new mappings without replacing previous versions. All unspecified roles are unchanged.

Note: Either the **-extgroup** or **-extuser** (or both) parameters can be used with either the **-dsgroup** or **-scope** (or both) parameters to set the mapping between the specified mapping pairs. Any existing mappings for the specified keyword pairs are replaced by the specified mapping.

-action setsasuser

(Required) The storage authentication service (SAS) user. Available for SAS authentication only.

-action settruststore

(Required) The location of the truststore file. You must specify the password to check the integrity of the keystore data, and to set the truststore.

In the location of truststore files, user should manually generate a Java Keystore(.jks) file containing

- the server certificate for RSA server while setting up RSA authentication policy using *settruststore* action parameter.
- the server certificate for LDAP server while setting up LDAP authentication policy using *settruststore* action parameter.
- the server certificate for RSA server and LDAP server while setting up RSA+LDAP authentication policy using *settruststore* action parameter.

-action setlocaladmin

(Required) A storage administrator with global resource scope authority can set a local administrator for the authentication policy. The local administrator is specified as the user account in the local security repository who can log in to the system when a given remote user directory policy is configured and the remote user directory server is not accessible.

-action setuserbasedn

(Required) The base distinguished name (DN) for user lookup. Available for LDAP authentication only.

-action setbinduser

(Required) The bind user name. Available for LDAP authentication only.

-action setbindpass

(Required) The password for the bind user. Available for LDAP authentication only.

-action setuserdnph

(Required) The placeholder for the bind user DN. Available for LDAP authentication only.

-action setgroupdnph

(Required) The placeholder for the bind group DN. Available for LDAP authentication only.

-action setgroupbasedn

(Required) The base distinguished name (DN) for group lookup. Available for LDAP authentication only.

-action setusernameattr

(Required) The name attribute for user lookup. Available for LDAP authentication only.

-action setgroupnameattr

(Required) The group name attribute for group lookup. Available for LDAP authentication only.

-action setgroupmemberattr

(Required) The group member attribute for group lookup. Available for LDAP authentication only.

-action setusernamefilter

(Required) The attributes for a user name filter. Enter a placeholder value such as {0} or {USERNAME}. Available for LDAP authentication only.

-action setgroupnamefilter

(Required) The attributes for a group name filter. Enter a placeholder value such as {0} or {GROUPNAME}. Available for LDAP authentication only.

-action setrsa

(Required) Disable or re-enable RSA authentication. Only applies to RSA+LDAP authentication policy type. If RSA authentication is disabled, LDAP authentication is still required. If RSA authentication is re-enabled, all existing RSA mappings are preserved.

-action setrsauser

(Required) Disable or re-enable RSA authentication for a user in the policy. Only applies to RSA+LDAP authentication policy type. If previous RSA SecurID users are defined, the setrsauser action replaces them. Use the addrsauser action to add new RSA SecurID users without replacing previous versions. If RSA SecurID authentication is disabled, LDAP authentication is still required.

-action addrsauser

(Required) Adds RSA SecurID users and disable or enable RSA authentication. Only applies to RSA+LDAP authentication policy type. If RSA SecurID authentication is disabled, LDAP authentication is still required.

-action rrsauser

(Required) Removes RSA SecurID users in the policy. Only applies to RSA+LDAP authentication policy type.

-action setrsaaccessid

(Required) Authentication identifier required for sending API authentication requests to RSA SecurID server. Available for RSA or RSA+LDAP authentication only.

Note: This is sensitive data that should be stored securely and shared only with other administrators.

-action setrsaaccesskey

(Required) Unique Key required for sending API authentication requests to RSA SecurID server. Available for RSA or RSA+LDAP authentication only.

Note: This is confidential data that should be stored securely and shared only with other administrators.

The following table includes all the valid combinations of actions and parameters and their effects on the storage system. One or more options from parameter group 1 must be specified. If any options are listed in parameter group 2, one or more of those options must also be specified.

| <i>Table 12. setauthpol action and parameter combinations</i> | | | |
|---|---|--|--|
| Action | Parameter group 1 | Parameter group 2 | Effects |
| addmap | -extgroup <i>extgrp1</i> [, <i>extgrp2</i>] -extuser <i>extusr1</i> [, <i>extusr2</i>] | -dsgrp <i>dsgrp1</i> [, <i>dsgrp2</i>] -scope <i>user_resource_scope</i> | Add mapping to existing maps |
| rmmap | -extgroup <i>extgrp1</i> [, <i>extgrp2</i>] -extuser <i>extusr1</i> [, <i>extusr2</i>] | -dsgrp <i>dsgrp1</i> [, <i>dsgrp2</i>] -scope <i>user_resource_scope</i> | Remove mapping from existing maps |
| rmallmap | -extgroup <i>extgrp1</i> [, <i>extgrp2</i>] -extuser <i>extusr1</i> [, <i>extusr2</i>] -dsgrp <i>dsgrp1</i> [, <i>dsgrp2</i>] -scope <i>user_resource_scope</i> | | Remove specified values from all existing maps |
| setauthserver | -loc <i>loc1</i> [, <i>loc2</i>] | | Set location of authentication server |
| setmap | -extgroup <i>extgrp1</i> [, <i>extgrp2</i>] -extuser <i>extusr1</i> [, <i>extusr2</i>] | -dsgrp <i>dsgrp1</i> [, <i>dsgrp2</i>] -scope <i>user_resource_scope</i> | Specify mapping to replace existing maps |

Table 12. *setauthpol* action and parameter combinations (continued)

| Action | Parameter group 1 | Parameter group 2 | Effects |
|--------------------|---|--------------------------|--|
| setsasuser | -username <i>name</i> | -pw <i>password</i> | Set SAS user name and password |
| settruststore | -loc <i>loc1</i> | -pw <i>password</i> | Set location and password of trust store file |
| setlocaladmin | -username <i>name</i> | -enable or -disable | Set the local administrator account of the specified authentication policy to enable or disable. |
| setuserbasedn | -userbasedn <i>user_base_dn</i> | | Set the base distinguished name (DN) for user lookup. |
| setbinduser | -binduser <i>bind_user</i> | | Set the bind user name. |
| setbindpass | -bindpass <i>bind_password</i> | | Set the password for the bind user. |
| setuserdnph | -userdnph <i>bind_placeholder</i> | | Set the placeholder for the bind user DN. |
| setgroupdnph | -groupdnph <i>bind_group_placeholder</i> | | Set the placeholder for the bind group DN. |
| setgroupbasedn | -groupbasedn <i>group_base_dn</i> | | Set the base distinguished name (DN) for group lookup. |
| setusernameattr | -usernameattr <i>user_name_attribute</i> | | Set the name attribute for user lookup. |
| setgroupnameattr | -groupnameattr <i>group_name_attribute</i> | | Set the name attribute for group lookup. |
| setgroupmemberattr | -groupmemberattr <i>group_member_attribute</i> | | Set the member attribute for group lookup. |
| setusernamefilter | -usernamefilter <i>user_name_filter</i> | | Set the attributes for a user name filter. |
| setgroupnamefilter | -groupnamefilter <i>group_name_filter</i> | | Set the attributes for a group name filter. |
| setrsa | -username <i>name</i> | -enable or -disable | Enable or disable MFA for the direct LDAP policy. |
| setrsauser | -extuser <i>extusr1</i> [, <i>extusr2</i>] | -enable or -disable | Enable or disable RSA SecurID for a user in the policy. |
| addrsauser | -extuser <i>extusr1</i> [, <i>extusr2</i>] | -enable or -disable | Adds RSA SecurID users to the authentication policy and enables or disables the user. |
| rmrsauser | -extuser <i>extusr1</i> [, <i>extusr2</i>] | | Removes a RSA SecurID user from the authentication policy. |

| Table 12. setauthpol action and parameter combinations (continued) | | | |
|--|-------------------------------------|-------------------|---|
| Action | Parameter group 1 | Parameter group 2 | Effects |
| setrsaaccessid | -rsaaccessid <i>rsa_access_id</i> | | Set the authentication identifier required for sending API authentication requests to RSA SecurID server. |
| setrsaaccesskey | -rsaaccesskey <i>rsa_access_key</i> | | Set the unique key required for sending API authentication requests to RSA SecurID server. |

Parameters, sorted by the selected action

Parameters for **-action setauthserver**:

-loc *loc1[,loc2...]*

(Optional) The URL location of the authentication servers. *loc1* and *loc2* are URLs specified as an IPv4, IPv6, or DNS-named IP address. Multiple locations are separated by commas without spaces.

SAS servers use the HTTPS protocol and port number 16311, both of which are specified in the URL. For example, `https://9.11.236.10:16311/TokenService/services/Trust`.

LDAP servers use the LDAP protocol if TLS 1.2 is not used (`ldap://hostname:port`) and the LDAPS protocol if TLS 1.2 is used (`ldaps://hostname:port`).

-servertarget *ldap | rsa*

(optional) Specifies the type of the authentication server to test. Inputs are either RSA or LDAP. If the user specifies RSA, the attributes for RSA authentication will be set. If the user specifies LDAP, the attributes for LDAP authentication will be set. Available only for RSA+LDAP authentication policy.

ldap

Remote authentication through a direct connection to an LDAP repository.

rsa

The RSA authentication type provides Multi-Factor Authentication with RSA Authentication Manager Servers.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setmap**:

-extgroup *extgrp1[,extgrp2...]*

(Optional) Maps storage system authentication group roles (**-dsgrupp**) and/or a user resource scope (**-scope**) to a specified list of external authentication group names (**extgrp**). Multiple group names are separated with commas without spaces. All unspecified external groups are unchanged.

Example: `ESS_ds1,ESS_ds2`

-extuser *extusr1[,extusr2...]*

(Optional) Maps storage system authentication group roles (**-dsgrupp**) and/or a user resource scope (**-scope**) to the specified list of external authentication user names (**extuser**). Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Example: `fred,sally`

-dsgrupp *dsgrp1[,dsgrp2...]*

(Optional) Lists storage system authentication group roles (**dsgrp**) that consist of one or more of the following role names: "admin", "secadmin", "op_storage", "op_volume", "op_copy_services", "monitor",

"no_access" "ibm_engineering", and "ibm_service". Multiple role names are separated with commas without spaces.

Note: The "ibm_engineering" and "ibm_service" roles cannot be combined with other existing roles. The DSCLI allows users to have multiple roles, but currently the only combination allowed is "op_volume" + "op_copy_services."

Example: op_volume,op_copy_services

-scope user_resource_scope

(Optional) The user resource scope, which must meet the following criteria:

- Must be 1 - 32 characters long
- The characters are limited to upper and lowercase, alphabetic, numeric, and the special characters, dash (-), underscore (_), and period (.). You can also define the scope as a single asterisk (*).

The default scope is * for users in the administrator and security administrator authority groups, and *PUBLIC* for users in all other authority groups.

Example: Product_A

Note: The user resource scope is matched to one or more resource group IDs that are assigned to resource groups. If the resource group ID of a resource group matches the user resource scope, the user is authorized to issue Copy Services requests to a logical volume, LSS, or LCU that is assigned to the resource group. To issue a Copy Services request to establish a volume pairing, an LSS-pairing, or LCU-pairing, you must be authorized to access the source volume, source LSS, or source LCU, respectively. To issue a Copy Services request that operates on an LSS or LCU or has a session parameter, you must be authorized to access that LSS or LCU.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action addmap**:

-extgroup extgrp1[,extgrp2...]

(Optional) Maps storage system authentication group roles (**-dsgrupp**) and user resource scope (**-scope**) to a specified list of external authentication group names (**extgrp**). Multiple group names are separated with commas without spaces. All unspecified external groups are unchanged.

Example: ESS_ds1,ESS_ds2

-extuser extusr1[,extusr2...]

(Optional) Maps storage system authentication group roles (**-dsgrupp**) and user resource scope (**-scope**) to the specified list of external user (**-extuser**). Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Note: Use of this parameter is not recommended for maintenance reasons.

Example: fred,sally

-dsgrupp dsgrp1[,dsgrp2...]

(Optional) Lists storage system authentication group roles (**dsgrp**) that consist of one or more of the following role names: "admin", "secadmin", "op_storage", "op_volume", "op_copy_services", "service", "monitor", and "no_access". Multiple role names are separated with commas without spaces.

Example: op_volume,op_copy_services

-scope user_resource_scope

(Optional) The user resource scope, which must meet the following criteria:

- Must be 1 - 32 characters long
- The characters are limited to upper and lower case alphabetic, numeric, and the special characters, dash (-), underscore (_), and period (.). You can also define the scope as a single asterisk (*).

The default scope is * for users in the administrator authority group, and *PUBLIC* for users in all other authority groups.

Example: Product_A

Note: The user resource scope is matched to one or more resource group IDs that are assigned to resource groups. If the resource group ID of a resource group matches the user resource scope, the user is authorized to issue Copy Services requests to a logical volume, LSS, or LCU that is assigned to the resource group. To issue a Copy Services request to establish a volume pairing, an LSS-pairing, or LCU-pairing, you must be authorized to access the source volume, source LSS, or source LCU, respectively. To issue a Copy Services request that operates on an LSS or LCU or has a session parameter, you must be authorized to access that LSS or LCU.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action rmmmap**:

-extgroup extgrp1[,extgrp2...]

(Optional) Unmaps storage system authentication group roles (**-dsgrupp**) and user resource scope (**-scope**) from a specified list of external authentication group names (**extgrp**). Multiple group names are separated with commas without spaces. All unspecified external groups are unchanged.

Example: ESS_ds1,ESS_ds2

-extuser extusr1[,extusr2...]

(Optional) Unmaps storage system authentication group roles (**-dsgrupp**) and user resource scope (**-scope**) from the specified list of external users (**-extuser**). Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Note: Use of this parameter is not recommended for maintenance reasons.

Example: fred,sally

-dsgrupp dsgrp1[,dsgrp2...]

(Optional) Lists storage system authentication group roles (**dsgrp**) that consist of one or more of the following role names: "admin", "secadmin", "op_storage", "op_volume", "op_copy_services", "service", "monitor", and "no_access". Multiple role names are separated with commas without spaces.

Example: op_volume,op_copy_services

-scope user_resource_scope

(Optional) The user resource scope, which must meet the following criteria:

- Must be 1 - 32 characters long
- The characters are limited to upper and lowercase alphabetic, numeric, and the special characters, dash (-), underscore (_), and period (.). You can also define the scope as a single asterisk (*).

The default scope is * for users in the administrator authority group, and *PUBLIC* for users in all other authority groups.

Example: Product_A

Notes:

1. The user resource scope is matched to one or more resource group IDs that are assigned to resource groups. If the resource group ID of a resource group matches the user resource scope, you are authorized to issue Copy Services requests to a logical volume, LSS, or LCU that is assigned to the resource group. To issue a Copy Services request to establish a volume pairing, an LSS-pairing, or LCU-pairing, you must be authorized to access the source volume, source LSS, or source LCU, respectively. To issue a Copy Services request that operates on an LSS or LCU or has a session parameter, you must be authorized to access that LSS or LCU.
2. When a scope mapping is removed from a **-extuser** or **-extgroup**, the default scope will still apply.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action rmallmap**:

-extgroup *extgrp1* [*extgrp2*...]

(Optional) Removes all maps with the specified external groups. Multiple group names are separated with commas without spaces. All unspecified external groups are unchanged.

Example: ESS_ds1,ESS_ds2

-extuser *extusr1* [*extusr2*...]

(Optional) Removes all maps with the specified external users. Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Note: Use of this parameter is not recommended for maintenance reasons.

Example: fred,sally

-dsgrp *dsgrp1* [*dsgrp2*...]

(Optional) Removes all maps with the specified storage system groups. Storage system authentication group roles (**dsgrp**) consist of one or more of the following role names: "admin", "secadmin", "op_storage", "op_volume", "op_copy_services", "service", "monitor", and "no_access". Multiple role names are separated with commas without spaces.

Example: op_volume,op_copy_services

-scope *user_resource_scope*

(Optional) Removes all maps with the specified scope. The user resource scope must meet the following criteria:

- Must be 1 - 32 characters long
- The characters are limited to upper and lower case alphabetic, numeric, and the special characters, dash (-), underscore (_), and period (.). You can also define the scope as a single asterisk (*).

The default scope is * for users in the administrator authority group, and *PUBLIC* for users in all other authority groups.

Example: Product_A

Notes:

1. The user resource scope is matched to one or more resource group IDs that are assigned to resource groups. If the resource group ID of a resource group matches the user resource scope, you are authorized to issue Copy Services requests to a logical volume, LSS, or LCU that is assigned to the resource group. To issue a Copy Services request to establish a volume pairing, an LSS-pairing, or LCU-pairing, you must be authorized to access the source volume, source LSS, or source LCU, respectively. To issue a Copy Services request that operates on an LSS or LCU or has a session parameter, you must be authorized to access that LSS or LCU.
2. When a scope mapping is removed from a **-extuser** or **-extgroup**, the default scope still applies.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setlocaladmin**:

-username *name*

(Optional) A user name in the local security repository. Only a storage administrator with global resource scope can be specified as the local administrator for a remote authentication policy.

-enable

(Optional) Enables the local administrator of the authentication policy.

-disable

(Optional) Disables the local administrator of the authentication policy.

The `-disable` parameter is not valid when specified with the `-enable` or `-username` parameters.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for an SAS policy type, sorted by the selected action

Parameters for **-action settruststore**:

-pw *password*

(Optional) The truststore password.

-loc *loc1*

(Optional) The local truststore file location. Only one truststore location can be specified. *loc1* is the full path name of the file that is stored on the local system.

Example: c:\mystore\trust.dat

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setsasuser**:

-username *name*

(Optional) The user name that is used internally by SAS (Storage Authentication Service). Only one user name can be specified.

-pw *password*

(Optional) The user name password that is used internally by SAS.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for LDAP authentication, sorted by the selected action

Parameters for **-action setbinduser**:

-binduser *name*

(Optional) The bind user name. Use `-binduser null` to remove a value.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setbindpass**:

-bindpass *password*

(Optional) The password for the bind user. Use `-bindpass null` to remove a value.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setuserdnph**:

-userdnph *bind_placeholder*

(Optional) The placeholder for the bind user DN. You must use either of the placeholders {USERNAME} or {0}, but you cannot use both placeholders in a string.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setgroupdnph**:

-groupdnph *bind_group_placeholder*

(Optional) The placeholder for the bind group DN. You must use either of the placeholders {GROUPNAME} or {0}, but you cannot use both placeholders in a string.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setuserbasedn**:

-userbasedn *user_base_dn*

(Optional) The base distinguished name (DN) for user lookup.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setgroupbasedn**:

-groupbasedn *group_base_dn*

(Optional) The base distinguished name (DN) for group lookup.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setusernameattr**:

-usernameattr *user_name_attribute*

(Optional) The name attribute for user lookup. Use `-usernameattr null` to remove a value.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setgroupmemberattr**:

-groupmemberattr *group_name_attribute*

(Optional) The group name attribute for group lookup. Use `-groupmemberattr null` to remove a value.

***pol_name* | -**

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setusernamefilter**:

-usernamefilter *user_name_filter*

(Optional) The attributes for a user name filter. Enter a placeholder value such as {0} or {USERNAME}. Use `-usernamefilter null` to remove a value.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setgroupnamefilter**:

-groupnamefilter *group_name_filter*

(Optional) The attributes for a group name filter. Enter a placeholder value such as {0} or {GROUPNAME}. Use `-groupnamefilter null` to remove a value.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for RSA or RSA+LDAP authentication policy type, sorted by the selected action

Parameters for **-action setrsa**:

-username *name*

(Optional) Sets a name for a user to the specified list of remote authentication user names. Use `-username null` to remove a value.

-enable

(Optional) Enables the multifactor authentication for a direct LDAP policy.

-disable

(Optional) Disables the multifactor authentication for a direct LDAP policy.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setrsauser**:

-extuser *extusr1[,extusr2...]*

(Optional) Sets the name for a user to the specified list of external authentication user names (**-extuser**). Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Example: fred,sally

-enable

(Optional) Enables the RSA SecurID authentication for a user.

-disable

(Optional) Disables the RSA SecurID authentication for a user.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action addrsauser**:

-extuser *extusr1[,extusr2...]*

(Optional) Adds the name for a user to the specified list of external authentication user names (**-extuser**). Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Example: fred,sally

-enable

(Optional) Enables the RSA SecurID authentication for a user.

-disable

(Optional) Disables the RSA SecurID authentication for a user.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action imrsauser**:

-extuser extusr1[,extusr2...]

(Optional) Removes the name of a user from the specified list of external authentication user names (**-extuser**). Multiple user names are separated with commas without spaces. All unspecified external users are unchanged.

Example: fred,sally

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setrsaaccessid**:

-rsaaccessid rsa_access_id

(Optional) Authentication identifier required for sending API authentication requests to RSA SecurID server. Sets the authentication identifier as *rsa_access_id* in RSA SecurID server.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Parameters for **-action setrsaaccesskey**:

-rsaaccesskey rsa_access_key

(Optional) Unique Key required for sending API authentication requests to RSA SecurID server. Sets the unique key *rsa_access_key* that is required for sending API requests to RSA SecurID server.

pol_name | -

(Required) The name of the authentication policy. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Creating a mapping between the external group 'Admins' and the storage system administrator role.

```
dscli> setauthpol -action addmap -extgroup Admins  
-dsgroup admin
```

Example 2: Removing all mappings between the external group 'Dept54' and all internal storage system groups and/or scope.

```
dscli> setauthpol -action rmallmap -extgroup Dept54
```

Example 3: Using the setauthpol1 command to modify the contents of the policy.

```
dscli> setauthpol -action rmallmap -extgroup Dept54
```

Example 4: Using action parameters for LDAP authentication.

```
dscli> setauthpol -action setuserbasedn -userbasedn o=ibm.com myLDAPPo1
```

```
dscli> setauthpol -action setbinduser -binduser uid=001016666,c=mx,ou=bluepages,O=IBM.COM myLDAPPo1
```

```
dscli> setauthpol -action setbindpass -bindpass 123456 myLDAPPo1
```

```
dscli> setauthpol -action setuserdnph -userdnph {USERNAME}@ibm.com myLDAPPo1
```

```
dscli> setauthpol -action setgroupdnph -groupdnph groupdnph=cn={0},cn=groups,o=company,0=com myLDAPPo1
```

```
dscli> setauthpol -action setgroupbasedn -groupbasedn o=group myLDAPPo1
```

```
dscli> setauthpol -action setusernameattr -usernameattr mail myLDAPPo1
```

```
dscli> setauthpol -action setgroupnameattr -groupnameattr cn myLDAPPo1
```

```
dscli> setauthpol -action setgroupmemberattr -groupmemberattr uniquemember myLDAPPo1
```

```
dscli> setauthpol -action setusernamefilter -usernamefilter (mail={xyz}) myLDAPPo1
```

```
dscli> setauthpol -action setgroupnamefilter -groupnamefilter (&(|  
(objectclass=groupOfUniqueNames)(objectClass=groupOfNames))(cn={0})) myLDAPPo1
```

Example 5: Using action parameters to disable and re-enable RSA in an RSA+LDAP authentication policy

```
dscli> setauthpol -action setrsa -disable nldap01
```

```
dscli> setauthpol -action setrsa -enable nldap01
```

showauthpol

The **showauthpol** command displays detailed properties of a specified authentication policy.

```
► showauthpol -map -revmap pol_name
```

Parameters

-map

(Optional) Displays tables with mappings of Basic authorization group roles and user resource scopes to external groups and users in the specified policy. No table is displayed if there are no mapping relationships in the specified policy.

Note: The **-map** and **-revmap** parameters cannot be used together.

-revmap

(Optional) Displays tables with mappings of external groups and users to Basic authorization group roles and user resource scopes in the specified policy. No table is displayed if there are no mapping relationships in the specified policy.

Note: The **-map** and **-revmap** parameters cannot be used together.

pol_name | -

(Required) The name of the authentication policy that you would like to view. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying the detailed properties of a specified authentication policy.

```
dscli> showauthpol my_policy2
```

Output for an SAS policy:

| | |
|-------------------|---------------------------|
| name | my_policy2 |
| type | SAS |
| state | inactive |
| location | 9.11.xxx.xxx |
| truststore | my_policy2_trustStore.jks |
| sasuser | - |
| localAdmin | admin |
| localAdminEnabled | Enabled |

Output for an LDAP policy:

| | |
|-------------------|---|
| name | my_policy2 |
| type | LDAP |
| state | active |
| location | ldaps://ldapServer.com:636 |
| truststore | bluep.jks |
| binduser | - |
| bindpass | - |
| userdnph | - |
| groupdnph | - |
| userbasedn | o=ibm.com |
| groupbasedn | - |
| usernameattr | mail |
| groupnameattr | cn |
| groupmemberattr | uniquemember |
| usernamefilter | - |
| groupnamefilter | (&((objectclass=groupOfUniqueNames) (objectClass=groupOfNames))(cn={0}) |
| localAdmin | admin |
| localAdminEnabled | Enabled |

Example 2: Displaying the detailed properties of a specified authentication policy by using the -map parameter.

```
dscli> showauthpol -map my_policy2
```

Output:

| | |
|------|------------|
| name | my_policy2 |
|------|------------|

| | |
|-------------------|---------------------------|
| type | SAS |
| state | inactive |
| location | 9.11.xxx.xxx |
| truststore | my_policy2_trustStore.jks |
| sasuser | - |
| localAdmin | admin |
| localAdminEnabled | Enabled |

=====**Role Group Maps**=====

| DS_group | Ext_group |
|------------------|------------------|
| op_volume | grpa,grpb |
| op_copy_services | grpa,grpb |

=====**Role User Maps**=====

| DS_group | Ext_user |
|-----------------|-----------------|
| admin | joe,bob |
| no_access | bob |

=====**Scope Group Maps**=====

| Scope | Ext_group |
|--------------|------------------|
| Accounting | grpa |
| Purchasing | grpb |

=====**Scope User Maps**=====

| Scope | Ext_user |
|--------------|-----------------|
| * | bob |
| Accounting | joe |

Example 3: Displaying the detailed properties of a specified authentication policy by using the -revmap parameter.

dscli> showauthpol -revmap my_policy2

Output:

| | |
|-------------------|---------------------------|
| name | my_policy2 |
| type | SAS |
| state | inactive |
| location | 9.11.xxx.xxx |
| truststore | my_policy2_trustStore.jks |
| sasuser | - |
| localAdmin | admin |
| localAdminEnabled | Enabled |

=====**Role Group Maps**=====

| Ext_group | DS_group |
|------------------|----------------------------|
| grpb | op_volume,op_copy_services |
| grpa | op_volume,op_copy_services |

=====**Role User Maps**=====

| Ext_user | DS_group |
|-----------------|-----------------|
| bob | admin,no_access |
| joe | admin |

=====**Scope Group Maps**=====

| Ext_group | Scope |
|------------------|--------------|
| grpb | Purchasing |
| grpa | Accounting |

=====**Scope User Maps**=====

| Ext_user | Scope |
|-----------------|--------------|
| bob | * |
| joe | Accounting |

Example 4: Displaying the detailed properties of a specified RSA authentication policy

dscli> showauthpol GUIRSAPolicy

Output:

| | |
|-------------------|------------------------------------|
| name | GUIRSAPolicy |
| type | RSA |
| state | inactive |
| location | https://rsa.server.ibm.com:5555 |
| truststore | /home/hscroot/jks/rsa_trustore.jks |
| localAdmin | admin |
| localAdminEnabled | Enabled |
| accessID | ***** |
| accessKey | ***** |

Example 5: Displaying the detailed properties of a specified RSA+LDAP authentication policy

dscli> showauthpol bothpol

Output:

| | |
|-------|----------|
| name | bothpol |
| type | RSA+LDAP |
| state | inactive |

| | |
|-------------------|---|
| location | https://rsa.server.ibm.com:5555, ldaps:// ldapServer.com:636 |
| truststore | /home/hscroot/jks/rsa_trustore.ks, bp.jks |
| binduser | - |
| bindpass | - |
| userbasedn | o=ibm.com |
| groupbasedn | - |
| usernameattr | mail |
| groupnameattr | cn |
| groupmemberattr | uniquemember |
| usernamefilter | (mail={0}) |
| groupnamefilter | (&((objectclass=groupOfUniqueNames) (objectClass=groupOfNames))(cn={0}) |
| userdnph | - |
| groupdnph | - |
| localAdmin | - |
| localAdminEnabled | Disabled |
| ldapPolicyID | ldappol_PROCESSED |
| rsaEnabled | Disabled |
| accessID | ***** |
| accessKey | ***** |

=====Role User Maps=====

| Ext_user | DS_group | RSA_SecurID |
|----------|-----------------|-------------|
| bob | admin,no_access | Enable |
| joe | admin | Disable |

Output definitions

For a basic policy type, the following properties are displayed:

name

The name of the authentication policy.

Example : SAS | LDAP | Basic | RSA | RSA+LDAP

type

The authentication policy type.

state

The state of the authentication policy (active or inactive).

location

The names or IP addresses of the Hardware Management Consoles that were used when users logged in. If users logged in from more than one location, a list of locations is displayed, separated by commas.

expire

The number of days a user account password is valid before it expires.

age

The minimum days a user must wait before changing a password.

fail

The number of login attempts allowed on any given user account.

length

The minimum length of a password.

history

The number of unique passwords that a user must go through before reusing a password.

localAdmin

The user name that is used as the local administrator.

Note: A dash (-) means that the local administrator was not available.

localAdminEnabled

Indicates whether the local administrator is enabled.

For an LDAP type policy, the following properties are displayed:

name

The name of the authentication policy.

type

The authentication policy type.

Example : SAS | LDAP | Basic | RSA | RSA+LDAP

state

The state of the authentication policy (active or inactive).

location

The names or IP addresses of the Hardware Management Consoles that were used when users logged in. If users logged in from more than one location, a list of locations is displayed, separated by commas.

truststore

The truststore file name.

binduser

The BIND user name. If a value was not set or a null value was entered, a dash (-) is displayed.

bindpass

The password for the BIND user. If a value was not set or a null value was entered, a dash (-) is displayed.

userdnph

The placeholder for the bind user DN. If a value was not set or a null value was entered, a dash (-) is displayed.

groupdnph

The placeholder for the bind group DN. If a value was not set or a null value was entered, a dash (-) is displayed.

userbasedn

The base distinguished name (DN) for user lookup.

groupbasedn

The base distinguished name (DN) for group lookup.

usernameattr

The name attribute for user lookup. If a value was not set or a null value was entered, a dash (-) is displayed.

groupnameattr

The name attribute for group lookup. If a value was not set or a null value was entered, a dash (-) is displayed.

groupmemberattr

The member attribute for group lookup. If a value was not set or a null value was entered, a dash (-) is displayed.

usernamefilter

The attributes for a user name filter. If a value was not set or a null value was entered, a dash (-) is displayed.

groupnamefilter

The attributes for a group name filter. If a value was not set or a null value was entered, a dash (-) is displayed.

localAdmin

The user name that is used as the local administrator.

Note: A dash (-) means that the local administrator was not available.

localAdminEnabled

Indicates whether the local administrator is enabled.

For a SAS type policy, the following properties are displayed:

name

The name of the authentication policy.

type

The authentication policy type.

Example : SAS | LDAP | Basic | RSA | RSA+LDAP

state

The state of the authentication policy (active or inactive).

location

The URL for the authentication server. Multiple locations are separated by commas.

truststore

The truststore file name.

sasuser

The user name used internally by SAS (Storage Authentication Service).

localAdmin

The user name that is used as the local administrator.

Note: A dash (-) means that the local administrator was not available.

localAdminEnabled

Indicates whether the local administrator is enabled.

For RSA type policy, the following properties are displayed:

name

The name of the authentication policy.

type

The authentication policy type.

Example : SAS | LDAP | Basic | RSA | RSA+LDAP

state

The state of the authentication policy (active or inactive).

location

The URL for the authentication server. Multiple locations are separated by commas.

truststore

The truststore file name.

localAdmin

The user name that is used as the local administrator.

Note: A dash (-) means that the local administrator was not available.

localAdminEnabled

Indicates whether the local administrator is enabled.

accessID

An identifier of the API Access Key used to send authentication requests to an RSA SecurID server. It is unique to the API Access Key and it is generated by the SecurID Super Admin when enabling API authentication.

accessKey

The unique passcode that is used in combination with access identifier when sending authentication requests to an RSA SecurID server. It is generated by the SecurID Super Admin when enabling API authentication.

For a RSA+LDAP type policy, the following properties are displayed:

name

The name of the authentication policy.

type

The authentication policy type.

Example : SAS | LDAP | Basic | RSA | RSA+LDAP

state

The state of the authentication policy (active or inactive).

location

The names or IP addresses of the Hardware Management Consoles that were used when users logged in. If users logged in from more than one location, a list of locations is displayed, separated by commas.

truststore

The truststore file name.

binduser

The BIND user name. If a value was not set or a null value was entered, a dash (-) is displayed.

bindpass

The password for the BIND user. If a value was not set or a null value was entered, a dash (-) is displayed.

userbasedn

The base distinguished name (DN) for user lookup.

groupbasedn

The base distinguished name (DN) for group lookup.

usernameattr

The name attribute for user lookup. If a value was not set or a null value was entered, a dash (-) is displayed.

groupnameattr

The name attribute for group lookup. If a value was not set or a null value was entered, a dash (-) is displayed.

groupmemberattr

The member attribute for group lookup. If a value was not set or a null value was entered, a dash (-) is displayed.

usernamefilter

The attributes for a user name filter. If a value was not set or a null value was entered, a dash (-) is displayed.

groupnamefilter

The attributes for a group name filter. If a value was not set or a null value was entered, a dash (-) is displayed.

userdnph

The placeholder for the bind user DN. If a value was not set or a null value was entered, a dash (-) is displayed.

groupdnph

The placeholder for the bind group DN. If a value was not set or a null value was entered, a dash (-) is displayed.

localAdmin

The user name that is used as the local administrator.

Note: A dash (-) means that the local administrator was not available.

localAdminEnabled

Indicates whether the local administrator is enabled.

ldapPolicyID

The name of the direct LDAP remote authentication policy.

rsaEnabled

Indicates the status of RSA SecurID activation for the LDAP policy as enabled or disabled.

accessID

An identifier of the API Access Key used to send authentication requests to an RSA SecurID server. It is unique to the API Access Key and it is generated by the SecurID Super Admin when enabling API authentication.

accessKey

The unique passcode that is used in combination with access identifier when sending authentication requests to an RSA SecurID server. It is generated by the SecurID Super Admin when enabling API authentication.

The **-map** and **-revmap** are mutually exclusive, but both display the mapping from external users and groups to storage system user role groups and user resource scopes. The **-map** parameter displays this information from the storage system point of view and is useful for answering questions like, "Which external users and groups map to the storage system role group administrator?" The **-revmap** parameter displays the same information, but from the external point of view and is useful answering questions like, "Which storage system user role groups and user resource scope map to the external group Human_Resources?"

The following additional properties are displayed when the **-map** parameter is specified:

Role Group Maps**DS_group**

Displays the name of the storage system authority group. The user authority group can consist of one or more of one of the following roles: admin, secadmin, op_storage, op_volume, op_copy_services, service, monitor, or no_access.

Ext_group

Displays the external groups that are mapped to each selected storage system authority group. Multiple external group names are separated by commas.

Role User Maps**DS_group**

Displays the name of the storage system authority group. The user authority group can consist of one or more of the following roles: admin, op_storage, op_volume, op_copy_services, service, monitor, or no_access.

Ext_user

Displays the external users that are mapped to each selected storage system authority group. Multiple external user names are separated by commas.

RSA_SecurID

Displays the external users who are enabled or disabled to authenticate from the RSA SecurID authentication manager. Only applies to RSA+LDAP authentication policy type.

Scope Group Maps

Scope

Displays the user resource scope.

Ext_group

Displays the external group names that are mapped to each user resource scope. Multiple external group names are separated by commas.

Scope User Maps

Scope

Displays the user resource scope.

Ext_user

Displays the external users that are mapped to each user resource scope. Multiple external user names are separated by commas.

The following additional properties are displayed when the **-revmap** parameter is specified:

Role Group Maps

Ext_group

Displays one or more external group names.

DS_group

Displays the storage system authority group names that are mapped to each external group name. Multiple external group names are separated by commas.

Role User Maps

Ext_user

Displays one or more external users.

DS_group

Displays the storage system authority group names that are mapped to each external group name. Multiple external group names are separated by commas.

Scope Group Maps

Ext_group

Displays the name of the storage system authority group. The user authority group can consist of one or more of the following roles: admin, op_storage, op_volume, op_copy_services, service, monitor, or no_access.

Scope

Displays the user resource scope that is mapped to each external group name.

Scope User Maps

Ext_group

Displays the name of the storage system authority group. The user authority group can consist of one or more of the following roles: admin, op_storage, op_volume, op_copy_services, service, monitor, or no_access.

Scope

Displays the user resource scope that is mapped to each external group name.

showpass

The **showpass** command lists the properties of passwords.

```
► showpass -pol pol_name ◀
```

Parameters

-pol *pol_name*

(Optional) The name of the basic authentication policy. This parameter is optional if you have authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

Example: Listing password properties.

```
dscli> showpass -pol my_policy1
```

Output:

```
dscli> showpass
Password Expiration  90 days
Failed Logins Allowed 5
Password Age         1 days
Minimum Length      8
Password History     8
```

Output definitions

Password Expiration

The number of days all user account passwords are valid before they expire.

Note: In the **showuser** command, the DaysToExpire field displays the number of days a particular user account password will be valid before it expires.

Failed Logins Allowed

The number of login attempts allowed on any given user account.

Password Age

The minimum days a user must wait before changing a password.

Minimum Length

The minimum length of a password.

Password History

The number of unique passwords that a user must go through before reusing a password.

showuser

The **showuser** command displays details for basic user accounts.

A CLI user who has administrative authority uses this command to display the properties (group assignment, user account status and number of failed logins) that are associated with a current user account.

```
➤ showuser _____ User_Name _____
      |_____| |_____|
      -pol  pol_name  "."
```

Parameters

-pol *pol_name*

(Optional) The name of the basic authentication policy. This parameter is optional if you have authenticated with a 'basic' authentication policy type, but it is required if you are authenticated with another type of authentication policy.

User_Name | -

(Required) The name of the user account .

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying details for user accounts.

```
dscli> showuser -pol my_policy1 testuser
```

Output:

For this command and all other DS CLI show commands, the results are shown in table format for clarity. The actual reports do not display as tables.

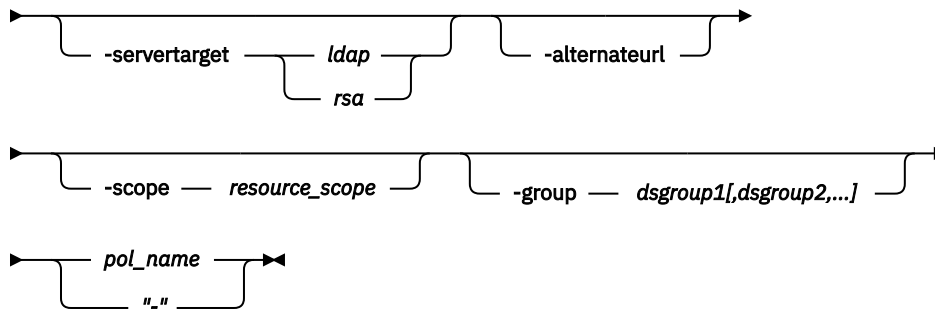
The following table represents the headers that are displayed on the output reports that are associated with the **showuser** command.

| Column Header | Description |
|---------------|---|
| Name | Name of the user that you have queried. |
| Group | The user's access authority group. One or more of the following group designations is displayed: <ul style="list-style-type: none">• admin (Administrator)• secadmin (Security Administrator)• op_storage (Physical Operator)• op_volume (Logical Operator)• op_copy_services (Copy Services Operator)• service (Service Operator)• monitor (Monitor)• no_access (No Access) |
| State | The status of the user account for the specified user group, either active or locked. |
| FailedLogin | Count of login failures since the last successful login for this user. This number resets to 0 with each successful login. |
| DaysToExpire | The number of days a user account password is valid before it expires. Note: A dash (-) means the field is unsupported on the server. 9999 means the password expiration function is disabled. |
| Scope | The user resource scope. A dash (-) is displayed if the storage unit does not support resource groups. |

testauthpol

The **testauthpol** command allows you to test the specified authentication policy.

► **testauthpol** — **-username** — *user_name* — **-pw** — *password* —►



Parameters

-username *user_name*

(Required) The user name for the authentication policy that is being tested. For example, if the current policy is Policy1 and you want to test Policy2, then you must be logged in with an administrator user account in Policy1, and provide a valid user name and password for Policy2.

-pw *password*

(Optional) The password for the user name in the policy being tested. The **-pw** parameter is still required for SAS, Basic, and LDAP type policies.

-servertarget *ldap* | *rsa*

(optional) Specifies the type of the authentication server to test. Inputs are either RSA or LDAP. If the user specifies RSA, the RSA authentication will be tested. If the user specifies LDAP, the LDAP authentication will be tested.

LDAP

Remote authentication through a direct connection to an LDAP repository.

RSA

The RSA authentication type provides Multi-Factor Authentication with RSA Authentication Manager Servers.

-alternateurl

(Optional) The parameter directs the authentication test to the alternative remote authentication server address.

-scope *resource_scope*

(Optional) The expected scope that the user is associated with. The test will succeed if the user is associated with the scope. The scope mappings can be set and changed using the **setauthpol** command.

-group *dsgroup1[,dsgroup2,...]*

(Optional) The expected groups that the user belongs to. The test will succeed if the user is part of each of the specified groups. The group mappings can be set and changed using the **setauthpol** command.

pol_name | **-**

(Required) The authentication policy that you want to test. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Testing a specified authentication policy.

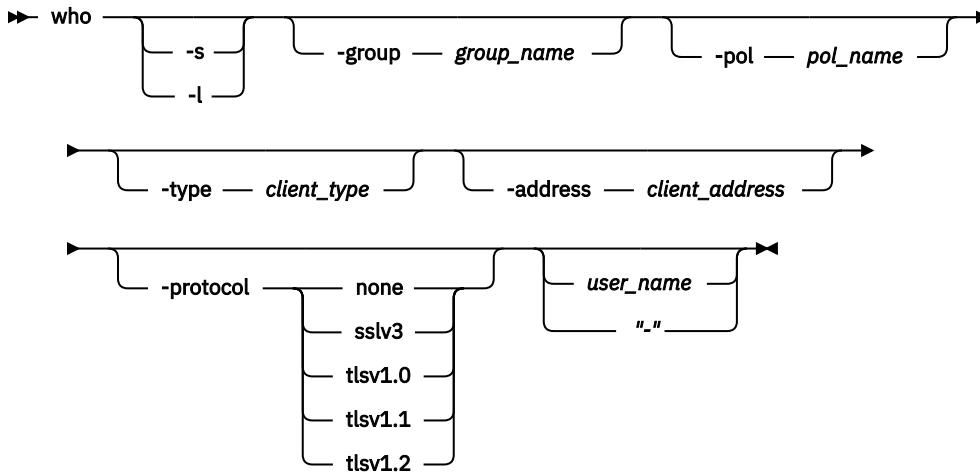
```
dscli> testauthpol -username admin -pw test2 -servertarget RSA GUIRSALDAPPolicy
```

Output:

Authentication policy GUIRSALDAPPolicy successfully verified.

who

The **who** command displays authentication information for the users who are currently logged in. It also includes information about users who are logged in with service and engineering roles.



Parameters

-s

(Optional) Displays the user names for the users who are currently logged on. The **-l** and **-s** parameters cannot be used together.

-l

(Optional) Displays details about the users who are currently logged on, including user name and authority groups that the user belongs to. The **-l** and **-s** parameters cannot be used together.

-group *group_name*

(Optional) Displays the list of users who are currently logged in and who are part of the specified access authority group. If the user has multiple group roles, the user is displayed if any of those roles match the specified group.

group_name

The following list provides the list choices that can be assigned to a user. The *group_name* can be one of the following roles:

- admin (Administrator)
- ibm_engineering (Engineer)
- ibm_service (Service)
- Note:** The "ibm_engineering" and "ibm_service" roles cannot be combined with other existing roles. The DSCLI allows users to have multiple roles, but currently the only combination allowed is "op_volume" + "op_copy_services."
- op_storage (Physical Operator)
- op_volume (Logical Operator)
- op_copy_services (Copy Services Operator)
- secadmin (Security Administrator)
- service (Service Operator)
- monitor (Monitor)
- no_access (No Access)

-pol pol_name

(Optional) Displays the list of users who are currently logged in under the specified client type.

-type client_type

(Optional) Displays the list of users who are currently logged in and who have the specified client type. One of the following client types are displayed:

DSCLI

DS Command Line Interface

DSGUI

DS Storage Management GUI

HMTU

IBM Easy Tier Heat Map Transfer Utility

SC

IBM Spectrum Control

CSM

IBM Copy Services Manager

Unknown

Unknown might be displayed for older versions of any of the client types that are listed above.

-address client_address

(Optional) Displays the users who are currently logged in with the specified client address.

-protocol none | sslv3 | tlsv1.0 | tlsv1.1 | tlsv1.2

(Optional) Displays the users who are currently logged in with the specified client connection protocol.

None

The connection is not encrypted.

sslv3

Secure Socket Layer version 3.

tlsv1.0

Transport Layer Security version 1.0.

tlsv1.1

Transport Layer Security version 1.1.

tlsv1.2

Transport Layer Security version 1.2.

user_name | -

(Optional) Displays only the users names for the specified user account.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Viewing authentication information for the users who are currently logged in.

```
dscli> who
```

Output:

| Name | Group | Policy | Scope | Type |
|----------|--------------------------|--------------|--------|-------|
| Testuser | service,op_copy_services | localPolicy | ABC_Co | DSGUI |
| Biguser | admin | localPolicy | * | DSCLI |
| Shyuser | ibm_service | initalPolicy | Public | DSCLI |

| Version | Address | Protocol |
|---------|--------------|----------|
| - | 9.123.236.89 | Internal |

| Version | Address | Protocol |
|------------|---------------|----------|
| 7.6.18.204 | 9.123.456.139 | TLSv1.2 |
| 7.8.98.409 | 9.123.456.139 | TLSv1.2 |

Output definitions

Name

The user names for the users who are currently logged on.

Group

The authority groups that the current users are assigned to.

Policy

The name of the authentication policy that was active when each of the current users authenticated. The currently active policy can differ.

Scope

The user resource scope.

Type

The client type. The value is *Unknown* when the DS CLI is pre-R6.1.

Version

The client version. The value is *Unknown* when the DS CLI is pre-R6.1.

Address

The client address.

Protocol

The type of client connection protocol is provided.

None

The connection is not encrypted.

Internal

The connection is wholly contained within the HMC.

SSLv3

Secure Socket Layer version 3.

TLSv1.0

Transport Layer Security version 1.0.

TLSv1.1

Transport Layer Security version 1.1.

TLSv1.2

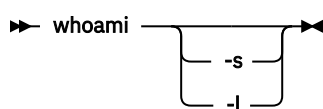
Transport Layer Security version 1.2.

-

The dash (-) indicates that the connection protocol is unknown or the reporting query is not supported.

whoami

The **whoami** command displays authentication information for the current user, including groups with users who are logged in with service and engineering roles.



Parameters

-s

(Optional) The user name of the current user. The **-l** and **-s** parameters cannot be used together.

-l

(Optional) Details about the current user, including user name and authority groups that the user belongs to. The **-l** and **-s** parameters cannot be used together.

Example: Displaying authentication information for the current user.

```
dsccli> whoami
```

Output:

| Name | Group | Policy | Scope |
|--------|-------------|---------------|--------|
| admin | admin | localPolicy | * |
| shyguy | ibm_service | initialPolicy | PUBLIC |

Output definitions

Name

The user name for the current user.

Group

The authority groups that the current user is assigned to.

Policy

The name of the authentication policy that was active when the current user authenticated. The currently active policy can differ.

Scope

The user resource scope.

Data encryption and security commands

Use data encryption and security commands to configure the storage system.

For security purposes, encryption keys are stored on external key servers, not on the storage system. The **mkkeymgr**, **chkeymgr**, **rmkeymgr**, and **lskeymgr** commands are used to specify the location of the external key servers and which servers are to be used by the storage system. If multiple servers are specified, it is assumed that the servers themselves manage the process to ensure that the stored keys are synchronized. Because multiple manufacturers' products might be using the same key servers, the **mkkeygrp**, **rmkeygrp**, **lskeygrp**, and **showkeygrp** commands are used to specify a *label* for any specific encryption key.

In some environments, there might be two disjointed groups of external key servers that are defined and that cannot synchronize their stored keys securely. In this case, you can specify a second *label*, one label for each group of servers. Under certain unusual circumstances, losing access to the encrypted data on the storage system might be possible. This loss of access might occur if all of the external keys servers go down, or if all physical connections are lost between the storage system and the external key servers. To prevent any of these possibilities from becoming a permanent loss of data access, you are required to create an encryption data access recovery key that is managed with a dual control process described in the "User account and security commands" section. The encryption recovery key itself is manually managed with the **managereckey**, **mkreckey**, and **rmreckey** commands.

The following data encryption and security commands are available:

chkeymgr

Updates the attributes of the key server entry on the storage complex.

lskeygrp

Displays a list of the key server encryption key group entries on the specified storage image.

lskeymgr

Displays a list of the key server entries that are on the storage complex.

managekeygrp

Allows you to manage an encryption key group.

managekeymgr

Allows you to manage an existing encryption key server.

managereckey

Allows you to manage an existing encryption recovery key.

mkkeygrp

Creates an entry for the key server encryption key group on the storage image.

mkkeymgr

Creates an entry for the key server on the storage complex.

mkreckey

Allows you to create an encryption recovery key.

rmkeygrp

Removes an entry for the key server encryption key group on a specified storage image.

rmkeymgr

Removes a key server entry on the storage complex.

rmreckey

Allows you to remove an encryption recovery key.

showkeygrp

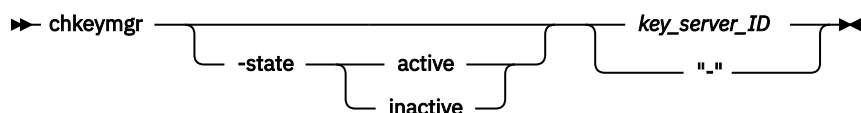
Displays detailed information for a specified key server encryption key group entry on the storage image.

showkeymgr

Displays detailed properties of a specified key server entry.

chkeymgr

The **chkeymgr** command updates the attributes of the key server entry on the storage complex.



Parameters

-state active | inactive

(Optional) Updates the state of the key server.

key_server_ID | -

(Required) The key server ID. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Updating the attributes of the key server entry on the storage complex.

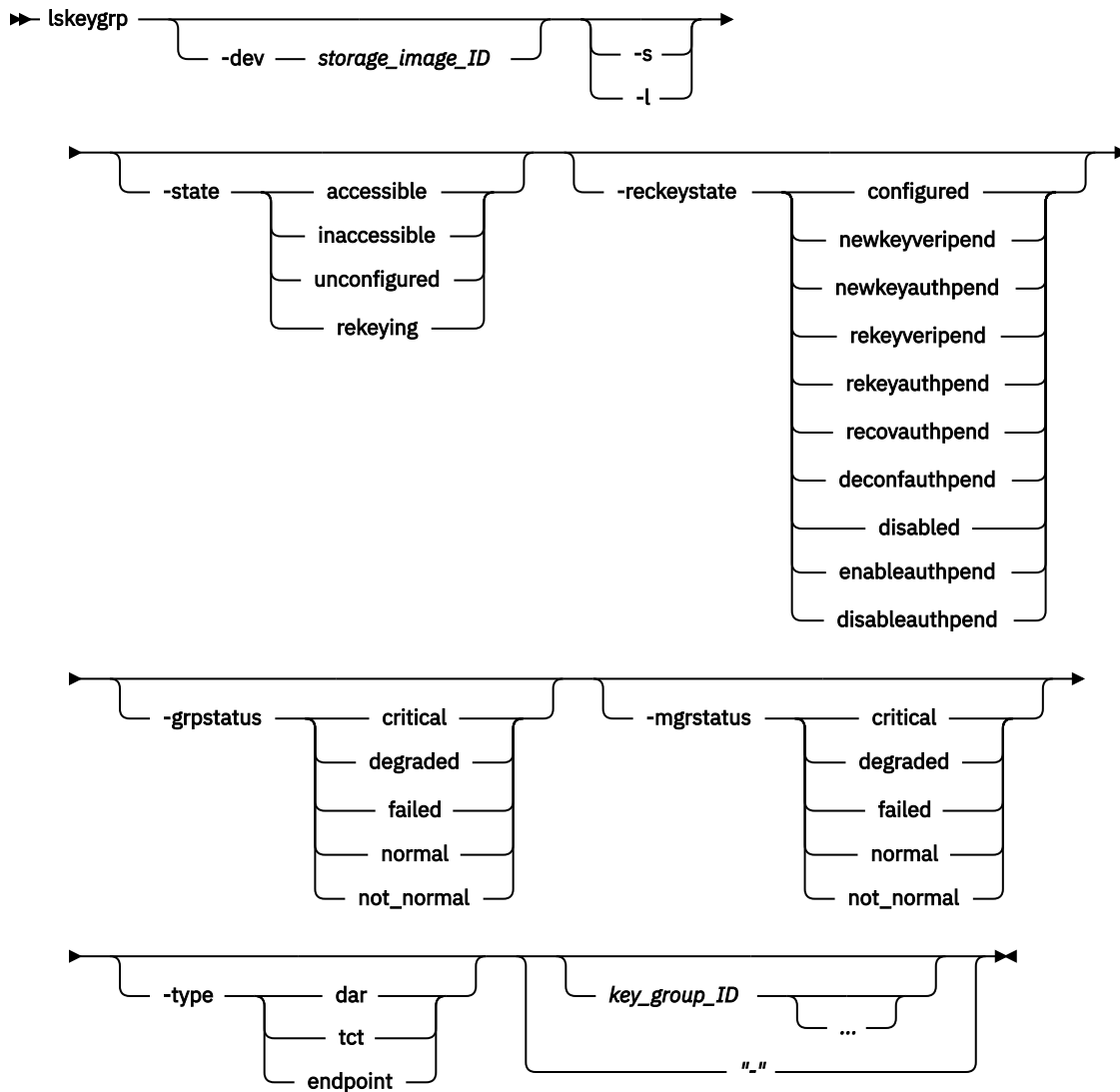
```
dscli> chkeymgr -state inactive 1
```

Output:

```
The key server 1 configuration has been changed.
```

lskeygrp

The **lskeygrp** command displays a list of the key server key group entries on a specified storage image.



Parameters

-dev *storage_image_ID*

Displays the storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the storage system is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-s

(Optional). Displays only the attributes that are identified as short output. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional). Displays the default output and extra attributes that are identified as long output. You cannot use the **-l** and the **-s** parameters together.

-state **accessible** | **inaccessible** | **unconfigured** | **rekeying**

(Optional) Displays the state of the key group.

-reckystate configured | newkeyveripend | newkeyauthpend | rekeyveripend | rekeyauthpend | recovauthpend | deconfauthpend | disabled | enableauthpend | disableauthpend

(Optional) Displays the key groups with the specified recovery key state.

-grpstatus critical | degraded | failed | normal | not_normal

(Optional) Displays the key access status for all key servers that are associated with the specified key group. The value `not_normal` displays for all key groups whose key access status is not "normal" or the state is inactive.

Note: The key groups with LOCAL keyprotocol are contained within the storage system rather than managed by an external key server.

-mgrstatus critical | degraded | failed | normal | not_normal

(Optional) Displays the key server path access status for all key servers that are associated with the specified key group. The value `not_normal` displays for all key groups whose key server path summary status is not "normal" or the state is inactive.

Note: The key groups with LOCAL keyprotocol are contained within the storage system rather than managed by an external key server.

-type dar | tct | endpoint

(Optional) Displays the type of encryption that is used by the key group:

dar

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

tct

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

key_group_ID ... | -

(Optional) Displays the ID for the key group that you want to view. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying a list of the key server key group entries on a specified storage image.

```
dscli> lskeygrp
```

Output:

```
ID   state      reckystate  reckeydate  datakeydate
=====
1   accessible configured   04/28/2015  03/18/2018

keyprotocol  type  name
=====
KMIP         DAR   dar_encr
```

Example 2: Displaying a list of the key server key group entries on a specified storage image.

```
dscli> lskeygrp -dev IBM.2107-75FA120 -l 0001
```

Output:

```
ID   state      reckystate  reckeydate  datakeydate
=====
```

1 accessible configured 04/28/2015 03/18/2018

```
grpstatus    mgrstatus    label    label2    keyprotocol
=====
critical    normal    CompanyABC    CompanyABC2    KMIP
```

Output definitions

ID

The key group ID.

state

One of the following states of the key group:

accessible

The key group is accessible if it is configured and the storage image has the key group from the key server for the specified key group.

inaccessible

The key group is inaccessible if the storage image was unable to obtain the key group from the key server.

unconfigured

The key group is unconfigured if it has not been configured.

rekeying

The key group is accessible and rekeying if it is configured and the storage image has the encryption key from the key server for the key group and is in the middle of rekeying.

reckeystate

One of the following states of the recovery key:

configured

A new recovery key was requested, verified, and authorized.

unconfigured

A recovery key was not created.

newkeyveripend

A new recovery key was requested but not verified.

newkeyauthpend

A new recovery key was requested and verified, but not authorized.

rekeyveripend

A new recovery key action was requested but not verified.

rekeyauthpend

A new recovery key action was requested and verified, but not authorized.

recovauthpend

A recover action was requested, but not authorized.

deconfauthpend

A deconfigure action was requested, but not authorized.

disabled

A recovery key was disabled, and the key group is used without a recovery key.

enableauthpend

An enable action was requested, but not authorized.

disableauthpend

A disable action was requested, but not authorized.

reckeydate

The date of the last recovery key creation.

datakeydate

The date of the last data key creation. If the key group is unconfigured, then any displayed date is to be considered erroneous data.

grpstatus

One of the following values of the key group access status:

Note: The **grpstatus** parameter is refreshed by either a background process that runs every 8 hours or after the **managekeygrp** command with **-action testaccess** processes. The following values that display depend on either process to determine when the **grpstatus** parameter is refreshed.

For example, if all key servers were recovered from an abnormal status, the **grpstatus** parameter displays **failed** because the status reflects either process that last completed unless a background process started or the **2** command with **-action testaccess** has processed again.

In addition, when a key group is created, the status always displays a "-" to indicate that the background process has not started or the **managekeygrp** command with **-action testaccess** has not processed.

critical

The key group has access to the key on a single key server and it represents a potential single point of failure. Use the **showkeygrp** command with the **-access** parameter to determine the access status for each key server on the HMCs.

degraded

The key group has access to the encryption key on two or more key servers, but not all key servers. Use the **showkeygrp** command with the **-access** parameter to determine the access status for each key server.

failed

The key group does not have access to the encryption key on any key server. Use the **showkeygrp** command with the **-access** parameter to determine the access status for each key server on the HMCs.

normal

The key group has access to the encryption key on all key servers.

"-"

The dash (-) indicates that the key group state is either unconfigured, rekeying, or was created but the background process has not started or the **managekeygrp** command with **-action testaccess** has not processed.

Note: The key groups with LOCAL keyprotocol are not configured on external key servers.

mgrstatus

One of the following values of the key server path access status:

critical

At least one key server for this key group reported an access status of **normal**, **degraded**, or **critical**. Use the **showkeymgr** command with the **-access** parameter to determine the access status of each HMC.

Note: A system with only one HMC configured displays status as **normal**.

degraded

At least two key servers for the specified key group reported an access status of **normal** or **degraded**. Use the **showkeymgr** command with the **-access** parameter to determine the access status of each HMC.

failed

All key servers for this key group reported an access status of **failed**. Use the **showkeymgr** command with the **-access** parameter to determine the access status of each HMC.

normal

All key servers for this key group reported an access status of **normal**.

"-"

The dash (-) indicates that the state of the key group is either unconfigured or all key servers report a state of **inactive**.

Note: The key groups with LOCAL keyprotocol are not configured on external key servers.

label

The label for the key server key group. Because of the possible length of the label value, this column is the second to last column even as new columns are added to the output. Example MyCompany

label2

The second label for the key server key group. Because of the possible length of the label2 value, this column is the last column even as new columns are added to the output. Example MyCompany2

keyprotocol

The key server protocol that the storage system communicates with to provide key server management operations.

IPP

The storage system communicates with the specified key server using the IBM Proprietary Protocol (IPP).

KMIP

The storage system communicates with the specified key server using the Key Management Interoperability Protocol (KMIP).

LOCAL

The storage system scrambles the data key using a cryptographic algorithm and stores it locally, rather than obtaining the data key as a secret managed by an external key server. If Local Data-at-Rest Encryption is used, it is not necessary to configure external key servers.

type

The type of encryption that is used by the key group:

DAR

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

TCT

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

Endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

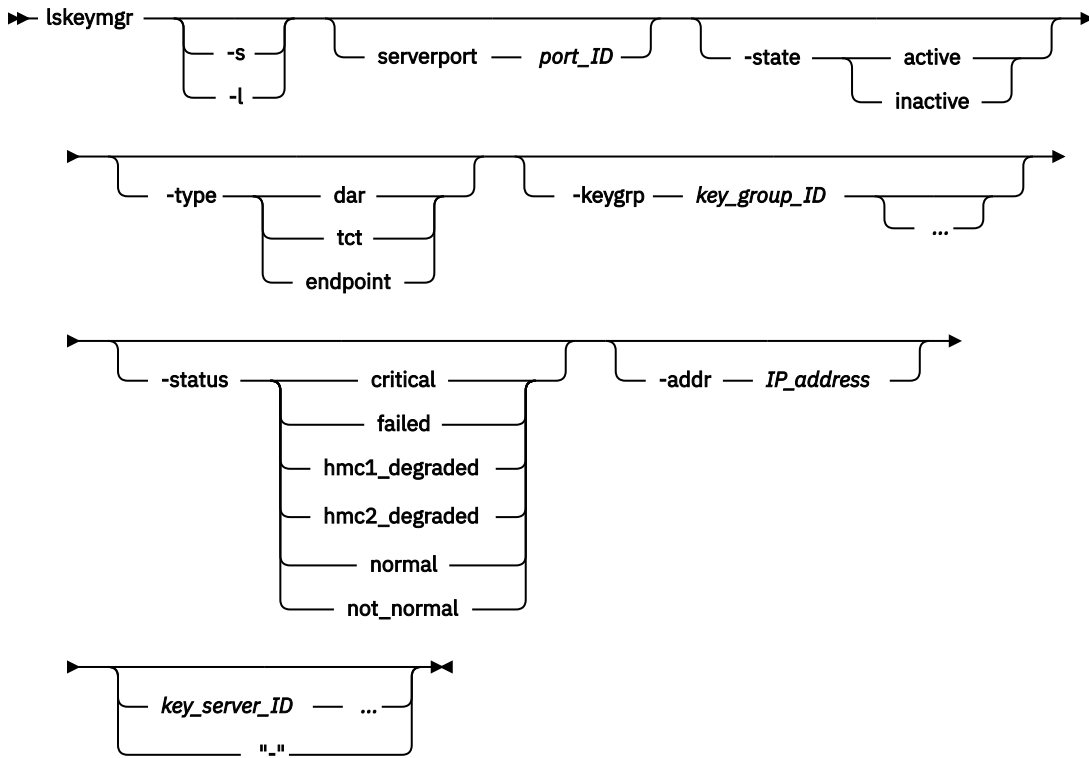
name

The user-specified name that is used to identify the key group.

lskeymgr

The **lskeymgr** command displays a list of key servers that are on the storage complex and provides status information for those key servers.

The terms *key server* and *key manager* are closely related and sometimes used interchangeably. The key manager is the program that runs on a physical server and provides key services to key clients, such as the storage system. Key services include generating, storing, and retrieving encryption keys. This command uses the term *key server* to indicate both the physical server and the key manager.



Parameters

-s

(Optional) Displays the key server IDs.

-l

(Optional) Displays the default output.

-serverport port_ID

(Optional) Displays the key servers that use the port ID that you specify. The key server port ID is 4 or 5 decimal characters. For example, 8100 is a valid port ID.

-state active | inactive

(Optional) Displays the key servers that are in the state that you specify.

-type dar | tct | endpoint

(Optional) Displays the registered key servers that use one of the following specified types of encryption.

dar

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

tct

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

-keygrp *key_group_ID* | ...

(Optional) Displays one or more key group IDs that are associated with the specified key manager. The ellipsis (...) indicates that, optionally, you can specify multiple values.

-status *critical* | *failed* | *hmc1_degraded* | *hmc2_degraded* | *normal* | *not_normal*

(Optional) Displays the status of the key server path. Only key servers that display the status of the specified key server path are displayed. The value *not_normal* displays for all key servers whose status is not "normal" or whose state is inactive.

-addr *IP_address*

(Optional) Displays the key server that uses the IP address you specify. The IP address can be an IPv4 address, an IPv6 address, or a DNS name.

***key_server_ID ...* | -**

(Optional) Displays the key servers that use the ID or IDs you specify. To include multiple IDs, separate each ID with a blank space. For example, 1 2 3 4. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the (-) dash option, this value can be read from standard input.

Example 1: Displaying the key server protocol.

```
dscli> lskeymgr -l
```

Output:

| ID | State | Status | Addr | Server Port | Key Protocol |
|----|----------|--------|---|-------------|--------------|
| 1 | active | normal | 2001:0db8:85a3:08d3:1319:8a2e:0370:7334 | 3801 | KMIP |
| 2 | active | normal | 2001:0db8::1428:57ab | 3801 | KMIP |
| 3 | inactive | - | ::ffff:9.11.56.78 | 3801 | KMIP |

Output definitions

ID*

The key server identification number. For example, 4.

State

One of the following states of the key server displays:

active

The key server is configured for a key exchange with the specified HMC.

inactive

The key server is configured, but does not exchange any key with the specified HMC.

Status

One of the following statuses the key server path:

critical

Only one Hardware Management Console (HMC) has access to the specified key server and it represents a potential single point of failure. This status *critical* replaces *hmc1_degraded* and *hmc2_degraded* on newer systems.

Use the **showkeymgr** command with the *-access* parameter to determine the status of each HMC.

Note: A system with only one HMC configured displays the status as *normal*.

degraded

Two or more HMCs have access to the specified key server, but at least one other HMC does not.

failed

Neither HMC1 or HMC2 have access to the key server.

hmc1_degraded

HMC2 has access to the specified key server, but HMC1 does not.

Newer systems display this status as *critical*.

Use the **showkeymgr** command with the -access parameter to determine the status of each HMC.

hmc2_degraded

HMC1 has access to the specified key server, but HMC2 does not.

Newer models display this status as `critical`.

Use the **showkeymgr** command with the -access parameter to determine the status of each HMC.

normal

All HMCs have access to the specified key server.

"-"

The dash (-) indicates that the specified key server is not an active key server.

Addr

The IP address of the key server.

Server Port

The key server port number, which is 4 or 5 decimal characters from 1 - 65535. For example, 8100.

Keyprotocol

The key server protocol that the storage system communicates with to provide key server management operations.

IPP

The storage system communicates with the specified key server using the IBM Proprietary Protocol (IPP).

KMIP

The storage system communicates with the specified key server using the Key Management Interoperability Protocol (KMIP).

Example 2: Displaying the type associated with the key server.

```
dscli> lskeymgr
```

Output:

```
=====  
ID      state    rekeystate  rekeydate  datakeydate  keyprotocol  type      name  
=====
```

| ID | state | rekeystate | rekeydate | datakeydate | keyprotocol | type | name |
|----|------------|------------|------------|-------------|-------------|----------|---------------|
| 1 | accessible | configured | 02/21/2018 | 3/07/2018 | KMIP | Endpoint | endpoint_encr |

Output definitions

ID

The key group ID.

state

One of the following states of the key group:

accessible

The key group is accessible if it is configured and the storage image has the key group from the key server for the specified key group.

inaccessible

The key group is inaccessible if the storage image was unable to obtain the key group from the key server.

unconfigured

The key group is unconfigured if it has not been configured.

rekeying

The key group is accessible and rekeying if it is configured and the storage image has the encryption key from the key server for the key group and is in the middle of rekeying.

reckystate

One of the following states of the recovery key:

configured

A new recovery key was requested, verified, and authorized.

unconfigured

A recovery key was not created.

newkeyveripend

A new recovery key was requested but not verified.

newkeyauthpend

A new recovery key was requested and verified, but not authorized.

rekeyveripend

A new recovery key action was requested but not verified.

rekeyauthpend

A new recovery key action was requested and verified, but not authorized.

recovauthpend

A recover action was requested, but not authorized.

deconfauthpend

A deconfigure action was requested, but not authorized.

disabled

A recovery key was disabled, and the key group is used without a recovery key.

enableauthpend

An enable action was requested, but not authorized.

disableauthpend

A disable action was requested, but not authorized.

reckeydate

The date of the last recovery key creation.

datakeydate

The date of the last data key creation. If the key group is unconfigured, then any displayed date is to be considered erroneous data.

keyprotocol

The key server protocol that the storage system communicates with to provide key server management operations.

IPP

The storage system communicates with the specified key server using the IBM Proprietary Protocol (IPP).

KMIP

The storage system communicates with the specified key server using the Key Management Interoperability Protocol (KMIP).

type

The type of encryption that is used by the key group. The descriptions are described

DAR

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

TCT

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

Endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM

Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

name

The user-specified name that is used to identify the key group.

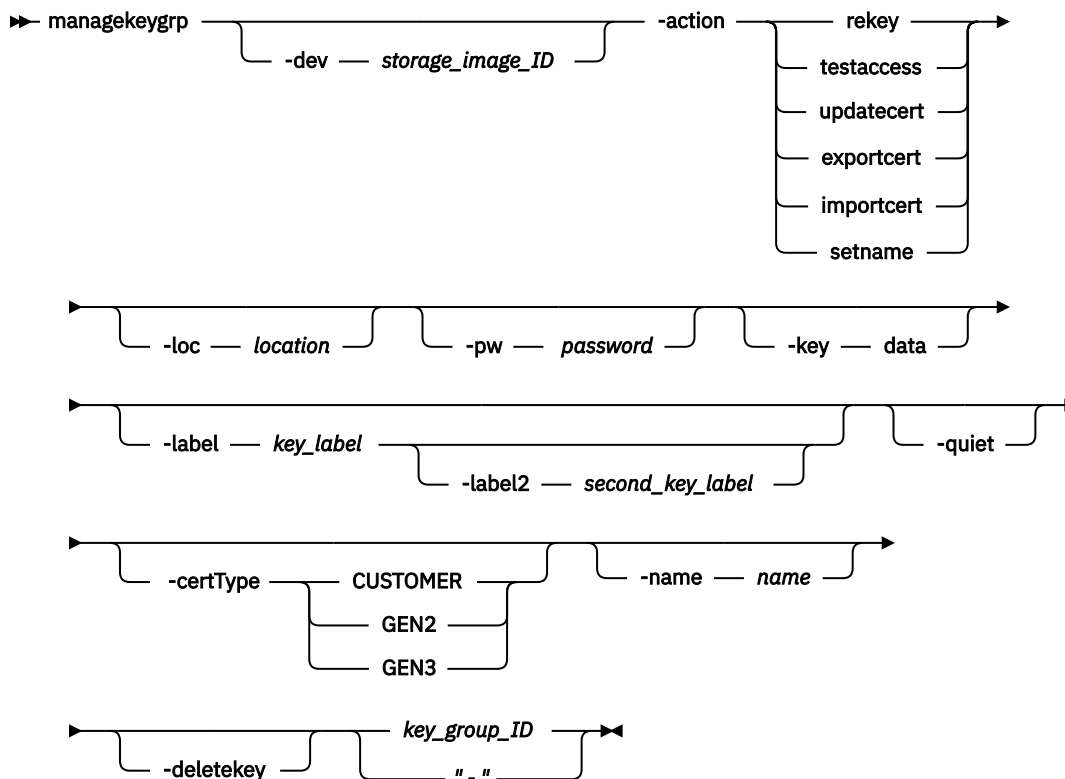
managekeygrp

The **managekeygrp** command manages a specified key group.

The encryption key servers use key labels to locate a specific encryption key that is stored in the key server. The dual platform key server supports a second label for the second key server platform. If the action is **rekey** or **updatecert** and no labels are specified, the existing labels are reused. If only one label is specified, that label is used for both key server platforms, replacing any existing labels. If two labels are specified, one label is used with the first key server platform, and the second label is used with the second platform. This process replaces any existing labels.

Note: The **managekeygrp** command cannot be run from the **Embedded DS CLI** window.

The connection to the encryption key that is stored on each key server is tested once every 8 hours. To test the key access for a specific key group on demand, use this command with the **-action testaccess** parameter. To view the results, use the **showkeygrp** command with the **-access** parameter.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the storage system is aware of more than one storage image.

Using the `-dev` parameter temporarily overrides any defined value for `devid` for the current command.

-action rekey | testaccess | updatecert | exportcert | importcert | setname
(Required) Specifies an action for the key group. The valid values are as follows.

Note: Starting from Release 8.1, the storage system ships with GEN2 certificate enabled.

rekey

Generates a new key, as specified by the **-key** parameter.

testaccess

Tests access to the specified key group. Use the **showkeygrp -access** command to view the results.

updatecert

Generates a new key, which is specified by the **-key** parameter. When the parameter processes, the key client certificate is updated to a NIST SP 800-131a compliant GEN2 certificate or GEN3 certificate that is used to authenticate with the key server.

Note: Before you use the `updatecert`, ensure that all key servers that are used by the system contain the GEN2 trust anchor certificate.

exportcert

Exports a public certificate to a file on the DS CLI client. This option, available to users with administration authority, requires the **-loc** parameter.

Users with administration authority can export a public certificate to a file on the DS CLI client.

importcert

Imports a customer-defined certificate in Public-Key Cryptography Standards (PKCS) #12 format. The file name extension for PKCS #12 files is `.p12` or `.pfx`. This option does not update the current certificate. To update the current certificate, use the `updatecert` option.

When you use this option, specify the local file name of the customer-defined certificate with the **-loc** parameter and the password of the certificate with the **-pw** parameter.

setname

Specifies a new name for the key group.

-loc location

(Optional) The location of the certificate file. For example, `c:\mystore\trust.pem`

The **-loc** parameter is required for the `exportcert` or `importcert` options.

-pw password

(Optional) The password of the certificate. For example, `myPassword`.

The **-pw** parameter is required for the `importcert` option.

The maximum length of customer-defined machine password is 128 characters. An example of a file name for a customer-defined filename is either `2107-75YZ123.mug` or `2107-75YZ123.p12` and password is `XyZABcPQRstu`.

-key data

(Optional) Rewraps the key group data key with the `rekey` action. The key can be rewrapped with either new or existing key labels.

The **-key** parameter is required for the `rekey` or `updatecert` actions. It is optional for the `testaccess` action. This parameter specifies which key is the object of the specified action.

The data parameter specifies a random 256-bit encryption key that is generated by the key server and is used by the storage system to wrap the key group. This key is identified by one of the key labels that is specified by the **-label1** or **-label2** parameters.

-label1 key_label

(Optional) The label for the key group data key. This parameter is required when you specify the **-label2** parameter. You can enter a maximum of 64 ASCII characters for the label. The label is used by a key server to identify a specific data key that the storage system uses to wrap the group key.

-label2 second_key_label

(Optional) The parameter that is used by a second key server to identify a specific data key that the storage system uses to wrap the group key. You can enter a maximum of 64 ASCII characters for the label.

-quiet

(Optional) Turns off the confirmation prompt for the command. This parameter is processed for testaccess only.

-certType CUSTOMER | GEN2 | GEN3

(Optional) The type of certificate. This parameter is optional if you specify either the updatecert or exportcert options.

CUSTOMER

The installed customer-defined certificate. If you specify the updatecert option, an IBM supplied GEN2 certificate or an IBM supplied GEN3 certificate is updated to a customer-defined certificate. If you do not specify this option, the certificate defaults to an IBM supplied GEN2 certificate. The parameter is optional for the updatecert and exportcert options.

The exportcert option is not supported by the **CUSTOMER** option.

Note: A customer-defined encryption certificate must meet the following requirements:

- The certificate must have an RSA public/private key pair with a single private key.
- The hashing algorithm must be SHA-256 or SHA-512.
- The public exponent must be 65537 or less.
- The public key size must be 2048 or 4096.
- The "Not Before" date must be before the current date.
- The "Not After" date must be after the current date.
- The key server ID must be in the valid range 1 - 4.
- The CN field value must be the storage facility image (SFI) ID for the storage system. For example, CN=2107-75NR699.
- For KMIP key groups that use a certificate user ID for Safenet key server local authentication, the UID field value must use the following format: DS8K-SFI_ID. For example, UID=DS8K-2107-75NR699.

GEN2

The SHA-256 digital signature encryption certificate that is included with the storage system. If you specify the updatecert option, the GEN2 certificate is applied. If you do not specify this option, the default is the IBM GEN2 certificate.

Users with administrative authority can use the exportcert option to export an IBM GEN2 certificate. If you do not specify this option, the certificate that is in use is exported.

GEN3

The SHA-512 digital signature encryption certificate, which includes the WWNN of the storage system and unique certificate serial number. GEN3 includes support for IBM Fibre Channel Endpoint Security, a feature that enables an IBM Z system to encrypt data and securely authenticate to the storage system. Before enabling IBM Fibre Channel Endpoint Security, update to GEN3 or user-defined certificates first.

Users with administrative authority can use the exportcert option to export an IBM GEN2 or an IBM GEN3 certificate that is not enabled for IBM Fibre Channel Endpoint Security. If you do not specify this option, the certificate that is in use is exported.

-name

(Optional) The name that you specify to identify the key group.

-deletekey

(Optional) The option to use during the key group rekey action and updatecert action for the specified key group.

If you do not specify `-deletekey`, the key group rekey action and `updatecert` action are set (by default) to deactivate.

key_group_ID | -

(Required) The ID for the key group. The key group ID is a decimal number that ranges from 1 to N, where N is the maximum number of key groups that are supported by the storage system. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Updating a certificate for a key group.

```
dscli> managekeygrp -action updatecert -key data -certType GEN3 1
```

Output:

```
CMUC00472I managekeygrp: The certificate for key group 1 has been updated.
```

Example 2: Importing a certificate for a key group.

```
dscli> managekeygrp -action importcert -loc /home/cert/  
75NH481/2107-75NH491_v3.mfg -pw nPx6ZXXbZc2N 1
```

Output:

```
CMUC00489I managekeygrp: The certificate for key group 1 has been imported.
```

Example 3: Importing a certificate for a key group.

```
dscli> managekeygrp -dev IBM.2107-75FA120 -action importcert -loc  
c:\hmcdire\2107-75ABCDE.mfg -pw myPassword 1
```

Output:

```
managekeygrp: The certificate file has been imported successfully.
```

Example 4: Generating a new key for a key group.

```
dscli> managekeygrp -dev IBM.2107-75FA120 -action rekey -key data -label  
companyABC -label2 companyXYZ 1
```

Output:

```
CMUCFFFFFI managekeygrp: The rekey action has been performed for  
key server key group 1.
```

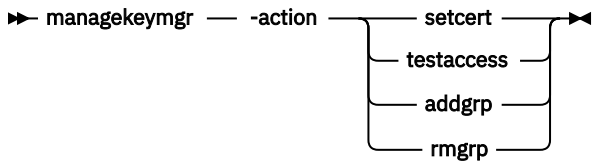
managekeymgr

The **managekeymgr** command allows you to manage an existing encryption key server.

The storage system tests the access from each hardware management console (HMC) to each key server once every five minutes. To test access for a specific key manager on demand, use this command with the **-action testaccess** parameter. To view the results, use the **showkeymgr** with the **-access** parameter.

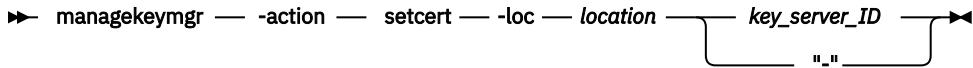
Note: The **managekeymgr** command cannot be run from the **Embedded DS CLI** window.

The terms *key server* and *key manager* are closely related and sometimes used interchangeably. The key manager is the program that runs on a physical server and provides key services to key clients, such as the storage system. Key services include generating, storing, and retrieving encryption keys. This command uses the term *key server* to indicate both the physical server and the key manager.

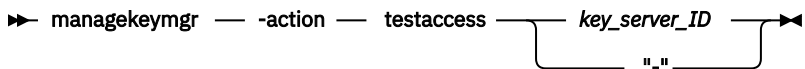


Each of the following sections shows the options for one of the listed **-action** parameters:

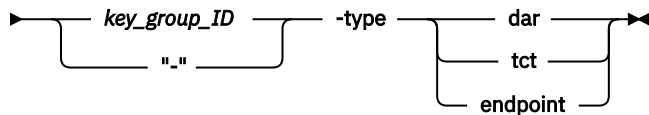
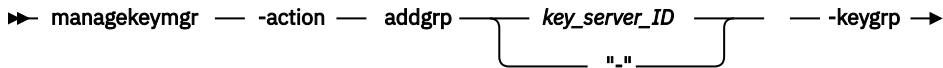
-action setcert



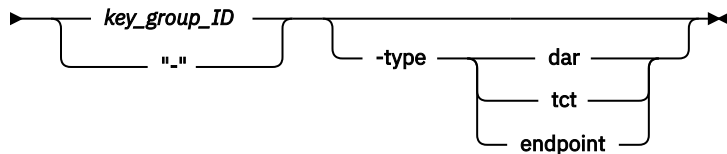
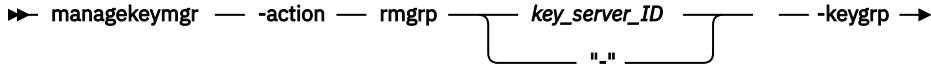
-action testaccess



-action addgrp



-action rmgrp



Action parameters for setcert

-action setcert

Replaces the existing anchor certificate that is used in secure communications with the key server.

-loc location

(Required) The location of the certificate file to use as the trust anchor to authenticate communications to the specified key server. The certificate is in PEM or DER format. For example, `c:\mystore\trust.pem`

key_server_ID | -

(Required) The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. Use the `showsp` command to determine the number of supported key servers.

Action parameters for testaccess

-action testaccess

Tests (by pinging) the connection from each HMC to the specified key server. The results are displayed in the `showkeymgr` command by using the `-access` parameter.

key_server_ID | -

(Required) The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. Use the **showsp** command to determine the number of supported key servers.

Action parameters for **addgrp**

-action addgrp

Adds a key group to the specified key server.

key_server_ID | -

(Required) The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. Use the **showsp** command to determine the number of supported key servers.

-keygrp key_group_ID | -

(Required) The ID for the key group. The key group ID is a decimal number that ranges from 1 to *n*, where *n* is the maximum number of key groups that are supported by the storage system. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

-type dar | tct | endpoint

(Required) The type of encryption that is used by the key group.

dar

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

tct

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

Action parameters for **rmgrp**

-action rmgrp

Removes a key group from the specified key server.

key_server_ID | -

(Required) The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. Use the **showsp** command to determine the number of supported key servers.

-keygrp key_group_ID | -

(Required) The ID for the key group. The key group ID is a decimal number that ranges from 1 to *n*, where *n* is the maximum number of key groups that are supported by the storage system. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

-type dar | tct | endpoint

(Optional) The type of encryption that is used by the key group.

dar

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

tct

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

Example: Modifying a key server certificate.

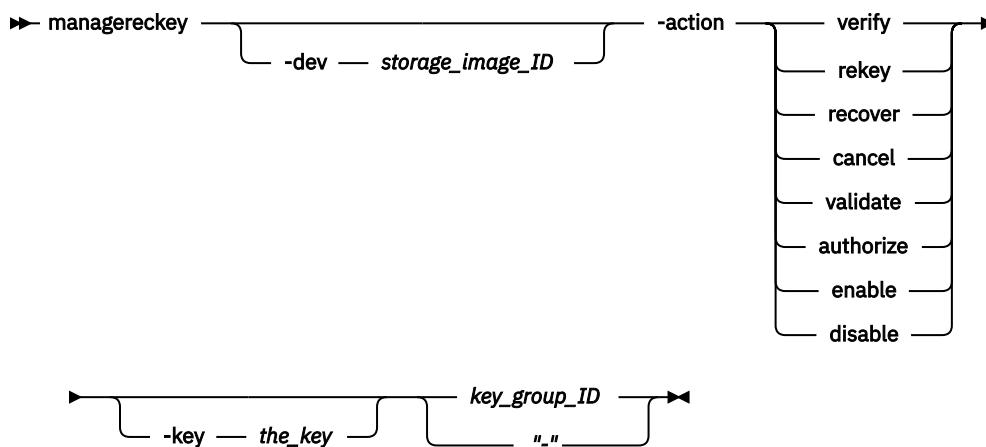
```
dscli> managekeymgr -action setcert -loc c:\mystore\trust.pem 4
```

Output:

```
The key server entry 4 successfully modified.
```

managereckey

The **managereckey** command is used to manage an existing encryption recovery key.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID. It is also required if you do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-action *verify* | *rekey* | *recover* | *cancel* | *validate* | *authorize* | *enable* | *disable*

(Required) The action to complete on the recovery key.

Verify

The *verify* option is for users with security administrator authority, and is the second step in creating an Encryption Recovery Key or re-creating an existing Encryption Recovery Key. Verify that you received the new Recovery Key from the first step (mkreckey, or managereckey with the *-rekey* option), by specifying that new key with the **-key** parameter. The next step requires the storage administrator to authorize the pending operation.

Rekey

The *rekey* option is for users with security administrator authority, and is the first step to reconfigure an existing Encryption Recovery Key. The existing Encryption Recovery Key is not required to start the rekey operation. The next step requires the security administrator to verify the new recovery key.

Recover

The *recover* option is for users with security administrator authority, and is the first step to using the Encryption Recovery Key to recover access to the encrypted data on the storage system. The user specifies the Encryption Recovery Key with the **-key** parameter. The next step requires the storage administrator to authorize the recover operation.

Cancel

The *cancel* option is for users with either security administrator or storage administrator authority to cancel any verification or authorization pending steps. The existing Encryption Recovery Key is not required and no further steps are required.

Validate

The *validate* option is for users with security administrator authority, and is used to ensure that the existing Encryption Recovery Key is identical to the recovery key that is in the user's possession. The user specifies the Encryption Recovery Key in their possession with the **-key** parameter, but no further steps are required.

Authorize

The *authorize* option is for users with storage administrator authority, and is the final step of most recovery key operations. Once authorized, the pending recovery key operation is completed and any resulting changes to the storage system are started. The existing Encryption Recovery Key is not required and no further steps are required.

Enable

The *enable* option is for users with security administrator authority, and is the first step to enable the Encryption Recovery Key for the key group. The Recovery Key needs to be enabled only if it was previously disabled. The existing Encryption Recovery Key is not required. The next step requires the storage administrator to authorize the pending operation.

Disable

The *disable* option is for users with security administrator authority, and is the first step to disable the Encryption Recovery Key for the key group. The existing Encryption Recovery Key is not required. The next step requires the storage administrator to authorize the pending operation. After that, the group will operate without an Encryption Recovery Key, and will not be recoverable with a Recovery Key.

-key *the_key*

(Optional) The encryption recovery key. The encryption recovery key is a string of 64 hexadecimal characters.

For example, 01F3-45A7-8D12-
B586-0123-4C67-891E-3586-01A3-45E7-8D12-3586-0123-45C7-8912-3B86.

key_group_ID | -

(Required) The key group ID for the encryption recovery key that you want to manage. The key group ID is a decimal number that ranges from 1 to N, where N is the maximum number of key groups that are supported by the storage system. Use the **shows** command to determine this maximum number. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Managing an existing encryption recovery key.

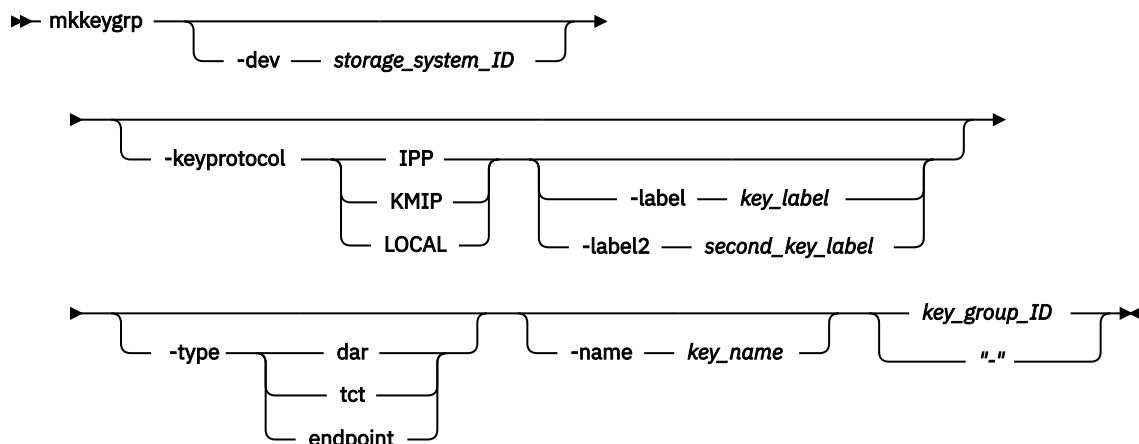
```
dscli> managereckey -dev IBM.2107-75FA120 -action verify  
-key 0123-4567-8912-3586-0123-4567-8912-3586-0123-4567-8912-  
3586-0123-4567-8912-3586 1
```

Output:

```
The Recovery Key for key group 1 has been verified,  
authorization pending.
```

mkkeygrp

The **mkkeygrp** command creates an entry for the key group on the storage system.



Parameters

-dev *storage_system_ID*

(Optional) The storage system ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120.

Using the **-dev** parameter temporarily overrides any defined value for *devId* for the current command.

-keyprotocol **IPP** | **KMIP** | **LOCAL**

(Optional) The protocol used by the storage system to communicate with the key server when using external key management (IPP, KMIP). When using local key management (LOCAL), an external key server is not required.

IPP

The storage system supports the IBM Proprietary Protocol (IPP) to communicate with the Security Guardium Key Lifecycle Manager or Guardium Key Lifecycle Manager for key server management operations. This value is the default.

KMIP

The storage system supports the Key Management Interoperability Protocol (KMIP) to communicate with the key server for key server operations.

LOCAL

The storage system supports local key management. The storage system scrambles the data key using a cryptographic algorithm and stores it locally, rather than obtaining the data key as a secret managed by an external key server. If Local Data-at-Rest Encryption is used, it is not necessary to configure external key servers.

-label *key_label*

(Optional) The label for the key group data key. This parameter is required with the **-keyprotocol** **IPP** parameter. You can enter a maximum of 64 ASCII characters for the label.

-label2 *second_key_label*

(Optional) The second label for the key group data key. You can enter a maximum of 64 ASCII characters for the label.

-type **dar** | **tct** | **endpoint**

(Optional) The type of encryption that key group will use:

dar

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

tct

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

Note: If the **-type tct** option is specified, the data at rest encryption recovery key for the storage system must be disabled. After the key group is created, the recovery key can be enabled. For details about managing a recovery key, see the [managereckey](#) command.

endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

-name *key_name*

(Optional) The user-specified name that is used to identify the key group.

key_group_ID | -

(Required) The ID for the key group. For key groups that use data at rest encryption, specify the numeral 1 as the ID. For key groups that use TCT encryption, specify a decimal number in the range 2 - 16. The default ID value is 1, which indicates a key group that is configured for data at rest encryption. Use the **shows** command to determine this maximum number. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Creating an entry for the key group on the storage system.

```
dscli> mkkeygrp -dev IBM.2107-75FA120 -label MyCompany -label2 MyCompany2 1
```

Output:

```
The key server key group 1 has been created.
```

mkkeymgr

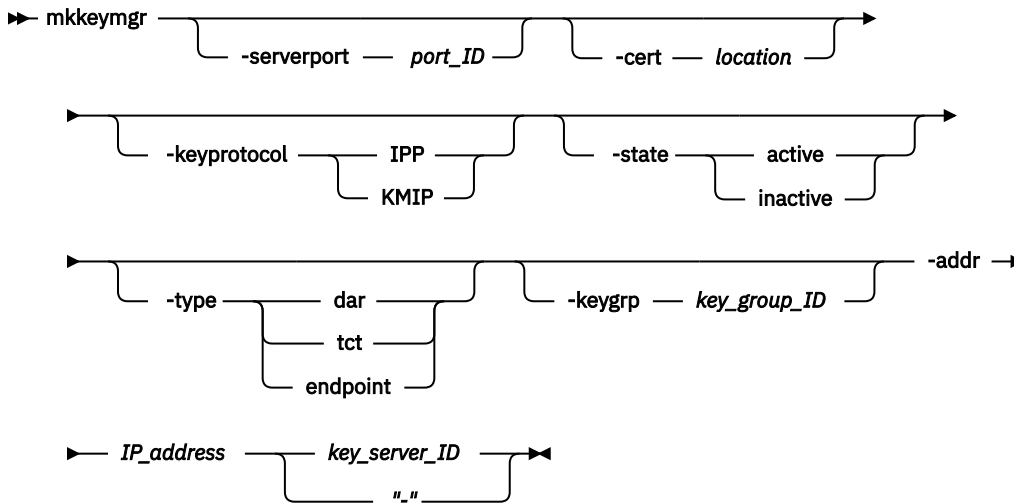
The **mkkeymgr** command creates an entry in the storage complex to access one or more key servers.

The storage system includes support for the industry-standard Key Management Interoperability Protocol (KMIP) for disk encryption. This support means that environments without IBM key management infrastructure can incorporate the storage system encryption feature into their environments that by using KMIP.

Note: The **mkkeymgr** command cannot be run from the **Embedded DS CLI** window.

The terms *key server* and *key manager* are closely related and sometimes used interchangeably. The key manager is the program that runs on a physical server and provides key services to key clients, such as the storage system. Key services include generating, storing, and retrieving encryption keys. This command uses the term *key server* to indicate both the physical server and the key manager.

To use a key group, the key client on the storage system HMC must have access to two or more key servers. A given key server is identified by an IP address and an IP port number, where the IP port also determines whether the key server requires a security protocol (TLS or not TLS) in communications. The storage system key client uses a TLS protocol if, and only if, a certificate is provided. However, if a certificate is provided and the specified IP port is a non-TLS port, or if no certificate is provided and the specified IP port is a TLS port, then the storage system key client cannot connect to the key server.



Parameters

-serverport *port_ID*

(Optional) The key server port ID. The key server port ID is 4 or 5 decimal characters. For example, 8100 is a valid server port ID.

-cert *location*

(Optional) The location of the certificate file to use as a trust anchor to authenticate the certificate of the specified key server when using a TLS security protocol. If not specified, then only non-TLS protocols that do not require a trust anchor certificate are allowed. The certificate is in the PEM or DER format. For example, C:\mystore\trust.pem.

-keyprotocol **IPP | **KMIP****

The key server protocol that the storage system communicates with to provide key server management operations.

IPP

The storage system communicates with the specified key server using the IBM Proprietary Protocol (IPP). This value is the default.

KMIP

The storage system communicates with the specified key server using the Key Management Interoperability Protocol (KMIP).

-state **active | **inactive****

(Optional) Specifies the state of the key manager.

active

The key manager is to be used to store encryption keys and it should be checked periodically to verify the status of the key manager.

inactive

The key manager is not to be used to store encryption keys and it should not be checked periodically.

-type **dar | **tct** | **endpoint****

(Optional) The type of encryption that is used by the key groups that are managed by the key manager.

dar

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

tct

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

-keygrp *key_group_ID* | -

(Optional) The ID for the key group. The key group ID is a decimal number that ranges from 1 to N, where N is the maximum number of key groups that are supported by the storage system. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode. The default ID value is 1, which indicates a key group that is configured for data at rest encryption.

-addr *IP_address*

(Required) The IP address for the key manager. The IP address can be an IPv4 address, an IPv6 address, or a DNS name.

key_server_ID | -

(Required) The key server ID. The key server ID is a decimal number that ranges from 1 to N, where N is the maximum number of key servers that the storage system can support. For example, 4.

Use the **showsp** command to determine this maximum number. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Creating an entry in the storage complex to access one or more key servers.

```
dscli> mkkeymgr -cert /home/hscroot/keyppard.pem -keyprotocol KMIP -addr  
keyppard.tuc1.stglabs.ibm.com 1
```

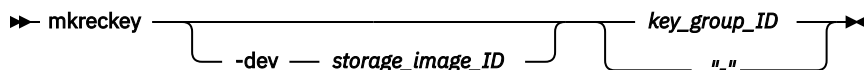
Output:

```
The key server 1 created successfully.
```

mkrekey

The **mkrekey** command is for users with security administrator authority. It is the first step in creating a new recovery key when no key currently exists.

If a key does exist, the security administrator must use the **managerekey -action rekey** command to rekey an existing key. The command returns the new key which the security administrator should copy to a safe place. The next step requires a security administrator to verify the new recovery key with the **managerekey** command.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *dev*id variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter will temporarily override any defined value for *dev*id for the current command.

key_group_ID | -

(Required) The key group ID for the new recovery key that you want to create. The key group ID is a decimal number that ranges from 1 to N, where N is the maximum number of key groups supported by the storage system. Use the **shows**i command to determine this maximum number. If you use the

dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Making a recovery key.

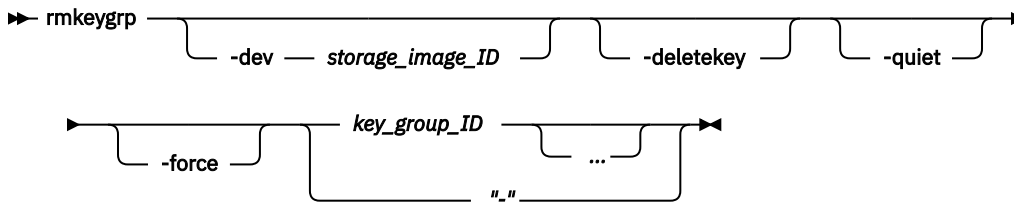
```
dscli> mkreckey -dev IBM.2107-75FA120 1
```

Output:

```
The Recovery Key 0123-4567-8912-3586-0123-4567-8912-3586-01
23-4567-8912-3586-0123-4567-8912-3586 for encryption group 1
has been created, verification pending.
```

rmkeygrp

The **rmkeygrp** command removes an entry for the key server group on a specified storage image.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified key group ID. The ID is also required if you do not set the *devid* variable in your profile or through the **setenv** command, and the storage system is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-deletekey

(Optional) the option to use during the key group delete action from the specified key server.

If you do not specify the **-deletekey** option, the key group delete action is set (by default) to deactivate.

-quiet

(Optional) Turns off the removal confirmation prompt for this command.

-force

(Optional) Deletes a Fibre Channel Endpoint Security key group, regardless of the I/O ports security status.

If you want to delete a Fibre Channel Endpoint Security key group but port security is enabled and enforced on one or more I/O ports, the force option allows the command to process but bypass I/O port security status.

key_group_ID

(Required) The ID for the key group. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Removing an entry for a key server group on a specified storage image

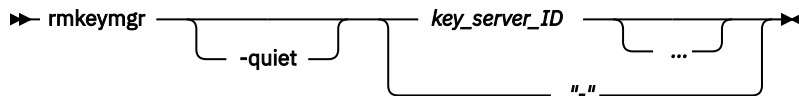
```
dscli> rmkeygrp -dev IBM.2107-75FA120 1
```

Output:

```
Are you sure you want to delete the key server group 1? y/n y
The key server group 1 has been deleted.
```

rmkeymgr

The **rmkeymgr** command removes a key server entry on the storage complex.



Parameters

-quiet

(Optional) Turns off the removal confirmation prompt for this command.

key_server_ID ... | -

(Required) Deletes the key servers with the specified key server ID. You must separate multiple IDs or ID ranges with a space between each value. The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Removing a key server entry on the storage complex.

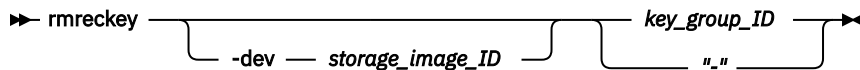
```
dscli> rmkeymgr -quiet 1 2
```

Output:

```
The key server 1 has been deleted.  
The key server 2 has been deleted.
```

rmreckey

The **rmreckey** command allows you to remove an encryption recovery key.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter will temporarily override any defined value for *devid* for the current command.

key_group_ID | -

(Required) The key group ID for the encryption recovery key that you want to deconfigure. The key group ID is a decimal number that ranges from 1 to N, where N is the maximum number of key groups supported by the storage system. Use the **shows** command to determine this maximum number. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Removing an encryption recovery key.

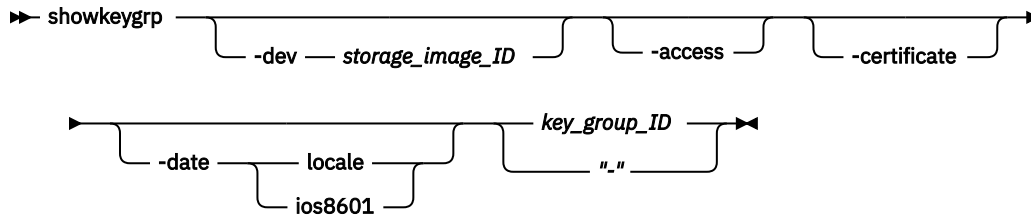
```
dscli> rmreckey -dev IBM.2107-75FA120 1
```

Output:

```
The Recovery Key for key group 1 will be de-configured after authorization.
```

showkeygrp

The **showkeygrp** command displays detailed information for a specified key group, including certificate information.



Parameters

-dev storage_image_ID

(Optional) Displays the properties for the specified storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID. Do not set the devid value in your profile or through the **setenv** command, and the HMC is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for devid for the current command.

-access

(Optional) Displays output with dates and times that the specified key group last assessed the encryption key on the key server.

Note: The **-access** and **-certificate** parameters cannot be used together.

-certificate

(Optional) Displays values of encryption X.509 certificate, such as issuer, expiration date, and subject information.

Note: The **-access** and **-certificate** parameters cannot be used together.

-date locale | iso8601

(Optional) The date and time format as follows:

locale

The locale format as set with the **-local** parameter, or by default, from the OS locale setting.

iso8601

The ISO 8601 date/time format as follows:

```
yyyy-MM-dd'T'HH:mm:ssZ
```

where:

yyyy

the year

MM

the month (01-12)

dd

the day (01-31)

HH

the hour (00-23)

mm

the minutes (00-59)

ss

the seconds (00-59)

Z

the time zone offset from UTC [-HHmm | +HHmm]

The default value is *locale*.

key_group_ID | -

(Required) The ID for the key group. The key group ID is a decimal number that ranges from 1 to *n*, where *n* is the maximum number of key groups supported by the storage system. Use the **shows** command to determine this maximum number. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying key group information.

```
dscli> showkeygrp -l
```

Output:

```
ID 1
numranks 1
numpools 1
state accessible
rekeystate configured
rekeydate 01/14/2016 15:05:30 MST
datakeydate 01/14/2016 15:05:30 MST
grpstatus critical
mgrstatus normal
label CompanyABC
label2 CompanyABC
certificate GEN2
certificate valid not before 02/03/2018 14:58:37 CST
certificate valid not after 01/27/2019 14:58:37 CST
certificate issuer C=US, ST=AZ, L=Tucson, O=IBM, OU=Storage
certificate subject C=US, ST=AZ, L=Tucson, O=IBM, OU=Storage
certificate install state Imported, Ready to Update
endpoint enabled Yes
pending cert valid not before 05/08/2017 16:57:13 CST
pending cert valid not after 05/08/2018 16:57:13 CST
pending cert issuer CN=2107-75NR641,O=Default Company Ltd,
L=Default City,
ST=ShangHai,C=CN
pending cert subject CN=2107-75NR641,O=Default Company Ltd,
L=Default City,
ST=ShangHai,C=CN
pending endpoint enabled Yes
uuid 128A829793D8A391ZZAF8X95554ACF813B58B0C98X2
B0DECFC3067XXD4D161776
keyprotocol KMIP
type ENDPOINT
name ENDPOINT_1
replication interval 60
master key manager ID 1
replication method Master Clone with Incremental Replication
```

Output definitions

ID

The key group ID.

numranks

The number of ranks that are configured in the specified key group.

numpools

The number of extent pools that are configured in the specified key group.

state

One of the following states of the key group:

accessible

The key group is accessible if it is configured. The storage image obtained the encryption key from the key server for the key group.

inaccessible

The key group is inaccessible if the storage image was unable to obtain the encryption key from the key server.

unconfigured

The key group is unconfigured if it has not been configured.

rekeying

The key group is accessible and rekeying if it has been configured. The storage image obtained the encryption key from the key server for the key group and is in the process of rekeying.

reckeystate

One of the following states of the recovery key:

configured

A new recovery key was requested, verified, and authorized.

unconfigured

A recovery key has not been created.

newkeyveripend

A new recovery key has been requested but not verified.

newkeyauthpend

A new recovery key has been requested and verified, but not authorized.

rekeyveripend

A new recovery key action has been requested but not verified.

rekeyauthpend

A new recovery key action has been requested and verified, but not authorized.

recovauthpend

A recover action has been requested, but not authorized.

deconfauthpend

A deconfigure action has been requested, but not authorized.

disabled

A recovery key has been disabled, and the key group is used without a recovery key.

enableauthpend

An enable action has been requested, but not authorized.

disableauthpend

A disable action has been requested, but not authorized.

reckeydate

The date and time of the last recovery key creation.

datakeydate

The date and time of the last data key creation. If the key group is unconfigured, then any displayed date is to be considered erroneous data.

grpstatus

One of the following access statuses of the encryption key.

Note: The **grpstatus** parameter is refreshed by either a background process that runs every 8 hours or after the **managekeygrp** command with **-action testaccess** processes. The following values that display depend on either process to determine when the **grpstatus** parameter is refreshed.

For example, if all key servers were recovered from an abnormal status, the **grpstatus** parameter displays **failed** because the status reflects either process that last completed unless a background process has started or the **managekeygrp** command with **-action testaccess** has processed again.

In addition, when a key group is created, the status always displays a "-" to indicate that the background process has not started or the **managekeygrp** command with **-action testaccess** has not processed.

critical

The key group has access to the encryption key on a single key server and it represents a potential single point of failure.

degraded

The key group has access to the encryption key on two or more key servers, but not all key servers.

failed

The key group does not have access to the encryption key on any key server.

normal

The key group has access to the encryption key on all key servers.

"_"

Indicates by the dash (-) that the key group state is either unconfigured, rekeying, or was created but the background process has not started or the **managekeygrp** command with -action testaccess has not processed.

Note: The key groups with LOCAL keyprotocol are not configured on external key servers.

mgrstatus

One of the following values of the key server path access status:

critical

At least one key server for this key group reported an access status of normal or critical.

Note: A storage system with only one HMC configured displays status as normal.

degraded

At least two key servers for this key group reported an access status of normal or degraded.

failed

All key servers for this key group reported an access status of failed.

normal

All key servers for this key group reported an access status of normal.

"_"

A dash (-) indicates that the key group state is either unconfigured or all key servers report a state of inactive.

Note: The key groups with LOCAL keyprotocol are not configured on external key servers.

label

The label that is used by the key servers to locate a specific encryption key. For example, MyCompany.

label2

The second label that is used by the key servers to locate a specific encryption key. For example, MyCompany2.

certificate

The currently activated key client certificate that is used in secure communications with the key servers. The following values are possible:

CUSTOMER

The installed customer-defined certificate.

GEN1

GEN1 is the legacy certificate that is not compliant with NIST SP 800-131a.

GEN2

GEN2 is the NIST SP 800-131a-compliant certificate.

GEN3

GEN3 is the NIST SP 800-131a-compliant certificate.

certificate valid not before

The certificate is not valid before a certain date.

certificate valid not after

The certificate is not valid after a certain date.

certificate issuer

The certificate issuer.

certificate subject

The certificate subject.

endpoint enabled

Identifies whether the IBM Fibre Channel Endpoint Security is enabled for the certificate.

certificate install state

Indicates one of several installation states:

- Not Imported
- Imported, Ready to Update
- Updated, In Use

pending cert valid not before

The pending certificate is not valid before a certain date.

pending cert valid not after

The pending certificate is not valid after a certain date.

pending cert issuer

The issuer of the pending certificate.

pending cert subject

The subject of the pending certificate.

pending endpoint enabled

Indicates whether IBM Fibre Channel Endpoint Security is enabled for the pending certificate.

UUID

The Universally Unique Identifier (UUID). The KMIP key server generates an encryption key and assigns an UUID to it. The storage system then uses the UUID to identify the encryption key on the KMIP key server.

keyprotocol

One of the following values for the key protocol server:

IPP

The storage system communicates with the specified key server using the IBM Proprietary Protocol (IPP).

KMIP

The storage system communicates with the specified key server using the Key Management Interoperability Protocol (KMIP).

LOCAL

The storage system scrambles the data key using a cryptographic algorithm and stores it locally, rather than obtaining the data key as a secret managed by an external key server. If Local Data-at-Rest Encryption is used, it is not necessary to configure external key servers.

type

The type of encryption that is used by the key group:

DAR

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

TCT

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

Endpoint

Encryption for IBM Fibre Channel Endpoint Security, which establishes authenticated communication and encryption of data in flight for Fibre Channel connections between an IBM Z host and the storage system. The connections are secured by Fibre Channel security protocols and key server authentication that uses communication certificates. If both the host and storage system use a connection with Fibre Channel ports that support encryption, the connection will transmit encrypted data between the ports.

Name

The user-specified name used to identify the key group.

replication interval

The frequency at which the SKLM master server is replicated to the SKLM clone server.

master key manager ID

The key manager ID of the master SKLM server.

replication method

The method which is used to replicate keys between redundant SKLM servers. The following replication methods are supported:

- Stand Alone
- Master-Clone
- Master-Clone with Incremental Replication
- Multi-Master

Note: For more information related to replication methods, see SKLM documentation in [IBM Docs](#).

Example 2: Displaying key group information.

```
dscli> showkeygrp -certificate 1
```

Output:

```
ID 1
certificate CUSTOMER
version 3
serial number 00:cf:86:54:6e:26:c7:c2:01
issuer O=ibmDisk,C=US
not valid before 08/24/2018 15:00:02 MST
not valid after 08/11/2032 17:36:55 MST
subject CN=2107-75NR641,O=ibmDisk,C=US,uid=DS8K-2107-75NR641
wWNN OTHERNAME=50:05:07:63:09:SF:C5:EE
size 2048
signature algorithm SHA256withRSA
SHA-256 fingerprint 1b:9d:7e:71:62:c9:80:4c:30:d8:4c:7c:6c:b0:c5:ac:4d:6f:4b:8c:ef:a7:f8:
ec:5e:fa:b6:20:c8:cf:65:93
public key algorithm RSA
public key exponent 65537
authority key id 37:8a:3d:1b:8b:0c:1e:f2:c2:c5:ed:ea:8c:65:a9:07:fd:c2:a9:e4
subject key id ad:8f:e8:ee:bd:e1:48:4f:c5:14:68:7b:52:a7:0d:c2:41:87:d7:16
pem format -----BEGIN CERTIFICATE-----
MIIDqjCCApKgAwIBAgIJAM+DvD4mycIBMA0GCSpGSIb3DQEBChUAMB8xCzBjBGNVBAWY1VTRAWdGyYDVQ
QKEwdpYm1EaXN1MB4XDTE4MDgyNDIyMDAwMlloXDTMyMDgxmjAwMzY1NVowWTEhMB8GCgmSjOMT8ixkBQE
TEURT0EstMjEwNy03NU5SNjQxMQswCQYDVQ0GQGEwJVUzEQMA4GA1UEChMHhWJtRG1zaZEVMBMGA1UEAxMM
jEwNy03NU5SNjQxMIIIBIjANCgkqhkiG9w0BAQEFAAOCAQ7AMIIBCgKCAQEArbVmVAIIbaARrMeIobZhgQe
hw9VA16Van7a15faaEJ0yWg02oYts7pwC86B7JyzEYAgN6Gb/s1Y1YgW0m18axJcgbhW856DK+K9A23NSr
YHgv+Dqb7Qp+R6TD7j01wv/ecY7nYAPgc4h5YWW06+iMbnV7oHZkFRLSVdqCT2ntThupD2UzQBNLoSax9bk
+kkeU7DH/zCL1SjoHF/pbhZg1yIkuVLukZGVGY1z0RLVa/gMTNQAwNnIwJnivswL83M17Wudq76ug6xS4zPj
FCBbCOM50Nf/MhH68UE/lv4r63rJ6IWXwf2iadBM+zxJbr4tjHHX9Mw8NkdiV0zW5dX01wIDAQABo4GuMIGrMEc
GA1UdIwRAMD6AFDeKPRuLDB7ywsXt6oxLqQf9wqkkoS0kITAFMQswCQYDVQ0GQGEwJVUzEQMA4GA1UEChMHhWJt
RG1zaZ4IBADAdBgNVHQ4EFgQUrY/o7r3hSE/FFGh7UqcNwKGH1xYwDgYDVDR0PAQH/BAQDAgWgMDEGA1UdEQQm
CigJgYJKoZIhviIAQEB0BMFzUw0jA10jA30jYz0jA50kZG0kM10kREMA0GCSpGSIb3DQEBChUAA4IBAQBicL1
7U4j96rUIU85+udvY6u+jfj9kbvIViZHQ/gJYP46Z00m5iMmQgfV2YBJPOa96RCtDS5gJj/7xU5P7jTxfcmoUWU
bge37oDHy7QSG3of587Izf2quZskZOPUhhjYlzfGfIQw89YUxbA6ivsneKjuAXAv1IIs3SiD7RE3I3PYv9X9S5R35e
tmJN9W1F+DKhI2uT92S91xTfDtXNm0PvVUJbGK0h915rCkezbp1t0/CvGUiw6cwufnva3rNjPL84a7gy9REY0oe
sW5JW4KpwMhfX9gr4aGNj/caE70gZ4N7XtGzXpsTB3LqOEESCU1sg0VXBwQXpXZjHiJu11HpzI
-----END CERTIFICATE-----
```


Output definitions

ID

The ID of the certificate.

certificate

The type of certificate.

version

The version of the certificate.

serial number

The serial number that uniquely identifies the certificate.

issuer

The entity that verified the information and signed the certificate.

not valid before

The earliest time and date on which the certificate is valid.

not valid after

The time and date past which the certificate is no longer valid.

subject

The entity a certificate belongs to: a machine, an individual, or an organization.

WWNN

The world wide node name that is associated with the certificate.

size

The key size of the certificate.

signature algorithm

The cryptographic algorithm used to sign the certificate.

SHA-256 fingerprint

The unique identifier of the certificate.

public key algorithm

The algorithm that is used to encrypt a pair of keys known as a public key and a private key (a public key pair), which are associated with an entity that needs to authenticate its identity electronically or to sign or encrypt data. Each public key is published and the corresponding private key is kept secret. Data that is encrypted with the public key can be decrypted only with the corresponding private key.

public key exponent

The value that is used to shorten the key size for encryption and signature verification.

authority key id

The ID that identifies the public key that is being used to verify the signature on this certificate.

subject key id

The ID that identifies the public key that is being certified.

pem format

The privacy enhanced mail (PEM) format for the certificate.

Example 3: Displaying key group information.

```
dscli> showkeygrp -access 1
```

Output:

| ID | KeyMgr | LastAccess | LastSuccess | LastFailure |
|----|--------|------------|-------------------------|-------------------------|
| 1 | 1 | success | 2013-12-11T06:37:46-700 | 2013-04-26T16:23:18-700 |
| 1 | 2 | failure | 2013-11-29T21:22:09-700 | 2013-12-11T06:37:47-700 |

Output definitions

ID

The key group ID in ranges from 1 to the number of key groups. Use the **showsi** command to determine the number of supported groups.

KeyMgr

The key server ID in ranges from 1 to the number of key servers. Use the **showsp** command to determine the number of supported key servers.

LastAccess

The result of the last access attempt. The following values are possible:

success

The LastSuccess date is more recent than the LastFailure date.

failure

The LastFailure date is more recent than the LastSuccess date.

inactive

The key server is in an inactive state. The encryption key access test to this key server cannot be performed.

A "-" (dash) displays if the specified encryption key server has never attempted to access the encryption key.

LastSuccess

The date and time of the last successful attempt of the specified key group to access the encryption key on the key servers. The output displays in ISO 8601 data/time format.

```
yyyy-MM-dd 'T' HH:mm:ssZ
```

where:

yyyy

The year

MM

The month (01-12)

dd

The day (01-31)

HH

The hour (00-23)

mm

The minutes (00-59)

ss

The seconds (00-59)

Z

The time zone offset from UTC [-HHmm | +HHmm]

"_"

A "-" (dash) displays if the specified key server has never successfully accessed the encryption key.

LastFailure

The date and time of the last failed attempt of the specified key group to access the encryption key on the key servers. The output displays in ISO 8601 data/time format.

```
yyyy-MM-dd 'T' HH:mm:ssZ
```

where:

yyyy

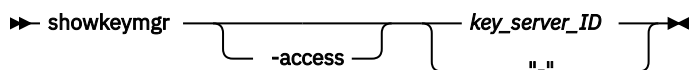
The year

- MM**
The month (01-12)
- dd**
The day (01-31)
- HH**
The hour (00-23)
- mm**
The minutes (00-59)
- ss**
The seconds (00-59)
- Z**
The time zone offset from UTC [-HHmm | +HHmm]
- "_"**
A "-" (dash) displays if the specified key server has never failed to access the encryption key.

showkeymgr

The **showkeymgr** command displays detailed properties of a specified key server entry. This command also displays when the hardware management console (HMC) last accessed the specified key server.

The terms *key server* and *key manager* are closely related and sometimes used interchangeably. The key manager is the program that runs on a physical server and provides key services to key clients, such as the storage system. Key services include generating, storing, and retrieving encryption keys. This command uses the term *key server* to indicate both the physical server and the key manager.



Parameters

-access

(Optional) Displays a table that includes dates and times that each HMC last accessed the specified key server.

key_server_ID

(Required) The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. Use the **showsp** command to determine the number of supported key servers.

Example 1: Displaying key server information.

```
dscli > showkeymgr 1
```

```
Date/Time: January 3, 2018 11:37:07 AM MST IBM DSCLI Version: 0.0.0.0 DS:
```

Output:

```

ID          1
State       active
Status      normal
addr        keyhler.tuc.stglabs.ibm.com
port        5697
protocol    tls
keyprotocol KMIP
certificate keyhler.pem
type        DAR
keygrp      1

```

Output definitions

ID

The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. For example, 1.

Use the **showsp** command to determine the number of supported key servers.

State

The key activation state with the following values:

active

The key server is configured for a key exchange with the specified HMC.

inactive

The key server is configured, but will not exchange any key with the specified HMC.

Status

The status of the key path with one of the following values:

critical

Only one HMC has access to the specified key server and it represents a potential single point of failure. This status replaces `hmc1_degraded` and `hmc2_degraded` on newer storage systems.

Note: A storage system with only one HMC configured displays status as `normal`.

degraded

Two or more HMCs have access to the specified key server, but at least one HMC does not.

failed

Neither HMC1 or HMC2 have access to the specified key server.

hmc1_degraded

HMC2 has access to the specified key server, but HMC1 does not.

Newer storage systems display this status as `critical`.

hmc2_degraded

HMC1 has access to the specified key server, but HMC2 does not.

Newer storage systems display this status as `critical`.

normal

All HMCs have access to the specified key server.

"_"

The dash (-) indicates that the specified key server is not an active key server.

addr

The key server IP address is in an IPv4 or IPv6 format.

port

The key server port number, which is 4 or 5 decimal characters from 1 – 65535. For example, 8100.

protocol

The connection protocol, where:

none

No encryption protocol is used.

tls

Allows protocols SSLv3, TLSv1.0, TLSv1.1, and TLSv1.2.

Note: The actual TLS protocol that is used depends also on whether the storage system was set to NIST 899131a-compliant.

keyprotocol

One of the following values for the key protocol server:

IPP

The storage system communicates with the specified key server using the IBM Proprietary Protocol (IPP).

KMIP

The storage system communicates with the specified key server using the Key Management Interoperability Protocol (KMIP).

certificate

The certificate file. A dash (-) is displayed if no certificate was specified.

type

The type of encryption that is used by the key groups that are managed by the key manager.

DAR

Encryption for data at rest, which encrypts data that is stored on your storage system. This value is the default.

TCT

Encryption for transparent cloud tiering, which ensures that data is encrypted before it is transferred to cloud storage. The data remains encrypted in cloud storage and is decrypted after it is transferred back to the storage system.

Endpoint

Specifies encryption for IBM Fibre Channel Endpoint Security, which provides authentication of participating hosts and storage devices to ensure a secure transmission of encrypted data using industry methods.

keygrp

The key group ID that is associated with this key manager.

Example 2: Displaying access information about the specified key server.

```
dscli > showkeymgr -access 1
```

Output:

Date/Time: December 11, 2013 8:57:44 AM MST IBM DSCLI Version: 7.7.20.524 DS:

| ID | hmc | LastAccess | LastSuccess | LastFailure |
|----|------|------------|-------------------------|-------------------------|
| 1 | hmc1 | success | 2017-12-11T06:37:46-700 | 2017-04-26T16:23:18-700 |
| 1 | hmc2 | failure | 2017-11-29T21:22:09-700 | 2017-12-11T06:37:47-700 |

Output definitions**ID**

The key server ID, in the range from 1 - *n*, where *n* is the number of key servers. For example, 1.

Use the **showsp** command to determine the number of supported key servers.

hmc

The HMC on which access was attempted. The possible values are hmc1 (primary) or hmc2 (secondary).

LastAccess

The result of the last access attempt. The possible values include **success** and **failure**.

A "-" (dash) displays if the HMC has never attempted to access the specified key server.

LastSuccess

The date and time of the last successful attempt by the HMC to access the specified key server. The output displays in ISO 8601 data/time format.

```
yyyy-MM-dd 'T' HH:mm:ssZ
```

where:

yyyy

the year

MM

the month (01-12)

dd

the day (01-31)

HH

the hour (00-23)

mm

the minutes (00-59)

ss

the seconds (00-59)

Z

the time zone offset from UTC [-HHmm | +HHmm]

"_"

A "-" (dash) displays if the HMC has never successfully accessed the specified key server.

LastFailure

The date and time of the last failed attempt by the HMC to access the specified key server. The output displays in ISO 8601 data/time format.

```
yyyy-MM-dd'T'HH:mm:ssZ
```

where:

yyyy

the year

MM

the month (01-12)

dd

the day (01-31)

HH

the hour (00-23)

mm

the minutes (00-59)

ss

the seconds (00-59)

Z

the time zone offset from UTC [-HHmm | +HHmm]

"_"

A "-" (dash) displays if the HMC has never failed to access the specified key server.

User access security commands

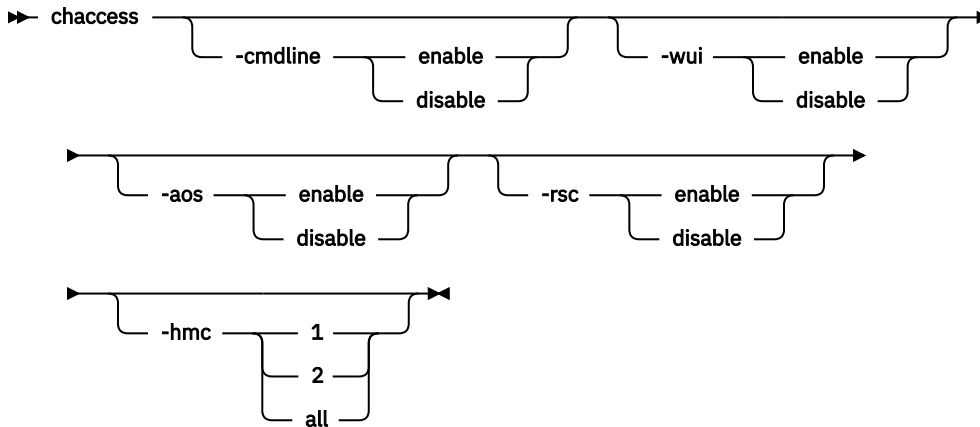
User access commands are used to manage network security on the storage system by using the DS CLI.

The following user access security commands are available:

- **chaccess** - The **chaccess** command allows for changing one or more access settings of a Hardware Management Console.
- **lsaccess** - The **lsaccess** command displays the access settings of a Hardware Management Console.
- **manageaccess** - The **manageaccess** command manages the security protocol access settings of a Hardware Management Console (HMC) for all communications to and from the storage system.
- **showaccess** - The **showaccess** command displays the access properties of a specified HMC.

chaccess

The **chaccess** command changes one or more access settings of a hardware management console (HMC). Only users with administrator authority can access this command.



Parameters

-cmdline enable | disable

(Optional) Enables or disables the command line shell access to the HMC through the Internet or a VPN connection. This command affects service access only and does not change access to the system through the DS Command Line Interface. At least one parameter **-cmdline**, **-wui**, or **-aos** must be specified.

-wui enable | disable

(Optional) Enables or disables the Web User Interface (WUI) access on the HMC through the Internet or a VPN connection. This command affects service access only and does not change access to the storage system through the GUI. At least one parameter **-cmdline**, **-wui**, or **-aos** must be specified.

-aos enable | disable

(Optional) Enables or disables the Assist On-Site (AOS) connection to the HMC for IBM service. At least one parameter **-cmdline**, **-wui**, or **-aos** must be specified.

-rsc enable | disable

(Optional) Enables or disables the remote support center (rsc) service for remote access. At least one parameter **-cmdline**, **-wui**, **-aos**, or **-rsc** must be specified.

-hmc 1 | 2 | all

(Optional) The HMC to which the access settings to apply. hmc 1 specifies the primary HMC, and hmc 2 specifies the secondary HMC. The default value all specifies the primary HMC on a single HMC system, and both the primary and secondary HMCs on a dual HMC system.

Example: Changing one or more access settings of an HMC

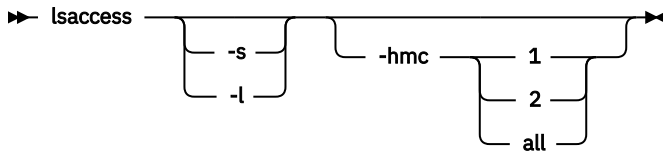
```
dscli> chaccess -cmdline enable -wui enable -hmc 1
```

Output

```
hmc1 successfully modified.
```

lsaccess

The **lsaccess** command displays the access settings of the primary and backup hardware management consoles (HMCs).



Parameters

-s

(Optional) Displays only attributes that are identified as short output. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional) Displays default output plus extra attributes that are identified as long output. You cannot use the **-l** and the **-s** parameters together.

-hmc 1 | 2 | all

(Optional)

Example: Displaying the access settings of the primary and backup HMCs

```
dscli> lsaccess -l
```

Output

Note: For DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as tables.

```
hmc          hmc1
cmdline      enabled
wui          enabled
aos          disabled
vpn          disabled
rsc          enabled
```

Output definitions

hmc*

The HMC identifier.

cmdline

The status, enabled or disabled, of the command line interface for service access through an Internet or VPN connection. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

This field is for service access only and is not related to access to the storage system through the DS CLI.

wui

The status, enabled or disabled, of the Web user interface (WUI) for service access through an Internet or VPN connection. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

aos

The status, enabled or disabled, of Assist On-Site (aos) for connection to the HMC for service. If the client is not connected to an HMC or if the query is not supported by the server, a dash (-) indicates that the information is not available.

vpn+

The status, enabled or disabled, of the outbound VPN connection. A status of enabled means that a VPN connection exists, and a status of disabled means that a VPN connection does not exist. Indicates whether the modem is enabled or disabled for access through an Internet or VPN connection. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

Note: Starting with DS8000 Release 8.0, VPN is no longer available as a remote support connectivity option for call home and remote access functions.

rsc

The status, enabled or disabled, of the remote support center service.

- Enabled - the remote support center service is started.
- Disabled - the remote support center service is stopped.

If the client is not connected to an HMC, or the HMC is not running rsc, a dash (-) indicates unknown status.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-1** parameter is specified.

manageaccess

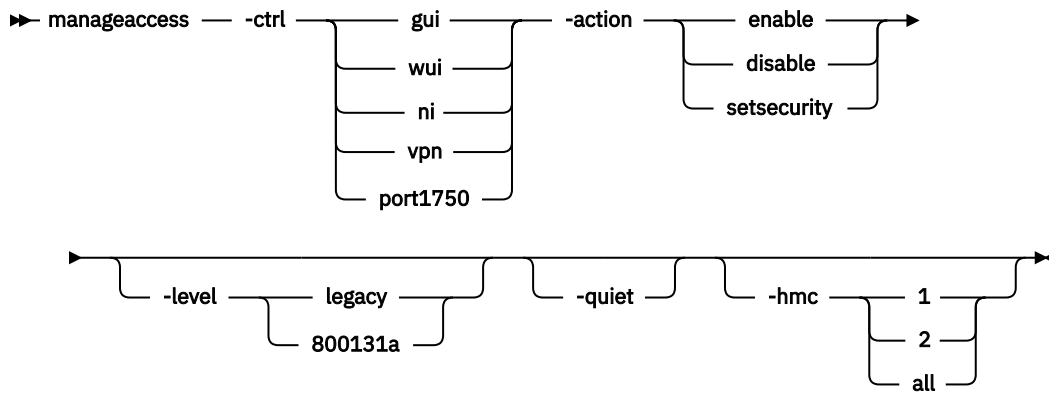
The **manageaccess** command manages the security protocol access settings of a hardware management console (HMC) for all communications to and from the storage system. You can also use the **manageaccess** command to start or stop outbound virtual private network (VPN) connections instead of using the **setvpn** command.

When a storage system is installed, the HMC sends a certificate (signed public key) for server authentication. A certificate is also sent for encrypting communications of applications that use VPN (Internet) connection. You can use the **manageaccess** command to start or stop a VPN session and to create a secure VPN connection. The IBM VPN server also provides extra authentication to allow traffic to certain servers only, for the call home feature and for remote service.

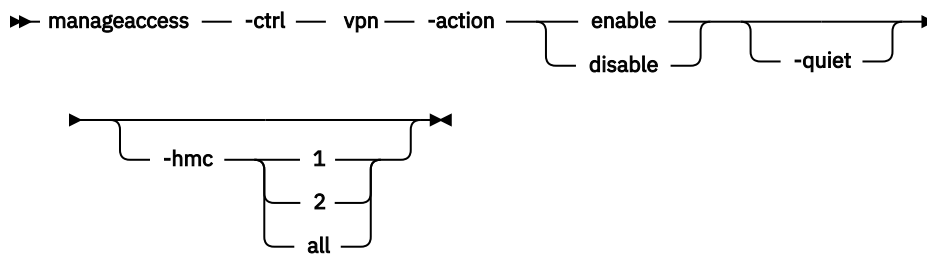
Notes:

1. Only users with admin authority can access the **manageaccess** command.
2. Only support personnel with special access rights can use the VPN connection.
3. The VPN connection is used when remote access is required by support personnel and no local onsite access to the system is available.
4. The VPN connection can take 2 - 10 minutes for the secure connection to be established and recognized by the RS3/RS4 server.
5. The secure VPN connection ends automatically when the terminal emulation session ends. However, you can end the session earlier by using the **manageaccess -action disable -ctrl vpn** command.

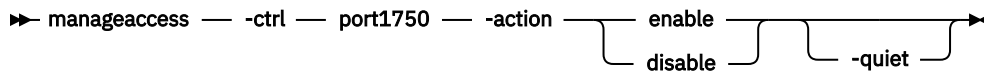
See the related link for a description of the behavior of the **-hmc** parameter.



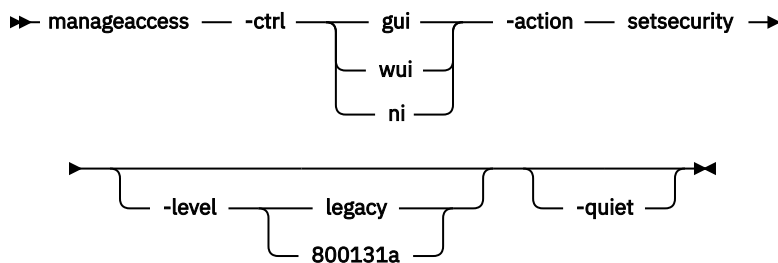
The following diagram shows the **manageaccess** command with the **-ctrl** parameter value set to `vpn`. The valid **-action** values for this control are `enable` and `disable`.



The following diagram shows the **manageaccess** command with the **-ctrl** parameter value set to `port1750`. The valid **-action** values for this control are `enable` and `disable`.



The following diagram shows the **manageaccess** command with the **-ctrl** parameter value set to `gui` | `wui` | `ni`. The valid **-action** value for these controls is `setsecurity`. You must also specify the **-level** parameter.



Parameters

-ctrl | `gui` | `wui` | `ni` | `vpn` | `port1750`

`gui`

The inbound connection protocol to the DS8000 Storage Management GUI through browsers such as Internet Explorer or Firefox. Set this control to the 800131a level only when all browsers that are accessing the DS8000 Storage Management GUI can support the NIST SP800-131a protocol.

The valid **-action** value for this control is `setsecurity`. You must also specify the **-level** value, either `legacy` or `800131a`.

For information about browser access to the Web User Interface (WUI), see the following definition.

Note: Setting this control causes the DS8000 Storage Management GUI to restart. All DS8000 Storage Management GUI users are forced to log on again.

wui

The inbound connection protocol to the service GUI or Web User Interface (WUI) through browsers such as Internet Explorer or Firefox. Set this control to the 800131a level only when all browsers that are accessing the WUI can support the NIST SP800-131a protocol.

The valid **-action** value for this control is `setsecurity`. You must also specify the **-level** value, either `legacy` or `800131a`.

For information about browser access to the GUI, see the preceding definition.

Note: Setting this control requires manually rebooting the HMC for the change to take effect.

ni

The inbound connection protocol to the storage system from external programs such as the DS CLI, Copy Services Manager, and others, through the network interface (NI). Set this control to the 800131a level only when all external programs that are accessing the storage system can support the NIST SP800-131a protocol.

The valid **-action** value for this control is `setsecurity`. You must also specify the **-level** value, either `legacy` or `800131a`.

Notes:

1. Setting the security mode on this control from `legacy` to `800131a` disables the `port1750` control. Setting the security mode on this control from `800131a` to `legacy` restores the `port1750` control to its previous value, either disabled or enabled.
2. Setting this control causes the NI server to restart. Any users who meet the specified security level requirements automatically reconnects. However, all commands from the NI client programs, such as DS CLI and Copy Services Manager, fail until the NI server completes rebooting.

vpn

The outbound IBM service connection. The valid **-action** values for this control are `enable` and `disable`. Setting this control does not cause any server to reboot.

Note: Starting with DS8000 Release 8.0, VPN is no longer available as a remote support connectivity option for call home and remote access functions.

port1750

The inbound port 1750 to the storage system from external legacy programs, such as the DS CLI, Copy Services Manager, and others that were created before Release 7.2. Release 7.2 and later programs use the new 1751 port with an NIST SP 800-131a-compliant certificate. The 1750 port uses a certificate that is not compliant with NIST SP 800-131a.

The valid **-action** values for this control are `enable` and `disable`.

Notes:

1. If the `ni` control is set to `legacy`, you can use this control to enable or disable the 1750 port. If the `ni` control is set to `800131a`, this control is set to **disabled** and cannot be enabled.
2. Setting the security mode on the `ni` control from `legacy` to `800131a` disables this control. Setting the security mode on the `ni` control from `800131a` to `legacy` restores this control to its previous value, either disabled or enabled.
3. Setting this control does not cause any server to restart.

-action enable | disable | setsecurity

An action to apply to the specified access control, as follows:

enable

The access control is enabled. This value is valid when the **-ctrl** value is `vpn` or `port1750`.

disable

The access control is disabled. This value is valid when the **-ctrl** value is `vpn` or `port1750`.

setsecurity

The security level to use with the specified access control. This value is valid when the **-ctrl** value is `, gui, wui, or ni`.

-level legacy | 800131a

(Optional) The security protocol level. Each connection automatically uses the highest level security protocol that is supported by both ends of the connection.

This parameter is valid for the following controls: `, gui, wui, and ni`, with the **-action** value of `setsecurity`.

The following security protocols are allowed:

legacy

SSLv3, TLSv1.0, TLSv1.1, TLSv1.2, and later.

800131a

TLSv1.2 and later.

Note: NIST SP 800-131a requires a minimum security level of TLSv1.2 or later.

-quiet

(Optional) Turns off the confirmation prompt for the **manageaccess** command.

-hmc 1 | 2 | all

(Optional) The primary (1), secondary (2), or both (all) HMCs for which access is modified.

Notes:

1. `-hmc 1` specifies the primary HMC, and `-hmc 2` specifies the secondary HMC regardless of how `-hmc1` and `-hmc2` were specified during the DS CLI startup. A DS CLI connection can succeed if, at DS CLI startup, a user inadvertently uses `-hmc2` to specify the primary HMC and `-hmc1` to specify the secondary HMC. Therefore, using `-hmc 1` in this command still refers to the actual primary HMC.
2. This parameter is valid only with the **-ctrl** `vpn` option and **-action** values of `enable` or `disable`. All other controls apply to all HMCs unless otherwise specified.

Example: Managing the security protocol access settings of an HMC for all communications to and from the DS8000 system

```
dscli> manageaccess -ctrl vpn -action enable
```

Output

```
CMUN00022E manageaccess: The specified operation is unsupported.
```

showaccess

The **showaccess** command displays the access properties of a specified Hardware Management Console (HMC).

```
► showaccess           HMC_ID          
                            "_"          
```

Parameters**HMC_ID | -**

(Required) The primary (`hmc1`) or the secondary (`hmc2`) HMC for which the properties are displayed.

Note: The hmc1 value specifies the primary HMC, and the hmc2 value specifies the secondary HMC, regardless of how -hmc1 and -hmc2 were specified during the DS CLI startup. A DS CLI connection can succeed if you inadvertently specify a primary HMC as -hmc2 and the secondary HMC as -hmc1 when you start the DS CLI. If so, by using hmc1 in this command still refers to the actual primary HMC.

Example: Displaying the access properties of an HMC

```
dscli> showaccess hmc1
```

Output

```
dscli> showaccess hmc 1
hmc                hmc1
cmdline            enabled
wui                enabled
vpn                disabled
aos                disabled
rsc                enabled
port1750           enabled
gui(security)      800131a
ni(security)       legacy
wui(security)      legacy
```

Output definitions

hmc

The HMC for which access properties are listed. hmc1 is the primary HMC, and hmc2 is the secondary HMC.

cmdline

The status, enabled or disabled, of the command-line shell on the HMC through an Internetor VPN connection. This information is for service access only and is not related to access to the system through the DS command-line interface. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

wui

The status, enabled or disabled, of the Web User Interface (WUI) on the HMC through an Internetor VPN connection. This information is for service access only and has no effect on access to the system by the DS8000 Storage Management GUI. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

vpn

The status, enabled or disabled, of the outbound VPN connection. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

Note: Starting with DS8000 Release 8.0, VPN is no longer available as a remote support connectivity option for call home and remote access functions.

aos

The status, enabled or disabled, of the Assist On-Site (aos) connection to the HMC for service. If the client is not connected to an HMC or if the query is not supported by the server, a dash (-) indicates that the information is not available.

rsc

The status, enabled or disabled, of the connection for remote support center service.

- Enabled - the remote support center service is started.
- Disabled - the remote support center service is stopped.

If the client is not connected to an HMC, or the HMC is not running rsc, a dash (-) indicates unknown status.

port1750

The status, enabled or disabled, of the legacy port 1750. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

gui (security)

The security protocol that is allowed for the inbound connections to the DS8000 Storage Management GUI server on the HMC or HMCs. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

The allowed security protocols are as follows:

legacy

SSLv3, TLSv1.0, TLSv1.1, TLSv1.2, and later.

800131a

TLSv1.2 and later.

ni (security)

The security protocol that is allowed for the inbound connections to the network interface (NI) server on the HMC or HMCs that the DS CLI, TPC, TPC-R, and other programs use. If the client is not connected to an HMC, a dash (-) indicates that the information is not available.

The allowed security protocols are as follows:

legacy

SSLv3, TLSv1.0, TLSv1.1, TLSv1.2, and later.

800131a

TLSv1.2 and later.

wui (security)

The security protocol that is allowed for the inbound connections to the service GUI, or WUI, server on the HMC or HMCs. The allowed security protocols are as follows:

legacy

SSLv3, TLSv1.0, TLSv1.1, TLSv1.2, and later.

800131a

TLSv1.2 and later.

Storage complex configuration commands

Various commands are available to configure a storage system.

The following storage complex configuration commands are available:

chsp

Modifies a storage complex for items such as notification of the Simple Network Management Protocol (SNMP) traps and email problem notification lists in a storage complex.

lsvpn

Displays a report that lists the outbound VPN information such as management consoles and connection status.

Note: Starting with DS8000 Release 8.0, VPN is no longer available as a remote support connectivity option for call home and remote access functions.

setvpn

Used when remote access is required by support personnel and there is no local onsite access to the storage system.

Note: Starting with DS8000 Release 8.0, VPN is no longer available as a remote support connectivity option for call home and remote access functions.

showsp

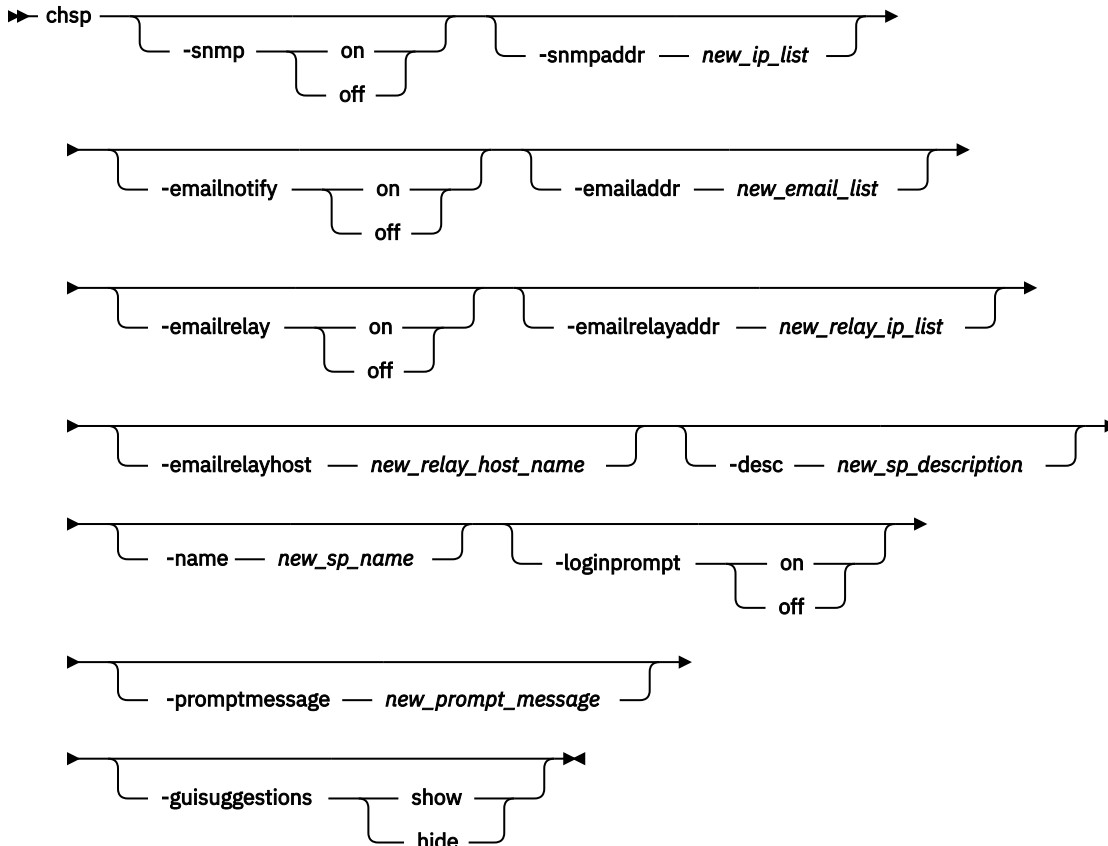
Generates a report that displays detailed properties of a storage complex.

chsp

The **chsp** command modifies a storage complex for items such as notification of the Simple Network Management Protocol (SNMP) traps and email problem notification lists in a storage complex.

Notes:

- The Storage Manager server domain is a single storage complex. The storage complex object can be created or deleted only by service personnel.
- The SNMP settings apply to only some types of SNMP notifications (Example: Copy Services).



Parameters

-snmp on | off

(Optional) The Simple Network Management Protocol (SNMP) trap notification function sends notifications when a problem occurs on a storage complex. SNMP traps that are generated by the storage complex are sent to the IP address that is specified by the **-snmpaddr** parameter.

-snmpaddr: new_ip_list

(Optional) A new SNMP trap destination list. This list consists of one or two IP addresses that receive SNMP traps that are generated by the storage complex if SNMP is enabled.

Note: Multiple IP addresses must be separated with a comma with no space before or after each comma.

-emailnotify on | off

(Optional) Email notifications are sent to the designated email addresses when a problem occurs on a storage complex.

When you enable the **-emailnotify** and **-emailrelay** parameters, the email notification is sent directly to the IP address that is associated with the **-emailrelayhost** *hostname* parameter.

However, if the email relay host name is not specified, the email notification is sent directly to the email relay address.

When email notify is enabled and email relay is disabled, the email notification is sent directly to the specified email address.

-emailaddr *new_email_list*

(Optional) The email IP address or addresses where problem notifications are sent. You can specify two IP addresses.

Note: Multiple IP addresses must be separated with a comma with no space before or after the comma.

-emailrelay on | off

(Optional) When you enable the **-emailrelay** and **-emailnotify** parameters, the email notification is sent directly to the IP address that is associated with the **-emailrelayhost *new_relay_host_name*** parameter. However, if the email relay host name is not specified, the email notification is sent directly to the email relay address.

When email notify is enabled and email relay is disabled, the email notification is sent directly to the specified email address.

-emailrelayaddr *new_relay_ip_list*

(Optional) The email relay IP address list. You can specify two IP addresses.

Note: Multiple IP addresses must be separated with a comma with no space before or after the comma.

-emailrelayhost *new_relay_host_name*

(Optional) The new email relay host system name.

-desc *new_sp_description*

(Optional) Your description of the storage complex. This description is limited to 256 byte or 128 double-byte characters.

-name *new_sp_name*

(Optional) The name that you designate for the storage complex. This name is limited to 32 byte or 16 double-byte characters.

-loginprompt on | off

(Optional) Whether the login prompt is enabled or disabled.

-promptmessage *new_prompt_message*

(Optional) The detailed prompt message. You cannot modify prompt message if the **-loginprompt** parameter is set to **off**.

-guisuggestions show | hide

(Optional) Whether suggested tasks are shown or hidden in the task icon at the top right of the Storage Manager GUI. The default is **show**.

Example: Modifying a storage complex

```
dscli> chsp -desc "my storage complex"
```

Output:

```
Storage-complex IBM.2107-75FA120 successfully modified.
```

setvpn

The **setvpn** command starts or ends an outbound virtual private network connection (VPN).

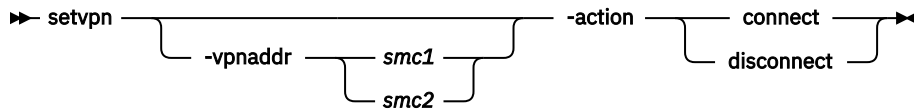
Note: VPN is no longer supported as a remote support connectivity option for call home and remote access functions. As a result, starting with DS8000 Release 8, the **setvpn** command is no longer supported.

During the installation, the hardware management console (HMC) sends a certificate (signed public key) for server authentication and for SSL encryption of applications using VPN (Internet and modem) connections.

You can use the **setvpn** command to start or stop the session and to create a secure connection. In addition, the VPN server does additional authentication to allow traffic to certain servers only, for the call home feature and remote service.

Notes:

1. Only technical support personnel with special access rights can use the VPN connection.
2. The **setvpn** command is used when remote access is required by technical support personnel and there is no local on-site access to the machine.
3. It can take from 2 to 10 minutes for the secure connection to be established and recognized by the RS3/RS4 server.
4. The secure connection ends automatically when the terminal emulation session ends. However, you also have the ability to end the session earlier by issuing the **setvpn -action disconnect** command.
5. The **-vpnaddr** parameter requires that you specify a value for either *smc1* or *smc2*. If you do not specify the **-vpnaddr** parameter, the storage management console (SMC) for the current connection is used. The SMC address is taken from the profile file or the SMC address that you specify on the DS CLI command line.



Parameters

-vpnaddr *smc1* | *smc2*

(Optional) The VPN server machine. In addition, you can specify where you want the outbound VPN to start from by designating the following values:

smc1

The management console (SMC) where you want the outbound VPN to start from. The console that you have specified in your profile for *hmc1* starts your DS CLI session, unless you specify a console that is not designated in your profile. In this case, the console that you specify to start your session is the one where the connection is made.

smc2

The management console where you want the outbound VPN to start from. The console that you have specified in your profile for *hmc2* starts your DS CLI session, unless you specify a console that is not designated in your profile. In this case, the console that you specify to start your session is the one where the connection is made.

-action **connect** | **disconnect**

(Required) The secure VPN connection be started or disconnected.

Example: Starting or ending an outbound virtual private network connection (VPN)

```
dscli> setvpn -vpnaddr smc1 -action connect
```

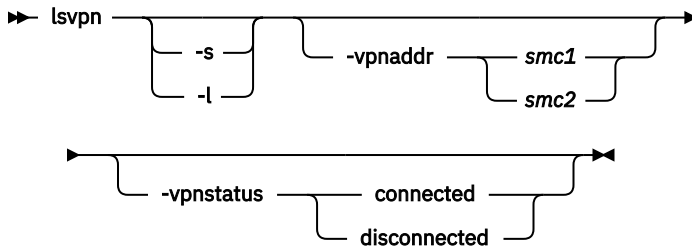
Output

```
Sun July 10 02:23:49 PST 2016 DS CLI Version: 5.0.0.0 DS: IBM.2107-75FA120  
Secure connection started.
```

lsvpn

The **lsvpn** command displays a report that lists the outbound VPN information such as management consoles and connection status.

Note: VPN is no longer supported as a remote support connectivity option for call home and remote access functions. As a result, starting with Release 8, the **lsvpn** command is no longer supported.



Parameters

-s

(Optional) Displays the management console (SMC) and connection status. You cannot use the **-l** and **-s** parameters together.

-l

(Optional) Displays the management console (SMC) and connection status. You cannot use the **-l** and **-s** parameters together.

-vpnaddr *smc1* | *smc2*

(Optional) The VPN server machine. In addition, you can specify where the outbound VPN was started from by designating the following values:

smc1

The management console (SMC) where the outbound VPN was started from. The console in your profile for hmc1 starts your DS CLI session, unless you specify a console that is not designated in your profile. In this case, the console you specified to start your session is the one reported where the connection was made.

smc2

The management console where the outbound VPN was started from if you did not start it from the management console that is identified by *smc1*. The console in your profile for hmc2 starts your DS CLI session, unless you specified a console that is not designated in your profile. In this case, the console that you specified to start your session is the one reported where the connection was made.

Note: The default value is to display the address for *smc1* and *smc2*. If you do not specify the **-vpnaddr** parameter, the generated report displays both the *smc1* and *smc2* addresses as they are recorded in your profile.

-vpnstatus *connected* | *disconnected*

(Optional) You receive a report that displays only the SMC for the connection status specified.

Note: The default value is to display the connection status for all SMCs. The generated report displays all connected and disconnected SMCs.

Example: Displaying a report that lists the outbound VPN information

```
dscli> lsvpn -l
```

Output

Note: For DS CLI list commands, the results are shown in table format for clarity. The actual reports do not display as tables.

The following table represents the headers that are displayed on the output report that is associated with the **lsvpn** command.

| VPN Address | VPN Status |
|-------------|--------------|
| smc1 | Connected |
| smc2 | Disconnected |

showsp

The **showsp** command displays a properties report for a storage complex.

The report included the properties values for the names, descriptions, and customer account names of the storage complex.

► showsp ◄

Parameters

No parameters exist for this command.

Notes:

1. The SNMP settings apply to only some types of SNMP notifications (Example: Copy Services).
2. The email parameters are not currently supported.

Example: Displaying a properties report for a storage complex

dsccli> showsp

Output

| Name | Desc | Acct | SNMP | SNMPadd |
|------------------------|-------------------------------|-------------|---------|--------------|
| My_ storage-complex | Production storage-complex | ABC Company | Enabled | 9.xxx.14.245 |

| eMailnotify | eMailaddr | eMailrelay | eMailrelay- addr | eMailrelay- host | numks supported |
|-------------|--|------------|---------------------|---------------------|--------------------|
| Enabled | email1@ ibmids8000.com, email2@ ibmids1.com | Disabled | 9.xxx.14.45 | relay_host | 1 |

| loginprompt | promptmessage | guisuggestions |
|-------------|------------------|----------------|
| On | ese switch is on | Show |

Report field definitions

Name

The name of the storage complex.

Desc

The description of the storage complex.

Acct

The customer account name for the storage complex.

SNMP

Whether SNMP traps that are generated by the storage complex for software events are sent to the IP address that is specified by the **chsp** command. Other types of SNMP traps are enabled or disabled by using the user interface on the HMC. This column displays the values: Enabled or Disabled.

SNMPadd

One or two IP addresses if SNMP is enabled. These addresses indicate where SNMP traps that are generated by the storage complex are sent. Multiple IP addresses are separated with commas with no blank space before and after each. For example: 9.111.14.254,9.113.22.236

eMailnotify

Whether email notifications are enabled or disabled.

When the **chsp** command enables the **-emailnotify** and **-emailrelay** parameters, the email notification is directed to the IP address that is associated with the **-emailrelayhost** *hostname* parameter. However, if the email relay host name is not specified, the email notification is directed to the email relay address.

When email notify is enabled and email relay is disabled, the email notification is sent directly to the specified email address.

eMailaddr

One or more email addresses to which notification is sent if service is required when email is enabled. A dash (-) is displayed if email is not enabled or if an email address is not available.

eMailrelay

Whether **-emailrelay** is enabled or disabled.

When **-email** and **-emailrelay** parameters are enabled, the email notification is directed to the IP address that is associated with the **-emailrelayhost** *hostname* parameter. However, if the email relay host name is not specified, the email notification is directed to the email relay address.

When **-email** is enabled and **-emailrelay** is disabled, the email is sent directly to the specified email address.

eMailrelayaddr

One or more email relay IP addresses. These IP addresses represent the addresses through which notification is relayed if service is required when email is enabled.

eMailrelayhost

The email relay host system name.

numkssupported

The number of key servers that are supported.

loginprompt

The following values of the login message prompt:

On

The login message prompt is enabled.

Off

The login message prompt is disabled.

"_"

The message prompt is not supported.

promptmessage

The login message prompt. A dash (-) displays if the promptmessage option is not supported.

guisuggestions

The following values for the GUI suggestions:

Show

Suggested tasks display in the task icon at the top right of the Storage Management GUI.

Hide

Suggested tasks do not display in the task icon at the top right of the Storage Management GUI.

Storage configuration commands

There are some specific DS CLI commands that are associated with configuring storage for IBM Z and open system hosts.

The commands below allow you to configure storage for IBM Z and open system hosts.

Array site specific commands

Specific commands are used to display array site information.

The following array site commands are available:

lsarraysite

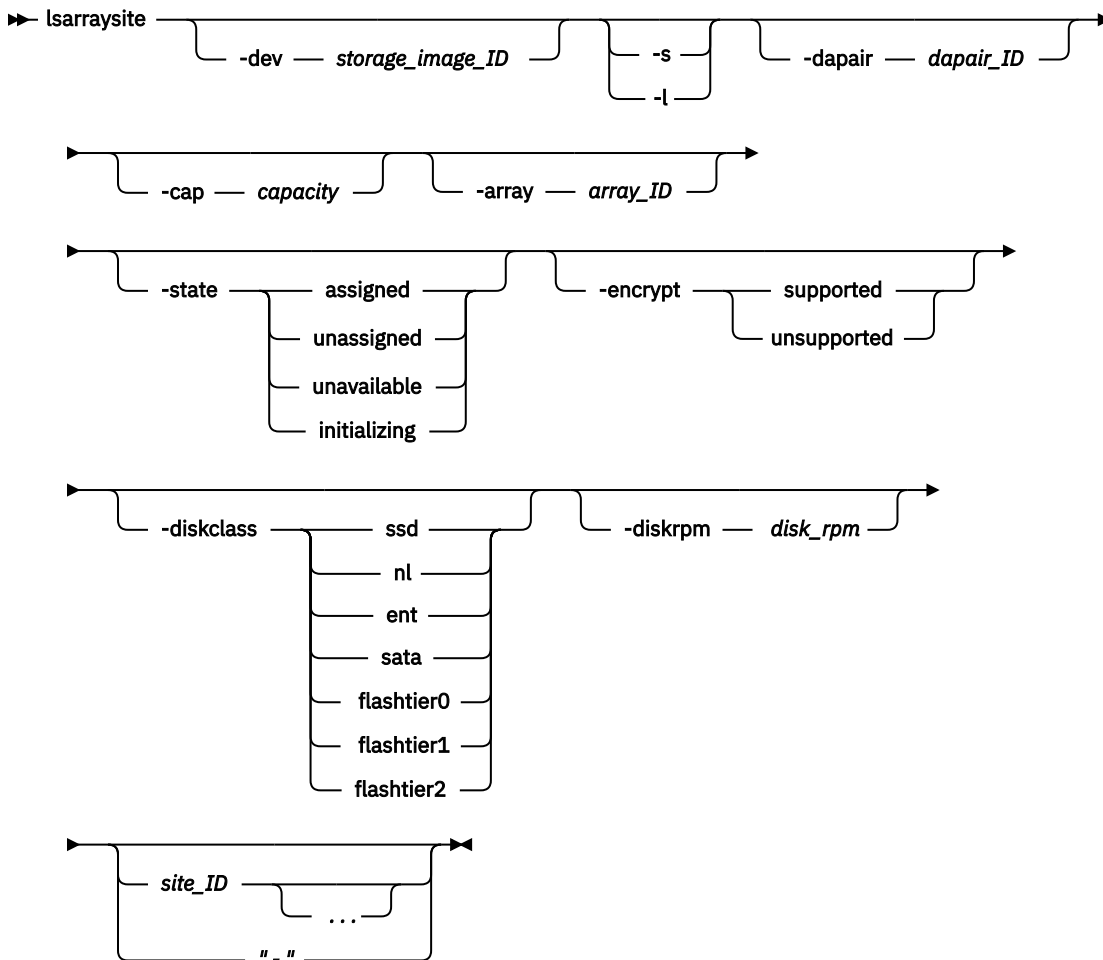
Generates a report that lists the array sites and status information for each array site in the list.

showarraysite

Generates a report that displays the detailed properties of a specific storage image array site.

lsarraysite

The **lsarraysite** command displays a list of array sites and status information for each array site in the list.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified site ID, do not set the *devId* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devId* for the current command.

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

-dapair *dapair_ID*

(Optional) Displays array sites that are associated with a common device adapter pair ID. A device adapter pair ID is a two-digit decimal number with no leading zeros.

-cap *capacity*

(Optional) Displays in decimal gigabytes (GB) the array sites that have the specified capacity of the disk drive module.

-array *array_ID*

(Optional) Displays the array site that is associated with the specified array ID. An array ID is a four-digit decimal number with no leading zeros, prefixed with the letter A.

-state *assigned* | *unassigned* | *unavailable* | *initializing*

(Optional) Displays array sites that are in the specified state. One of the following values is displayed:

assigned

The designated array site is defined as an array.

unassigned

The array site is available to be defined as an array.

unavailable

The designated array site is unassigned and at least one disk is not in the normal state. Also, the array site is not in the initializing state.

initializing

The array site is unassigned and all disks are either in the normal or initializing state. Also, at least one disk is in the initializing state.

-encrypt *supported* | *unsupported*

(Optional) Displays only the array that has the specified encryption capability.

-diskclass *ssd* | *nl* | *ent* | *sata* | *flashtier0* | *flashtier1* | *flashtier2*

(Optional) Displays only array sites with the following specified disk classes:

ssd

Solid-state devices.

nl

High-capacity near-line disk drives.

ent

High-speed Enterprise disk drives.

sata

High-capacity SATA devices.

flashtier0

High performance flash (Flash Tier 0) drives.

flashtier1

The first tier of high capacity flash (Flash Tier 1) drives.

flashtier2

The second tier of high capacity flash (Flash Tier 2) drives.

-diskrpm *disk_rpm*

Displays only array sites with the specified disk RPM.

site_ID . . . | -

(Optional) The array sites that have the specified IDs. An array site identifier is a four-digit decimal number with no leading zeros, prefixed with the letter S.

To specify a range of array site IDs, separate the array site IDs with a hyphen.

You must separate multiple array site IDs or ranges of array site IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying array sites' status information

```
dscli> lsarraysite -l
```

Output

| Arsite | DA pair | Dkcap (10 ⁹ B) | Diskrpm | State | Array | Diskclass | Encrypt |
|--------|---------|---------------------------|---------|----------|-------|-----------|-------------|
| S1 | 2 | 146.0 | 10000 | Assigned | A1 | ENT | supported |
| S2 | 2 | 146.0 | 10000 | Assigned | A0 | ENT | supported |
| S3 | 2 | 146.0 | 10000 | Assigned | A3 | NL | unsupported |
| S4 | 2 | 146.0 | 10000 | Assigned | A2 | SATA | unsupported |

Output definitions

Arsite*

The array site ID. The array site ID is a four-digit decimal number, with no leading zeros, prefixed with the letter S.

Note: The array site ID does not point to a physical location.

DA pair

The DA pair ID. DA pairs are located in I/O enclosure pairs. The DA pair ID indicates the I/O enclosure location.

Note: An even-numbered DA pair ID indicates the first DA pair in an I/O enclosure pair. An odd-numbered DA pair ID indicates the second DA pair in an I/O enclosure pair.

Dkcap (10⁹B)

The minimum disk capacity of the disks in the designated array site in decimal gigabytes (GB).

Diskrpm*

The minimum disk rpm of the disks in the designated array site.

State

The array site state. One of the following values can be displayed in this field:

Assigned

The designated array site is defined as an array.

Unassigned

The array site is available to be defined as an array.

Unavailable

The designated array site is unassigned and at least one disk is not in the normal state. Also, the array site is not in the initializing state.

Initializing

The array site is unassigned and all disks are either in the normal or initializing state. Also, at least one disk is in the initializing state.

Array

The array ID that this assigned array site is assigned to. The ID is prefixed by the letter A.

Diskclass⁺

The disk class. One of the following values can be displayed:

ENT

Enterprise; High-speed Fibre Channel disk drives

NL

Near-line; ATA (FATA) disk drives

SATA

High capacity SATA disk drives.

SSD

Solid-state devices.

FlashTier0

High performance flash (Flash Tier 0) drives.

FlashTier1

The first tier of high capacity flash (Flash Tier 1) drives.

FlashTier2

The second tier of high capacity flash (Flash Tier 2) drives.

encrypt⁺

The encryption support capability. One of the following values can be displayed:

supported

The disk drive modules in this arraysite are capable of encryption.

unsupported

The disk drive modules in this arraysite are not capable of encryption.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

showarraysite

The **showarraysite** command displays detailed properties of a specific storage image array site.

```

▶▶ showarraysite site_ID
                -dev storage_image_ID " "
  
```

Parameters**-dev *storage_image_ID***

(Optional) Displays the storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified site ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

site_ID | -

(Required) Displays information for the designated array site ID. This parameter also accepts a fully qualified site ID, which consists of the storage image ID or a shortened version without the storage image ID, if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeros, prefixed by the letter S. The array site ID does not imply a physical location.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying array site properties

```
dscli> showarraysite -dev IBM.2107-75FA120 S11
```

Output

| Arsite | DA pair | Dkcap (10 ⁹ B) | Diskrpm | State |
|----------------------|--------------------|---------------------------|---------|----------|
| IBM.2107-75FA120/S11 | IBM.2107-75FA120/0 | 146 | 15000 | Assigned |

| Array | Dkinf | Dkrate (GB/sec) | DDMSN | Spare s | dataDD M | Diskclass | Encrypt |
|----------------------|-------|-----------------|--------------------------|---------|----------|-----------|-------------|
| IBM.2107-75FA120/A44 | FCAL | 2 | 012345678 9 ABCDEF | 0 | 8 | SATA | Unsupported |

Output definitions

Arsite

The array site ID. The array site ID is a decimal number up to four digits in length, no leading zeros, prefixed by the letter S. For example, S11.

Notes:

1. Array sites consist of eight DDMS.
2. The array site ID does not imply a physical location.

DA pair

The DA pair ID. DA pairs are located in I/O enclosure pairs. DA pair ID implies the I/O enclosure location.

Note: DA Adapters are installed in slot 3 in one enclosure and slot 6 in the peer enclosure. The DA pair ID identifies the enclosure that contains the DA Adapter in slot 3. For example, a DA adapter is installed in slot of 3 of enclosure 2. Its peer is installed in slot 6 of enclosure 3. In this case, the DA Pair ID is 2.

Dkcap (10⁹B)

The minimum disk capacity of the disks in the designated array site.

Diskrpm

The minimum disk rpm of the disks in the designated array site.

State

The array site state. The values that can be displayed in this field are as follows:

assigned

The designated array site is defined as an array.

unassigned

The array site is available to be defined as an array.

Array

The array ID that the designated array site is assigned to. The ID is prefixed by the letter *A*.

Dkinf

The DDM interface type for the disks in this array site. The following value is displayed:

- FC-AL (Fibre Channel arbitrated loop)
- SAS (Serial Attached SCSI)

Dkrate

The minimum disk interface rate of the disks in the designated array site.

DDMSN

The list of DDM serial numbers (SN) that are associated with the designated array site. Each DDM SN is a 16-character string. Each serial number is separated by a comma.

Spares

The number of spare DDMs that are allocated from the array site.

DataDDM

The number of data DDMs. This value is based on the number of DDMs minus the number of spares.

Diskclass

The disk class. One of the following values is displayed:

ENT

Enterprise; A high-speed Fibre Channel disk drive.

NL

Near-line; ATA (FATA) disk drives.

SATA

High-capacity SATA disk drives.

SSD

Solid-state devices.

FlashTier0

High performance flash (Flash Tier 0) drives.

FlashTier1

The first tier of high capacity flash (Flash Tier 1) drives.

FlashTier2

The second tier of high capacity flash (Flash Tier 2) drives.

encrypt

The encryption support capability. One of the following values are displayed:

supported

The disk drive modules in this array site are capable of encryption.

unsupported

The disk drive modules in this array site are not capable of encryption.

Array specific commands

Array specific commands are used to create and delete arrays and to display array information.

The following array specific commands are available:

lsarray

Generates a report that displays a list of arrays in a storage image and the status information for each array in the list.

mkarray

Creates one array per command.

rmarray

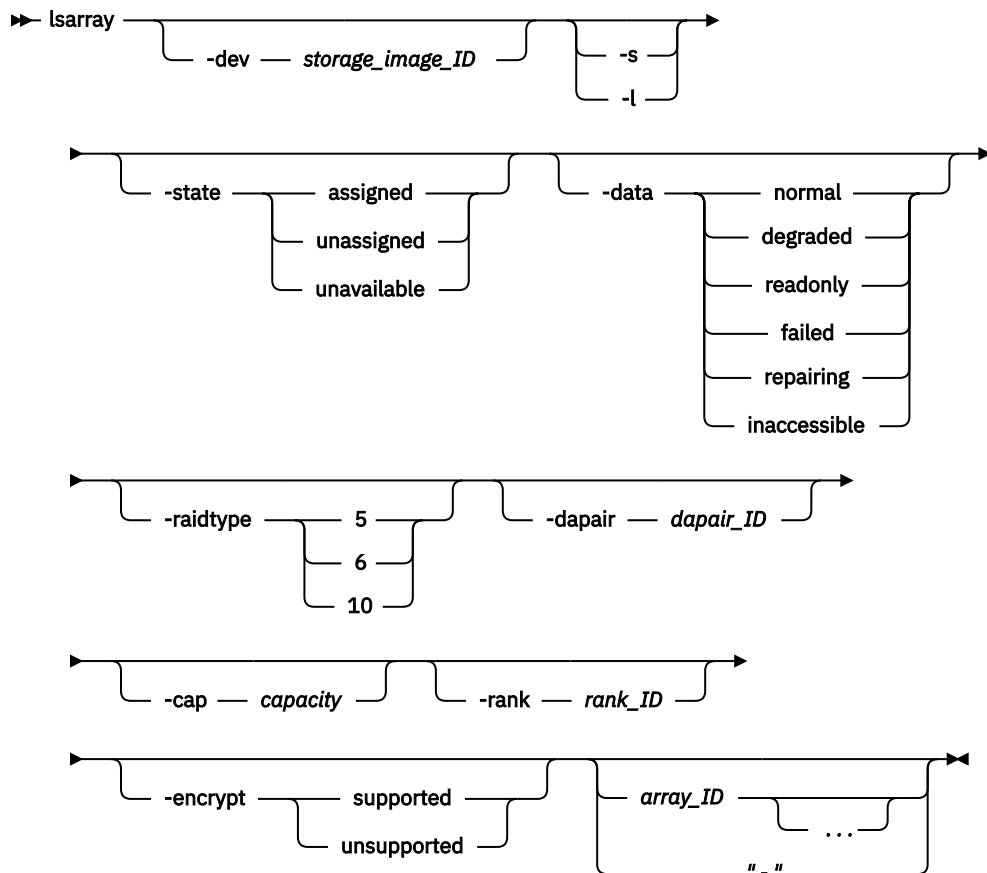
Removes the specified array or arrays from the storage system.

showarray

Generates a report that displays the detailed properties of a specific array.

lsarray

The **lsarray** command displays a list of arrays in a storage image and status information for each array in the list.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified array ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-s

(Optional) Displays only the array ID. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays default output plus the disk class and encryption capability of the arrays. You cannot use the **-l** and the **-s** parameters together.

-state **assigned** | **unassigned** | **unavailable**

(Optional) Whether information about those arrays in the designated state are to be displayed on the generated report.

-data **normal** | **degraded** | **readonly** | **failed** | **repairing** | **inaccessible**

(Optional) Whether information about those arrays in the designated data state are to be displayed on the generated report.

-raidtype 5 | 6 | 10

(Optional) Displays only those arrays with the specified RAID type, 5, 6, or 10.

-dapair dapair_ID

(Optional) Displays only the array that is specified by the device adapter pair ID. A device adapter pair ID is a two-digit decimal number with no leading zeros.

-cap capacity

(Optional) Displays in decimal gigabytes (GB) only the array with the specified DDM capacity. You can specify up to three digits after the decimal point, for example -cap 1.447.

-rank rank_ID

(Optional) Displays only the array that is assigned to the specified rank ID. A rank ID is a four-digit decimal number with no leading zeros, prefixed with the letter *R*.

-encrypt supported | unsupported

(Optional) Displays only the array sites that have the specified encryption capability.

array_ID . . . | -

(Optional) Displays array information for the specified arrays. An array ID is a four-digit decimal number with no leading zeros, prefixed with the letter *A*.

To specify a range of array IDs, separate the array IDs with a hyphen. For example: A10-A12 (equates to A10 A11 A12)

You must separate multiple array IDs or ranges of array IDs with a blank space between each ID or range of IDs. For example: A11 A12 A14-A16. Your command in this case could look similar to this example:

```
dscli> lsarray IBM.2107-75FA120 -l A11 A12 A14-A16
```

The ellipsis (...) indicates that, optionally, you can specify multiple values.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying arrays' status information

For this command and all other DS CLI list commands, the results are shown in table format to provide clarity. The actual reports do not display as tables.

The following tables represent the headers that are displayed on the output report that is associated with the **lsarray** command using the **-l** parameter.

```
dscli> lsarray -dev IBM.2107-75FA120 -l
```

Output

| Array | State | Data | RaidType |
|-------|------------|--------|----------|
| A10 | Assigned | Normal | 5(6+p) |
| A11 | Assigned | Normal | 5(7+p) |
| A12 | Assigned | Normal | 5(6+p) |
| A13 | Unassigned | Normal | 5(7+p) |

Output descriptions**Array***

The array number. The array number starts with the prefix *A*, followed by a decimal number up to four digits in length, with no leading zeros. For example, A44.

State

The relationship between the array and a rank. One of the following values is displayed:

Assigned

The array is assigned to a rank.

Unassigned

The array is not assigned to a rank and all of the storage devices that are indicated by the disk serial numbers attribute are in the normal state.

Unavailable

The array is not assigned to a rank and one or more of the disk drive modules (DDMs) that are indicated by the disk serial numbers attribute are not in the normal state.

Data

This value reflects the current data status. One of the following values is displayed:

Normal

The array is in the Normal data state if none of the other data states applies. This status applies if the array is unassigned.

Degraded

The array is in the Degraded data state if both of the following conditions exist:

- The Read-only, Failed, Repairing, or Inaccessible data states do not apply.
- One or more redundancy groups are rebuilding (that is, there is a DDM with a rebuilding state in the array).

Read Only

The array is in the Read-only data state if all of the following conditions exist:

- The Failed, Repairing, and Inaccessible data states do not apply.
- One or more DDMs have failed.
- There are insufficient spares to support all rebuild operations.
- Continued write operation without redundancy could result in data loss.

Failed

The array is in the Failed data state if all of the following conditions exist:

- The Repairing and Inaccessible data states do not apply.
- Two or more DDMs in the array have failed.
- There are insufficient DDMs left in the array to rebuild the data that was lost on the failing storage devices.

Repairing

The array is in the Repairing data state if all of the following conditions exist:

- The Inaccessible data status does not apply.
- The array has previously entered the failed state.
- The repair array function has been accepted.
- The repair array function has not completed.

Inaccessible

The array is in the Inaccessible data state if the storage system cannot access a set of storage devices that are sufficient to access all the data on the array.

RaidType

Indicates the type of RAID array (5, 6, or 10) and the array configuration (for example, 6+P). Storage system array configurations are based on 8 DDM array sites for DA Pair Types 1 and 2, and 7 or 8 DDM array sites for DA Pair Type 3.

Note: The RAID type 6 is displayed in storage system models only.

Arsite

The array sites that are associated with the array.

Rank

The rank the array is assigned to. The value is displayed as a combination of a Storage Image ID and a rank number. The rank number is the prefix *R*, followed by a decimal number up to four digits in length, with no leading zeros. For example, R26.

DA pair

The DA pair ID. DA pairs are located in I/O enclosure pairs. DA pair ID indicates the I/O enclosure location.

Note: An even-numbered DA pair ID indicates the first DA pair in an I/O enclosure pair. An odd-numbered DA pair ID indicates the second DA pair in an I/O enclosure pair.

DDMcap (10⁹B)

The minimum disk capacity in decimal gigabytes (GB) of the storage devices (DDMs) in the specified array.

Diskclass⁺

The disk class. One of the following values is displayed:

ENT

Enterprise; High speed Fibre Channel disk drives.

NL

Near-line; ATA (FATA) disk drives.

SATA

High capacity SATA disk drives.

SSD

Solid-state devices.

FlashTier0

High performance flash (Flash Tier 0) drives.

FlashTier1

The first tier of high capacity flash (Flash Tier 1) drives.

FlashTier2

The second tier of high capacity flash (Flash Tier 2) drives.

encrypt

The encryption support capability. One of the following values is displayed:

supported

The disk drive modules in this array are encryption capable.

unsupported

The disk drive modules in this array are not encryption capable.

Key:

*

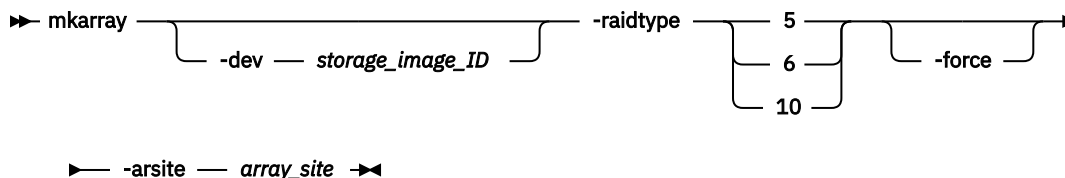
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-1** parameter is specified.

mkarray

The **mkarray** command creates one array per command. You can specify only one array site for a storage system machine type.



Parameters

Note: The storage system assigns the ID during array creation based on the current configuration, past configuration changes, and other internal considerations. No algorithm is available to accurately predict the newly created array ID in every case.

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified array site, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-raidtype 5 | 6 | 10

(Required) Specifies a RAID type for the array.

Note: The **-raidtype 6** parameter can be specified for storage system models only.

-force

(Optional) The force option applies only when you create a RAID 5 array. An information message displays a disclaimer about using RAID 5. If you agree with the disclaimer, the RAID 5 array creation is processed. Even when this option is not used, a disclaimer displays and you must accept the disclaimer to create RAID 5.

-arsite *array_site*

(Required for a storage system machine type) The array site for the array. An array site number is a four-digit decimal number with no leading zeros, prefixed with the letter S.

Example of fully qualified array site: IBM.2107-75FA120/S11

Specify 1 or 2 array sites for 1750 RAID types 5 and 10. If there are two array sites, both must be associated with a common DA pair ID. An array site number is a four-digit decimal number with no leading zeros, prefixed with the letter S. Separate the two array sites by a comma with no blank space in between. Example: S10,S11.

Example: Creating an array

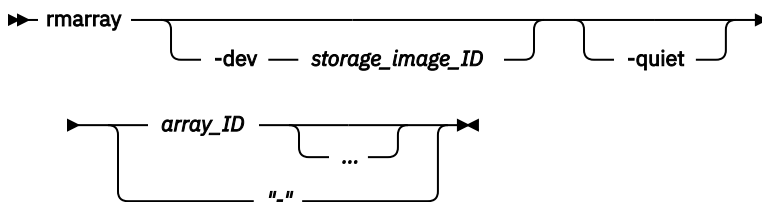
```
dscli> mkarray -dev IBM.2107-75FA120 -raidtype 10 -arsite S08
```

Output

```
Array A10 successfully created.
```

rmarray

The **rmarray** command deletes arrays.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all array IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-quiet

(Optional) Turns off the array removal confirmation prompt for this command.

array_ID ... | -

(Required) The array IDs that are to be deleted. Accepts a fully qualified array ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four digit decimal number with no leading zeros, prefixed by the letter "A".

To specify a range of array IDs, separate the array IDs with a hyphen.

You must separate multiple array IDs or ranges of array IDs with a blank space between each ID or range of IDs.

The ellipsis (...) means that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting an array

```
dscli> rmarry -dev IBM.2107-75FA120 A44
```

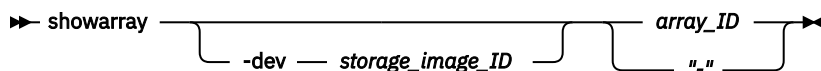
Output

```
Are you sure you want to delete array IBM.2107-75FA120/A44? [y/n]: Y
```

```
Array Storage Image ID/A44 successfully deleted.
```

showarray

The **showarray** command displays detailed properties of a specific array.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified array ID. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

array_ID | -

(Required) The array ID that you want to view. This parameter accepts a fully qualified array ID, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeros, prefixed by the letter A.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying detailed array properties

```
dscli> showarray -dev IBM.2107-75FA120 A44
```

Output

| Array | SN | State | Datastate | RaidType | Arsite |
|----------------------|---------|----------|-----------|----------|--------|
| IBM.2107-75FA120/A44 | AZ123AQ | Assigned | Normal | 5 (6+P) | S21 |

| Rank | DA Pair | DDMcap (10^9B) | DDMRPM | Interface Type | Interrate (GB/secs) | Diskclass | Encrypt |
|----------------------|---------------------|-------------------|--------|-------------------|------------------------|-----------|-------------|
| 2107-75FA 123/R26 | 2107-75FA 123/11 | 145 | 15000 | FCAL | 2 | SATA | unsupported |

Output definitions

Array

The array ID number. The array ID number starts with the prefix *A*, followed by a decimal number up to 4 digits in length, with no leading zeros. For example, A44.

SN

The unique internal identifier for the data space of the designated array (for example, AZ123AQ).

State

The array state. One of the following values is displayed:

Assigned

The array is assigned to a rank.

Unassigned

The array is not assigned to a rank and all of the storage devices that are indicated by the disk serial numbers attribute are in the normal state.

Unavailable

The array is not assigned to a rank and one or more of the disk drive modules (DDMs) that are indicated by the disk serial numbers attribute are not in the normal state.

Datstate

The current data state. One of the following values is displayed:

Normal

The array is in the Normal data state if none of the other data states applies. This status applies if the array is unassigned.

Degraded

The array is in the Degraded data state if both of the following conditions exist:

- The Read-only, Failed, Repairing, or Inaccessible data states do not apply.
- One or more redundancy groups are rebuilding (that is, there is a DDM with a rebuilding state in the array).

Read Only

The array is in the Read-only data state if all of the following conditions exist:

- The Failed, Repairing, and Inaccessible data states do not apply.
- One or more DDMs failed.
- There are insufficient spares to support all rebuild operations.
- Continued write operation without redundancy might result in data loss.

Failed

The array is in the Failed data state if all of the following conditions exist:

- The Repairing and Inaccessible data states do not apply.
- Two or more DDMs in the array failed.
- There are insufficient DDMs left in the array to rebuild the data that was lost on the failing storage devices.

Repairing

The array is in the Repairing data state if all of the following conditions exist:

- The inaccessible data state does not apply.

- The array previously entered the failed state.
- The repair array function was accepted.
- The repair array function did not complete.

Inaccessible

The array is in the inaccessible data state if the storage unit cannot access a set of storage devices that are sufficient to access all the data on the array.

RaidType

The type of RAID array (5, 6, or 10) and the array configuration (for example, 6+P). Storage system array configurations are based on 8 DDM array sites for DA Pair Types 1 and 2, and 7 or 8 DDM array sites for DA Pair Type 3.

Arsite

The array sites that are associated with the array.

Rank

The rank that the array is assigned to. The value is displayed as a combination of a storage image ID and a rank number. The rank number is the prefix *R*, followed by a number up to 4 digits in length, with no leading zeros. For example, R26.

Note: If the array is unassigned, the field is " – "

DA pair

The DA pair ID. DA pairs are in I/O enclosure pairs. The DA pair ID locates the I/O enclosure.

Note: DA adapters are installed in slot 3 an enclosure and slot 6 in the peer enclosure. The DA pair ID identifies the enclosure that contains the DA adapter in slot 3. For example, a DA adapter is installed in slot of 3 of enclosure 2. Its peer is installed in slot 6 of enclosure 3. In this case, the DA Pair ID is 2.

DDMcap (10^9B)

The minimum disk capacity (10^9B) of the storage devices (DDMs) in the designated array.

DDMRPM

The minimum disk rpm of the DDMs in the designated array.

Interface Type

The disk interface type of the DDMs in the designated array.

Interrate

The minimum disk interface rate of the disks in the designated array.

Diskclass

The disk class. One of the following values can be displayed:

ENT

Enterprise; High-speed Fibre Channel disk drives.

NL

Near-line; ATA (FATA) disk drives.

SATA

High capacity SATA disk drives.

SSD

Solid-state devices.

FlashTier0

High performance flash (Flash Tier 0) drives.

FlashTier1

The first tier of high capacity flash (Flash Tier 1) drives.

FlashTier2

The second tier of high capacity flash (Flash Tier 2) drives.

encrypt

The encryption support capability. One of the following values can be displayed:

supported

The disk drive modules in this array support encryption.

unsupported

The disk drive modules in this array do not support encryption.

Rank specific commands

There are specific DS CLI commands that are used to create, modify, and delete ranks and to display rank information.

The following rank specific commands are available:

chrank

Assigns an unassigned rank to an extent pool or removes an assigned rank from a extent pool. This command can also be used to change an assigned rank to an unassigned rank.

lsrank

Generates a report that displays a list of defined ranks in a storage system and the status information for each rank in the list.

mkrank

Creates one fixed block or count key data (CKD) rank from one array.

rmrank

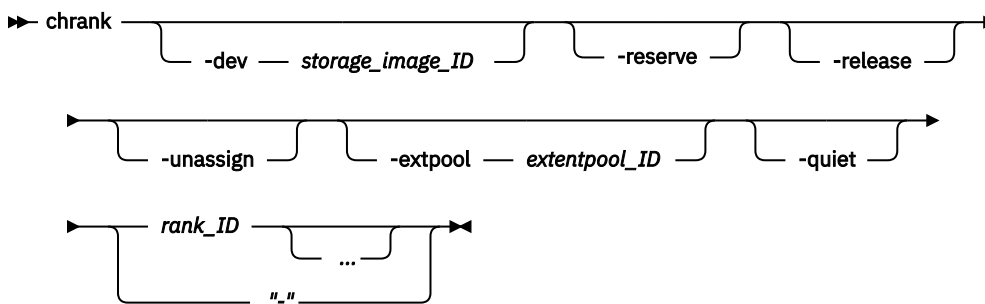
Deletes the specified ranks from a storage system.

showrank

Generates two types of reports. One report displays the detailed properties of a specified rank. The other report displays the performance metrics of a specified rank.

chrank

The **chrank** command assigns an unassigned rank to an extent pool, or removes an assigned rank from an extent pool. This command can also be used to change an assigned rank to an unassigned rank.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *dev* for the current command.

-reserve

(Optional) Changes the rank configuration state to *Reserved* if the rank is assigned to an extent pool, or changes the state to *Unassigned Reserved* if the rank is not assigned to an extent pool. If the rank is in the *depopulating* state, changing the configuration state to *Reserved* with the *-reserve* parameter stops the rank depopulation. In this case, data is not migrated back to the depopulation rank. Use the **-release** parameter to convert it back to the normal state and restart the depopulation later. The depopulation process starts from where it left off when the abort was triggered.

Note: Versions of the DS CLI before Release 6.1 fail if you use the **-reserve** parameter on Release 6.1 or later DS8000 storage systems when the rank is in the *unassigned* state. These DS CLI versions cannot handle the *Unassigned Reserved* state.

-release

(Optional) Changes the rank configuration state from Unassigned Reserved to Unassigned, or from Reserved, Normal, or Depopulation Error to Normal.

-unassign

(Optional) Changes the rank configuration state to Unassigned by removing the rank from the extent pool. If extents exist on this rank are used to provision a volume, the unassign process normally fails. If the Easy Tier LIC feature is active, then the rank configuration state is set to Depopulating while the extents are migrated to other ranks in the same extent pool. If the depopulation is successful, the rank configuration state is set to Unassigned. If it is not successful, the state is set to Depopulation Error.

Notes:

1. If the rank enters the *Depopulating* configuration state, the time that is required to depopulate the rank depends on the number of allocated extents; it might take a long time before the rank enters the *Unassigned* state. When this situation occurs, a confirmation prompt is given, but can be suppressed with the **-quiet** parameter.
2. Versions of the DS CLI before Release 6.1 fail if you use the **-unassign** parameter on Release 6.1 or later DS8000 storage systems with allocated extents. If you use these previous versions of the DS CLI, manually delete or migrate any volumes that use these ranks before you use the **-unassign** parameter.
3. The **-extpool** and **-unassign** parameters cannot be used together.

-extpool extentpool_ID

(Optional) Assigns the rank to an extent pool. Accepts either a fully qualified extent pool ID including storage image ID or a shortened version if the **-dev** parameter is used. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter P.

Note: The **-extpool** and **-unassign** parameters cannot be used together.

-quiet

(Optional) Turns off the rank modification confirmation prompt for this command.

rank_ID ... | -

(Required) Whether one or more ranks to be modified. Accepts either a fully qualified rank ID, or a rank number if the **-dev** parameter is used. A rank number is a four-digit decimal number with no leading zeroes, prefixed by the letter R.

To specify a range of rank IDs, separate the rank IDs with a hyphen.

You must separate multiple rank IDs or ranges of rank IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Assigning a rank to an extent pool

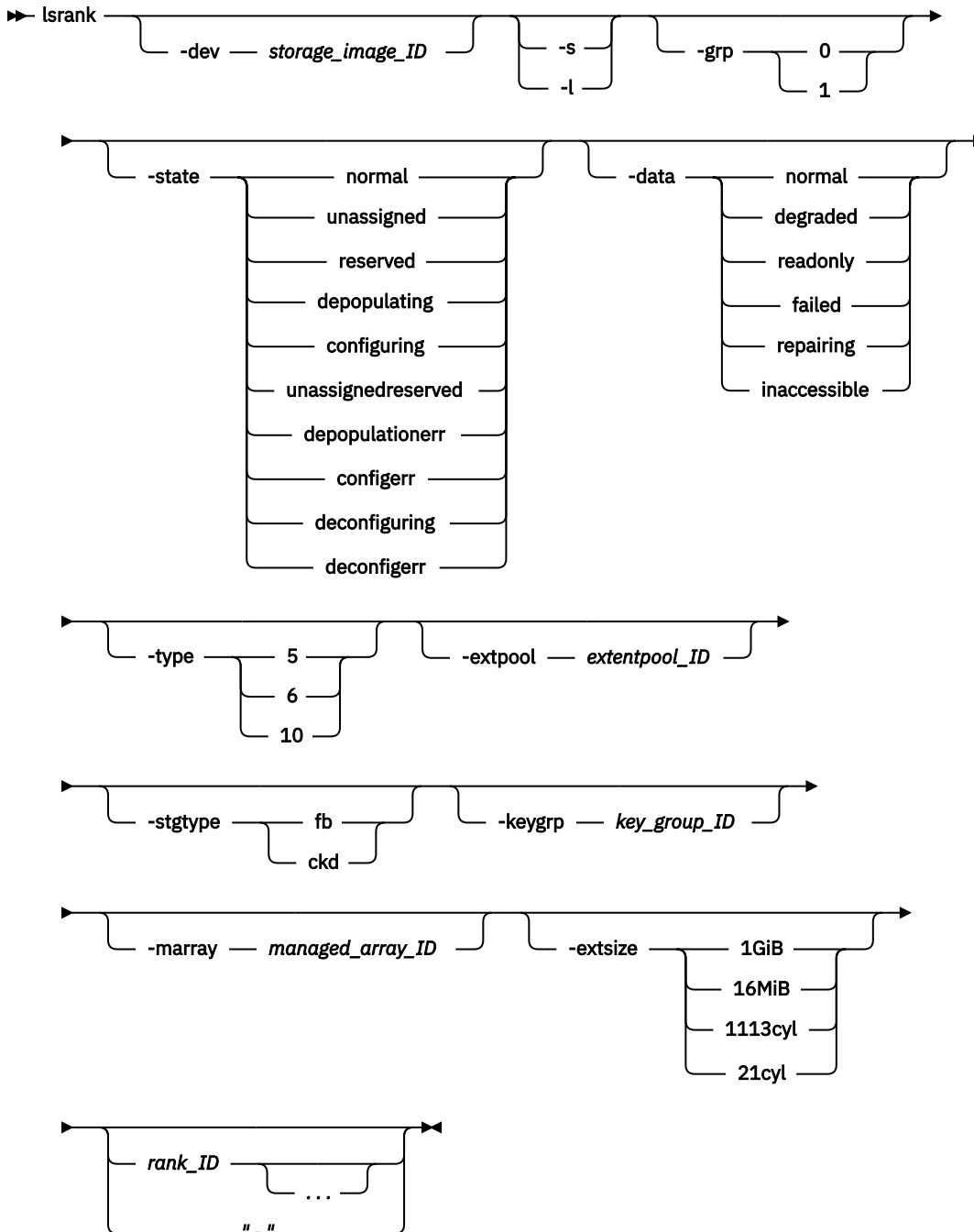
```
dscli> chrnk -dev IBM.2107-75FA120 -extpool P101 -quiet R2
```

Output

```
Rank IBM.2107-75FA120/R2 successfully modified.
```

lsrank

The **lsrank** command displays a list of defined ranks in a storage image and status information for each rank.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs or do not set the *devId* variable in your profile or through the **setenv** command. The storage image ID is also required if HMC is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for *devId* for the current command.

Example: IBM.2107-75FA120

-s

(Optional) Displays only the rank ID. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output plus the extent pool name, number of extents, extents that are used, and key group for each rank. You cannot use the **-l** and the **-s** parameters together.

-grp 0 | 1

(Optional) Displays only the ranks that belong to the specified rank group. A rank in the unassigned state is not associated with a rank group.

-state normal | unassigned | reserved | depopulating | configuring | unassignedreserved | depopulationerr | configerr | deconfiguring | deconfigerr

(Optional) Displays only ranks in the specified state.

-data normal | degraded | readonly | failed | repairing | inaccessible

(Optional) Displays only ranks in the specified data state.

-type 5 | 6 | 10

(Optional) Displays only ranks of the specified RAID type.

Note: The **-raidtype 6** parameter can be specified for storage system models only.

-extpool extentpool_ID

(Optional) Displays only ranks in the specified extent pool. An extent pool ID is a four-digit decimal number with no leading zeros, prefixed with the letter P.

-stgtype fb | ckd

(Optional) Displays only ranks that are configured for the specified storage type.

-keygrp key_group_ID

(Optional) Displays the key group that this rank uses.

-marray managed_array_ID

(Optional) Displays only those ranks that are assigned to the specified managed array.

-extsize

(Optional) Displays only those ranks that have the specified extent sizes.

1GiB

The rank storage type is FB and there is 1 GiB in an extent on this rank.

16MiB

The rank storage type is FB and there is 16 MiB in an extent on this rank.

1113cyl

The rank storage type is CKD and there are 1113 cylinders in an extent on this rank.

21cyl

The rank storage type is CKD and there are 21 cylinders in an extent on this rank.

rank_ID ... | -

(Optional) The rank information for specified rank IDs. An ID range is defined by two IDs that are separated by a hyphen.

You must separate multiple rank IDs or ranges of rank IDs with a blank space between each ID or range of IDs.

The ellipsis (...) means that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying ranks' status information

```
dscli> lsrank -dev IBM.2107-75FA120 -l
```

Output (The output displays in two parts to avoid text overflow.)

```
ID Group State datastate Array RAIDtype extpoolID extpoolnam          stgtype exts
=====
R0 1    Normal Normal   A1     5      P1     pool_large_ckd_wht  ckd     95
R1 1    Normal Normal   A2     5      P3     pool_small_ckd_wht  ckd    20949
```

```
usedexts  keygrp  marray  extsize(cap)
=====
0          -      MA2     1113cyl
0          -      MA3     21cyl
```

Output definitions

ID

The unique identifier that is assigned to the rank.

Group

The rank group that the rank is assigned to. A value of 0, 1, or " - " is displayed. If a rank is unassigned, the value that is displayed is " - ".

State

The current configuration state of this rank ID. One of the following values is displayed:

Normal

The rank is assigned to an extent pool ID and none of the other state conditions apply.

Unassigned

The rank is not assigned to an extent pool ID.

Reserved

The rank extents are not eligible for volume assignment.

Depopulating

The extents on a rank are not eligible for allocation and the existing allocations are to be moved to another rank in the extent pool by using dynamic extent relocation.

Configuring

The rank is being initially configured.

Unassigned Reserved

A rank is not assigned to any extent pools, and it is also reserved. A rank with this state will change to Reserved state after it is assigned to an extent pool or changed to the Unassigned state after it is released.

Depopulation Error

Depopulating of the specified rank failed and efforts to depopulate the rank were stopped. (A failed rank can occur when the state of the rank is not valid.) A rank with this state changes to Reserved state if it is reserved, or change to Normal state if it is released.

Configuration Error

A rank configuration process failed to complete successfully. This state reflects an internal error condition and not an error in the user's request to create the rank. To correct this state, you must delete the designated rank configuration.

Deconfiguring

The rank is being deleted.

Deconfiguration Error

A rank removal process did not complete successfully. An internal error condition, not a user input error. This state is corrected by reissuing the **rmrank** command.

Datstate

The current state of the data extents that are contained by the designated rank ID. One of the following values is displayed:

Normal

A rank is in the normal data state during one of the following configuration states: unassigned, configuring, or configuration error.

Degraded

A rank is in the degraded data state if one or more arrays in the rank are in the degraded data state and none are in the read only, failed, repairing, or inaccessible data states.

Read only

A rank is in the read only data state if one or more arrays in the rank are in the read only data state and none are in the failed, repairing, or inaccessible data states.

Failed

The rank is in the failed data state if one or more arrays in the rank are in the failed data state.

Repairing

A rank is in the repairing data state if one or more arrays in the rank are in the repairing data state and none are in the failed data state.

Inaccessible

A rank is in the inaccessible data state if one or more arrays in the rank are in the inaccessible data state and none are in the failed or repairing data states.

Note: A rank is not considered for new extent allocations if it is not in the normal or degraded data state (even if the configuration state is normal).

Array

Indicates the array ID that is assigned to the designated rank.

RAIDtype

The RAID type of the array that is associated with this rank. The value that is displayed is either 5, 6, or 10.

Note: The RAID type 6 is displayed in storage system models only.

ExtpoolID

The extent pool to which the rank is assigned.

Extpoolnam

The name that is assigned to the extent pool to which the rank is assigned.

Stgtype

The storage type of the extent pool to which the rank is assigned. The value that is displayed is either FB (fixed block) or CKD (count key data).

Exts

The number of extents that are contained in the designated rank.

Usedexts

The number of extents that are allocated to volumes from the designated rank.

keygrp

The encryption key group. A dash (-) means that either encryption is supported but not used, or encryption is not supported.

marray

The managed array that is assigned to this rank. This parameter only displays when you specify the **-1** parameter. The following values can display:

"-"

If the system does not support managed arrays, a dash (-) displays.

Unknown

If managed arrays are understood by the system, ranks consisting of more than one array are in the Unknown state.

managed_array_ID

If managed arrays are understood by the system, the specified rank has only one array, with only one array site. The range of managed array ID numbers that display is the same as the range of array site numbers, but prefixed with *MA*.

extsize(cap)

The extent size for the specified rank. There is a direct relationship with the **-extsize** parameter specified for the rank when it is created and the CKD and FB small extent values.

Note: This parameter only displays when you specify the **-l** parameter. The following values can display.

1GiB

The rank storage type is FB and there is 1GiB in an extent on this rank.

16MiB

The rank storage type is FB and there is 16MiB in an extent on this rank.

1113cyl

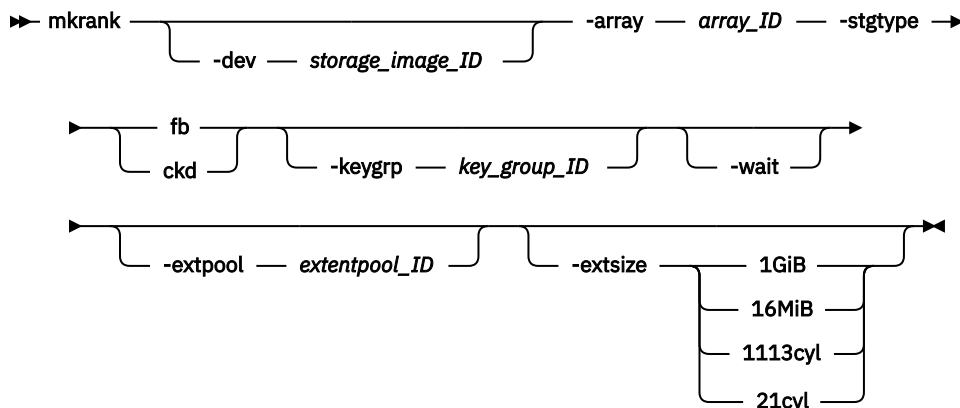
The rank storage type is CKD and there are 1113 cylinders in an extent on this rank.

21cyl

The rank storage type is CKD and there are 21 cylinders in an extent on this rank.

mkrank

The **mkrank** command creates one fixed block or count key data (CKD) rank from one array.



Parameters

Notes:

1. The ID is assigned during rank creation based on the current configuration, past configuration changes, and other internal considerations. No algorithm is available to accurately predict the newly created rank ID in every case.
2. Ensure that you specify either the **-wait** or the **-extpool** parameter with the **mkrank** command. Either of these parameters provide notification if the rank configuration fails for any reason.

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the storage system is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-array *array_ID*

(Required) The ID of the array from which the rank is to be created. An array ID is a four-digit decimal number with no leading zeros, prefixed with the letter A.

-stgtype fb | ckd

(Required) The type of extent for which the rank is configured for either fixed block or count key data.

-keygrp key_group_ID

(Optional) The encryption key group that this rank uses. The default is zero, which means that no key group is assigned to the rank.

-wait

(Optional) Delays the command response until the rank configuration process completes.

-extpool extentpool_ID

(Optional) The extent pool that contains the created rank extents. If an extent pool is specified, the rank is assigned to the extent pool. Otherwise, the rank state is unassigned. The extent pool you specify must exist and must be compatible with the specified **-stgtype** parameter option. An extent pool ID is a four-digit decimal number with no leading zeros, prefixed with the letter *P*.

Note: If you choose to specify the extent pool ID later, then you must use the **chrank** command.

-extsize

(Optional) Displays only those ranks that have the specified extent sizes.

1GiB

The rank storage type is FB and there is 1 GiB in an extent on this rank.

16MiB

The rank storage type is FB and there is 16 MiB in an extent on this rank.

1113cyl

The rank storage type is CKD and there are 1113 cylinders in an extent on this rank.

21cyl

The rank storage type is CKD and there are 21 cylinders in an extent on this rank.

Example: Creating an FB rank

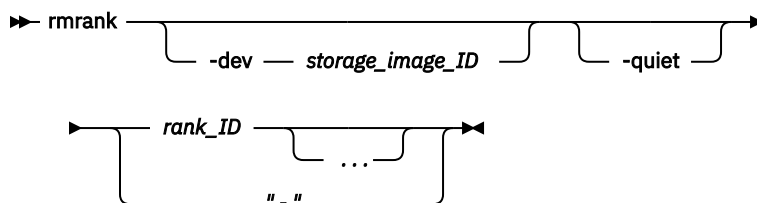
```
dscli> mkrank -array A3 -stgtype fb -extsize 16MiB
```

Output

```
Sun Aug 11 02:23:49 PST 2015 IBM DS CLI Device: IBM.2107-75FA120
Rank R4 successfully created
```

rmrank

The **rmrank** command deletes ranks from a storage image. This command is rejected if any volume extents in the rank are being used. In addition, this command formats the drives (DDMs). Until the formatting is done, the associated array cannot be removed.

**Parameters**

Note: The processing time that is associated with this command can be lengthy and might inhibit your use of the array on which this command is being processed.

When the **rmrank** command is issued, the following processing occurs:

- The rank is unassigned from the array.

- The rank is removed. When this is successful, a message is displayed. This part of the process does not take long; however, the processing that is associated with this command is not complete even though you have received a message that the rank was removed.
- The array is formatted. This processing can take some time. During this process, the array cannot be removed or assigned to another rank. Also, until this process is fully completed, a display of the associated array shows a status of Unavailable. After it is fully completed, the status of the array changes to Unassigned.
- You can check the progress of the **rmrank** command by logging on to another session of DS CLI. Issue the **lsarray** command against the storage image where the rank or ranks are being deleted. If the array state is Unavailable, the **rmrank** command is still processing. When the array state becomes Available, the **rmrank** command is complete.

The following list defines the parameters that are associated with the **rmrank** command:

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all ranks, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-quiet

(Optional) Turns off the rank removal confirmation prompt for this command.

rank_ID ... | -

(Required) Array of one or more ranks to be deleted. This parameter accepts a fully qualified rank ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter *R*.

To specify a range of rank IDs, separate the rank IDs with a hyphen.

You must separate multiple rank IDs or ranges of rank IDs with a space between each ID or range of IDs.

The ellipsis (...) means that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting a rank

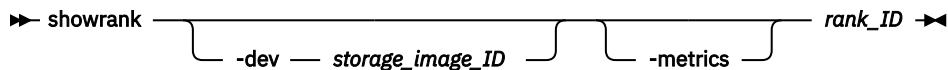
```
dscli> rmrank -dev IBM.2107-75FA120 R23
```

Output

```
Are you sure you want to delete rank R23? [y/n]: Y
Rank R23 successfully deleted.
```

showrank

The **showrank** command displays detailed properties or performance metrics of a rank.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified rank ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one

storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-metrics

(Optional) The rank ID and performance statistics for the specified rank.

Note: All performance statistics are an accumulation since the most recent counter wrap or counter reset. Rank performance counters are reset on a power up sequence or by a server failover and fallback sequence.

rank_ID

(Required) The properties for the specified rank. This parameter accepts a fully qualified rank ID, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeros, prefixed by the letter *R*.

Example 1: Displaying detailed properties of a rank

```
dscli> showrank r4
```

Output

```
ID                R4
SN                -
Group            0
State            Normal
datastate        Normal
Array            A1
RAIDtype         5
extpoolID        P4
extpoolnam       POOL_1GiB_FB
volumes          -
stgtype          fb
exts             352
usedexts         0
widearrays       0
nararrays        1
trksize          128
stpsize          512
stripesize       0
extsize          16384
keygrp           -
migrating(in)    0
migrating(out)   0
marray           MA2
extsize(cap)     1GiB
```

Output definitions (-metrics parameter not specified)

ID

The unique ID that is assigned by the system to the rank. The ID includes the storage image ID and the rank ID.

SN

The unique serial number that is assigned to the designated rank ID.

Group

The rank group that the rank is assigned to. One of the following values is displayed: 0, 1, " - ".

Note: " - " is displayed if the rank has not been assigned to an extent pool.

State

The configuration state that is associated with the rank at the time that the report is generated. The following values can be displayed for the rank

Normal

A rank is assigned to an extent pool ID and none of the other state conditions apply.

Unassigned

A rank is not assigned to an extent pool ID.

Reserved

Rank extents are not eligible for volume allocation.

Depopulating

The extents on a rank are not eligible for allocation and the existing allocations are to be moved to another rank in the extent pool using dynamic extent relocation.

Configuring

A rank is in the process of being initially configured. The associated rank transaction has not completed.

Unassigned Reserved

A rank is not assigned to any extent pools, and it is also reserved. A rank with this state will change to Reserved state after it is assigned to an extent pool or changed to the Unassigned state after it is released.

Depopulation Error

Depopulating the specified rank failed and efforts to depopulate the rank were stopped. (A failed rank can occur when the state of the rank is not valid.) A rank with this state will change to Reserved state if it is reserved, or change to Normal state if it is released.

Configuration Error

A rank configuration process did not complete successfully. An internal error condition not a user input error.

Deconfiguring

A rank is in the process of being deleted.

Deconfiguration Error

A rank removal process did not complete successfully. An internal error condition, not a user input error. This state is corrected by reissuing the **rmrank** command.

Datstate

The current state of the data extents that are contained by this rank ID. The following values can be displayed for the rank.

Normal

None of the other data states apply.

Degraded

One or more arrays in the rank are in the degraded state.

Read Only

One or more arrays in the rank are in the Read Only state.

Failed

One or more arrays in the rank are in the Failed state.

Repairing

One or more arrays in the rank are in the Repairing state.

Inaccessible

One or more arrays in the rank are in the Inaccessible state.

Array

The array ID that is assigned to the designated rank.

RAIDtype

The RAID type (5, 6, or 10) of the array that is associated with the designated rank.

Note: The RAID type 6 is displayed in storage system models only.

ExtpoolID

The extent pool to which the designated rank is assigned.

Extpoolnam

The extent pool to which the designated rank is assigned.

Volumes

The volume IDs that have an extent pool value that is allocated on the designated rank.

Stgtype

The storage type of the extent pool the designated rank is assigned to. Valid values are fixed block and count key data (CKD).

Exts

The number of extents that are contained in the designated rank.

Usedexts

The number of extents that are allocated to volumes from the designated rank.

Widearrays

The number of wide arrays that are contained by the designated rank. 0 or 1 are valid values.

Nararrays

The number of narrow arrays that are contained by the designated rank.

Trksize

The track size.

Notes:

1. The track size is displayed as a 1 if it is associated with a CKD storage type.
2. The track size is displayed as 128 if it is associated with a fixed block storage type.

Strpsize

The number of logical tracks in a strip on the designated rank.

Strpesize

The number of logical tracks in a stripe on the designated rank.

Extsize

The number of logical tracks in an extent on the designated rank.

Notes:

1. A CKD 1 GB extent contains 16 695 tracks.
2. A fixed block 1 GB extent contains 16 384 tracks.

keygrp

The key group number. A dash (-) means that either encryption is supported but not used, or encryption is not supported.

migrating(in)

The number of extents that are migrating into the rank. In other words, this value is the number of migrating extents in the rank that have specified this rank as the target of the migration.

migrating(out)

The number of extents that are migrating out of the rank.

marray

The managed array that the specified rank is assigned to using one of the following values.

""

If the system does not support managed arrays, a dash (-) displays.

Unknown

If managed arrays are understood by the system, ranks consisting of more than one array are in the Unknown state.

managed_array_ID

If managed arrays are understood by the system, the specified rank has only one array, with only one array site. The range of managed array ID numbers that display is the same as the range of array site numbers, but prefixed with *MA*.

extsize(cap)

The extent size on the specified rank.

1GiB

The rank storage type is FB and there is 1GiB in an extent on the specified rank.

16MiB

The rank storage type is FB and there is 16MiB in an extent on the specified rank.

1113cyl

The rank storage type is CKD and there are 1113 cylinders in an extent on the specified rank.

21cyl

The rank storage type is CKD and there are 21 cylinders in an extent on the specified rank.

Example 2: Displaying performance metrics of a rank

```
dscli> showrank -dev IBM.2107-75FA120 -metrics R34
```

Output

```
ID                IBM.2107-75FA120/R34
Date              10/11/15 02:23:47
Byteread         10000
Bytewrit         10000
Reads            10000
Writes           10000
Timeread         10000
Timewrite        10000
Dataencrypted    yes
```

Output definitions (with the -metrics parameter specified)**ID**

The unique ID that is assigned by the system to the rank. The ID includes the storage image ID and the rank ID.

Date

The time stamp for the rank performance counters.

Byteread

The number of rank bytes that are read in 128 KB increments.

Bytewrit

The number of rank bytes that are written in 128 KB increments.

Reads

The rank read operations.

Writes

The rank write operations.

Timeread

The rank read response time in 16 millisecond increments.

Timewrite

The rank write response time in 16 millisecond increments.

dataencrypted

Whether the data stored on the physical media is encrypted.

Extent pool specific commands

There are DS CLI commands that are specifically used to create, modify, and delete extent pools and to display extent pool information.

The following extent pool specific commands are available:

chextpool

Modifies an extent pool.

lsextpool

Generates a report that displays a list of the extent pools in a storage system and the status information on each extent pool in the list.

mkextpool

Creates a fixed block or count key data (CKD) storage type extent pool.

rmextpool

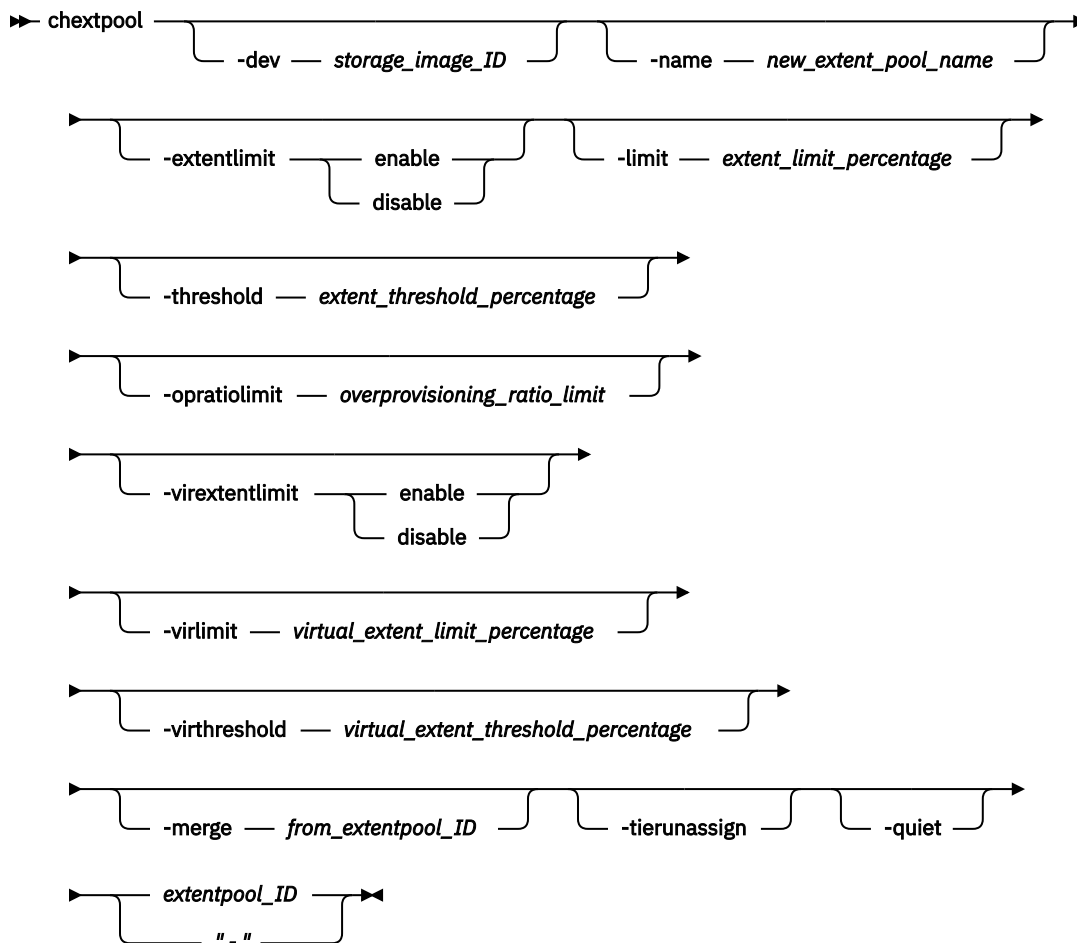
Deletes one or more specified extent pools from a storage system.

showextpool

Generates two types of reports. One of the reports displays the detailed properties of a specified extent pool. The other report displays the performance metrics for the specified extent pool.

chextpool

Use the **chextpool** command to modify attributes that are associated with an extent pool, merge two extent pools, or unassign all tier-assigned volumes or extents in the pool.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the extent pool, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-name *new_extent_pool_name*

(Optional) A new name for the extent pool.

-extentlimit *enable* | *disable*

(Optional) The enabled or disabled function of the extent limit.

-limit *extent_limit_percentage*

(Optional) The maximum value of the percentage of allocated real extents that are allowed in this extent pool.

-threshold *extent_threshold_percentage*

(Optional) The threshold as a percentage of the available real extents that is compared to the actual percentage of available real extents. The system issues a warning when this percentage is exceeded. The default threshold is 15. The system triggers a warning when the available capacity is less than 15% of the total pool capacity.

Note: A warning is generated when this percentage is exceeded by capacity allocation to Extent Space Efficient (ESE) volumes.



Warning: One third of threshold space is not usable for ESE volume migration.

-opratiolimit *overprovisioning_ratio_limit*

(Optional) Whether overprovisioning is allowed on the extent pool. The default value is 0 (unlimited overprovisioning allowed), whereas 1 means that no overprovisioning is allowed (with no assumed production impact resulting from reaching storage capacity limits on the system).

-virextentlimit *enable* | *disable*

(Optional) The enabled or disabled function of the virtual extent limit.

-virllimit *virtual_extent_limit_percentage*

(Optional) The maximum value of the percentage of allocated virtual extents that are allowed in this extent pool.

-virthreshold *virtual_extent_threshold_percentage*

(Optional) The minimum threshold percentage of the virtual extents that are available.

-merge *from_extentpool_ID*

(Optional) An existing extent pool to be merged into the extent pool that is specified by the *extentpool_ID* parameter. When the merge is complete, the ranks that are assigned to *from_extentpool_ID* are reassigned to *extentpool_ID*, and the extent pool that is specified by *from_extentpool_ID* are removed. This parameter cannot be used with any other parameters except the *-quiet* and *-dev* parameters.

-tierunassign

(Optional) All volume and extent tier assignments in the specified pool are to be canceled. This process does not remove any volumes or extents from the pool. It removes only any specified tier assignments for the volumes and extents in the pool.

-quiet

(Optional) Turns off the confirmation prompt for the **-merge** parameter.

***extentpool_ID* | -**

(Required) The ID of the extent pool to be changed. This parameter accepts either a fully qualified extent pool ID or a shortened version if the parameter is used, **-dev**. The shortened version is a four-digit decimal number with no leading zeros, prefixed with the letter *P*.

If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Modifying extent pool attributes

```
dscli> chextpool -name host_4_extpool IBM.2107-75FA120/P21
```

Output

```
Extent Pool IBM.2107-75FA120/P21 successfully modified.
```

Example: Modifying virtual extent limit

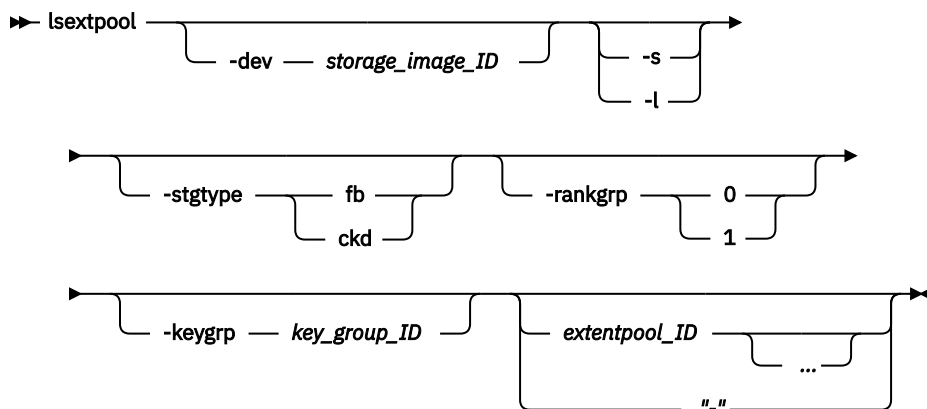
```
dscli> chextpool -dev IBM.2107-75FA120  
-virextenlimit enable -virlimit 50 -virthreshold 0 my_extpool
```

Output

```
Extent Pool IBM.2107-75FA120/P21 successfully modified.
```

lsextpool

The **lsextpool** command displays a list of extent pools in a storage system and status information on each extent pool in the list.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. For example, IBM.2107-75FA120. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the storage system is aware of more than one storage image. U

Using the *-dev* parameter temporarily overrides any defined value for *devid* for the current command.

-s

(Optional) Displays only extent pool IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays default output plus the number of ranks and tiers, key group ID, and management status of the extent pools. You cannot use the **-l** and the **-s** parameters together.

-stgtype fb | ckd

(Optional) Displays only extent pools with the specified storage type.

-rankgrp 0 | 1

(Optional) Displays only extent pools in the specified rank group.

-keygrp key_group_ID

(Optional) Displays only extent pool of the specified encryption key group.

extentpool_ID ... | -

(Optional) Displays only the extent pools with the specified IDs. An extent pool ID is a four-digit decimal number with no leading zeroes, prefixed by the letter *P*.

To specify a range of extent pool IDs, separate the extent pool IDs with a hyphen.

You must separate multiple extent pool IDs or ranges of extent pool IDs with a space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying extent pools' status information

```
dscli> lsextpool -l
```

Output

| Name | ID | stgtype | rankgrp | status | availstor (2^30B) | %allocated | available |
|-------------------|----|---------|---------|--------|-------------------|------------|-----------|
| pool_large_fb_wht | P2 | fb | 0 | below | 352 | 0 | 352 |
| pool_small_fb_wht | P4 | fb | 0 | below | 22584 | 0 | 22584 |

| reserved | numvols | numranks | keygrp | numtiers | etmanaged | extsize |
|----------|---------|----------|--------|----------|-----------|---------|
| 0 | 0 | 1 | - | 1 | no | 1GiB |
| 0 | 0 | 1 | - | 1 | no | 16MiB |

Output definitions

Name

The name you assigned to the extent pool.

ID*

The system assigned unique identifier for the extent pool object.

Stgtype

The storage type associated with the extent pool. One of the following types is displayed:

- fb
- ckd

Rankgrp

The rank group in which the designated extent pool is configured.

Status

The extent status. One of the following values is displayed:

exceeded

That the percent of real extents available is less than the real extent threshold.

below

The percent of real extents available is greater than the real extent threshold.

full

The percentExtents Available is 0.

Availstor (2^30B)

The available storage for the designated extent pool, in gibibytes (GiB).

%allocated

The percentage of real extents allocated.

Available

The maximum number of real extents available for allocation in the designated extent pool.

Reserved

The real extents reserved in the designated extent pool.

Numvols

The number of logical volumes that have been configured from the designated extent pool.

Numranks*

The number of ranks that have been configured in the designated extent pool.

Keygrp

The encryption key group associated with the extent pool. A dash (-) means that either encryption is supported but not used, or encryption is not supported.

Numtiers

The number of tiers in this extent pool.

Etmanaged

Whether or not the extent pool is managed.

extsize

The extent size in the extent pool.

Note: In prior models, a fixed area on each rank was assigned to be used for volume metadata, which reduced the amount of space available for use by volumes. In the storage system family, there is no fixed area for volume metadata, and this capacity is added to the space available for use. The metadata is allocated in the storage pool when volumes are created and is referred to as the pool overhead.

The amount of space that can be allocated by volumes is variable and depends on both the number of volumes and the logical capacity of these volumes. If thin provisioning is used, then the metadata is allocated for the entire volume when the volume is created, and not when extents are used, so over-provisioned environments have more metadata. For more information, see the *DS8900F Introduction and Planning Guide (GC27-8525)*.

1GiB

The extent pool storage type is FB and there is 1GiB in an extent in this extent pool.

16MiB

The extent pool storage type is FB and there is 16GiB in an extent in this extent pool.

1113cyl

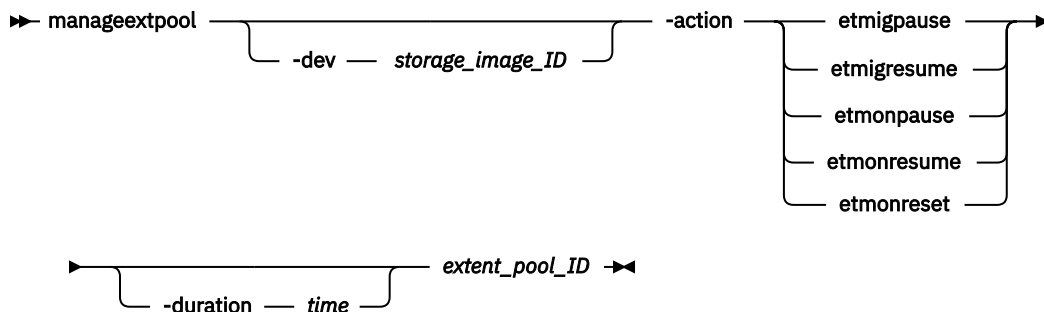
The extent pool storage type is CKD and there are 1113 cylinders in an extent in this extent pool.

21cyl

The extent pool storage type is CKD and there are 21 cylinders in an extent in this extent pool.

manageextpool

The **manageextpool** command starts a process to initiate a change on extent pools.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID or do not set the *devid* variable in your profile. The storage image ID is also required if the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-action etmigpause|etmigresume|etmonpause|etmonresume|etmonreset

(Required) Select one of the following actions:

etmigpause

Easy Tier migrations of this storage pool are paused, including migrations that are required to relieve rank bandwidth performance issues. Easy Tier monitoring is unaffected by this action.

etmigresume

Easy Tier migrations of this storage pool are resumed. Easy Tier monitoring is unaffected by this action.

etmonpause

Easy Tier monitoring of this storage pool is paused. All current Easy Tier migration plans are unaffected, but no new migration plans are formed.

etmonresume

Easy Tier monitoring of this storage pool is resumed. Any current Easy Tier migration plans are unaffected.

etmonreset

All Easy Tier monitoring data (history), including migration plans, are erased. All new plans are based on new monitoring data.

-duration time

(Optional) The hours of the pause time in ISO 8601 format. For example, `-duration 24H`. The maximum value of the time is a week, which is 168 hours (168H). You can specify this option only with `-action etmigpause` or `etmonpause` parameters.

Note: If you want the duration of the pause to be infinite, you must specify `-duration 0H`. Otherwise, if you do not specify a value with the **-duration** parameter, the default is 168H.

extent_pool_ID

(Required) The ID of the extent pool that is being managed. Example: `IBM.2107-75FA123/P11`

Example: Pausing Easy Tier migrations on extent pool

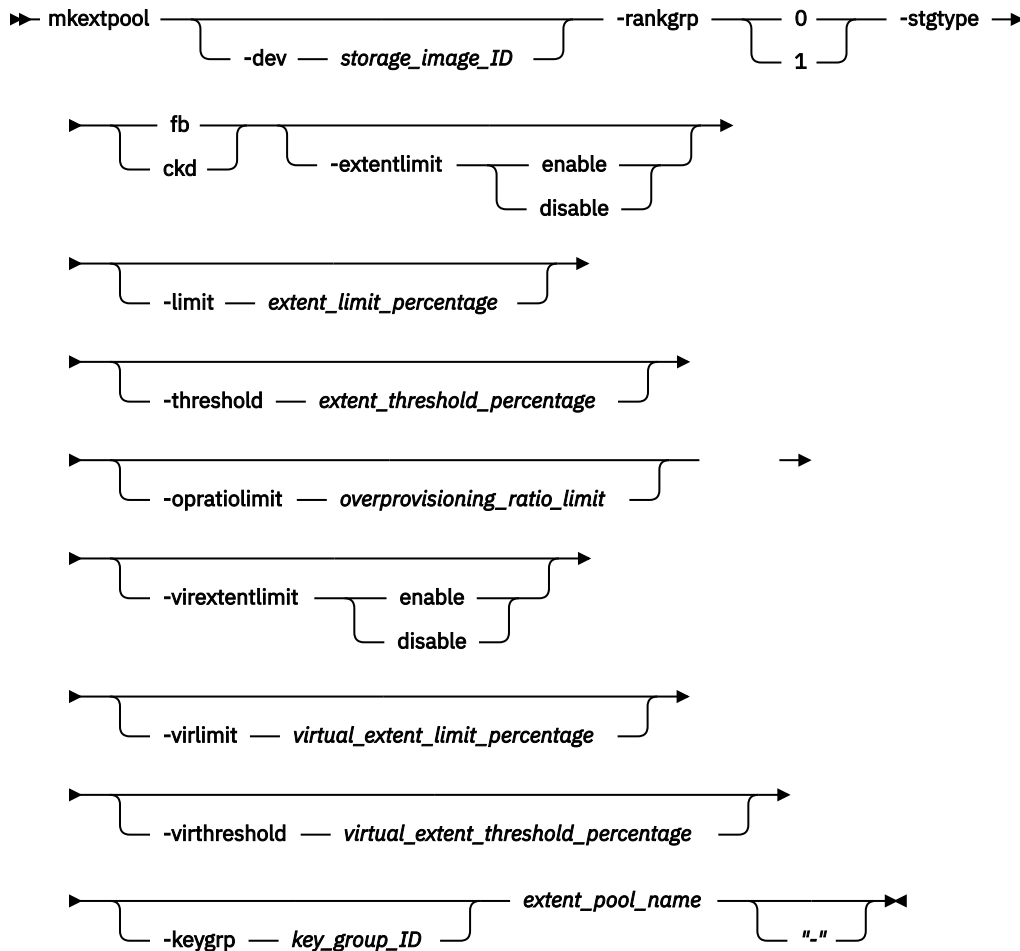
```
dscli> manageextpool -action etmigpause -duration 1H IBM.2107-75FA120/P21
```

Output

```
The etmigpause action for extent Pool IBM.2107-75FA120/P21 has completed.
```

mkextpool

The **mkextpool** command creates a fixed block or count key data (CKD) storage type extent pool.



Parameters

Notes:

1. The storage system assigns the ID during extent pool creation based on the current configuration, past configuration changes, and other internal considerations. No algorithm is available to accurately predict the newly created extent pool ID in every case.
2. An extent pool object is assigned to either rank group 0 or 1. This order allows the extent pool to be managed by storage system server 0 or 1, respectively.
3. Create extent pool objects before creating array and rank objects.
4. Create extent pools of a given type for both rank groups 0 and 1. This method means that volumes that are assigned to a volume group can be spread across both rank groups 0 and 1.

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified key group ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-rankgrp 0 | 1

(Required) Assigns the extent pool to either rank group 0 or 1. Rank group 0 is managed by server 0, and rank group 1 is managed by server 1.

Note: If an extent pool does not exist, you can issue the **chrank** command after an extent pool is created to assign the rank to the extent pool. In addition, you can create extent pools of a given type for both rank groups 0 and 1. This method means that volumes that are assigned to a volume group might be spread across both rank groups 0 and 1.

-stgtype fb | ckd

(Required) The volume storage type that is contained by this extent pool.

-extentlimit enable | disable

(Optional) Specifies that the extent limit function is enabled or disabled. The default is disable.

-limit extent_limit_percentage

(Optional) The maximum value of the percentage of allocated real extents that are allowed in this extent pool. This value defaults to 100 if not specified.

-threshold extent_threshold_percentage

(Optional) The minimum threshold percentage of the real extents available. When the percentage of the currently available real extents is less than this minimum percentage, notifications are reported. The real extent status is reported as exceeded.

-opratiolimit overprovisioning_ratio_limit

(Optional) Specifies whether overprovisioning is allowed on the extent pool. The default value is 0 (unlimited overprovisioning allowed), whereas 1 specifies that no overprovisioning is allowed (with no assumed production impact resulting from reaching storage capacity limits on the system).

-virextentlimit enable | disable

(Optional) Specifies that the virtual extent limit function be enabled or disabled. The default is disable.

-virlimit virtual_extent_limit_percentage

(Optional) The maximum value of the percentage of allocated virtual extents that are allowed in this extent pool.

-virthreshold virtual_extent_threshold_percentage

(Optional) The minimum threshold percentage of the virtual extents available. When the percentage of the currently available virtual extents is less than this minimum percentage, notifications are sent and the virtual extent status is reported as exceeded.

-keygrp key_group_ID

(Optional) The encryption key group that is associated with the specified extent pool. The default is zero, which means that no key group is assigned to the extent pool.

extent_pool_name | -

(Required) Your extent pool name, which is limited to 16 characters.

If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Creating an FB extent pool

```
dscli> mkextpool -dev IBM.2107-75FA120 -rankgrp 0 -stgtype fb my_extpool
```

Output

```
Extent pool P2 successfully created.
```

Example: Creating an FB extent pool with a virtual extent limit

```
dscli> mkextpool -dev IBM.2107-75FA120  
-rankgrp 0 -stgtype fb -virextentlimit enable -virlimit 30  
-virthreshold 10 my_extpool -keygrp 1
```

Output

```
Extent pool P2 successfully created.
```

rmextpool

The **rmextpool** command deletes extent pools from a storage image.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all extent pools, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-quiet

(Optional) Turns off the extent pool removal confirmation prompt for this command.

extentpool_ID ... | -

(Required) The IDs of one or more extent pools to be deleted. A fully qualified extent pool ID is accepted, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-decimal digit number with no leading zeroes, prefixed with the letter *P*.

Note: All rank assignments must be removed before extent pool can be deleted.

To specify a range of extent pool IDs, separate the extent pool IDs with a hyphen.

You must separate multiple extent pool IDs or ranges of extent pool IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting an extent pool

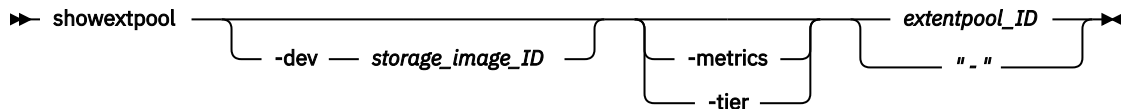
```
dscli> rmextpool IBM.2107-75FA120/P101
```

Output

```
Are you sure you want to delete extent pool IBM.2107.75FA120/P101?  
[y/n]: Y  
Extent pool IBM.2107-75FA120/P101 successfully deleted.
```


showextpool

The **showextpool** command displays detailed properties, tier information, or performance metrics of an extent pool.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified extent pool ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-metrics

(Optional) Displays the extent pool ID and performance metrics for the specified extent pool.

Note: All performance metrics are an accumulation starting from the most recent counter wrap or counter reset. The extent pool performance counters are reset on the following occurrences:

- The storage system is powered-up.
- A server failed and a failover and failback sequence completed.

-tier

(Optional) Displays the extent pool ID and tier information for the specified extent pool.

extentpool_ID | -

(Required) The extent pool that is to be displayed. This parameter accepts a fully qualified extent pool ID, which consists of the storage image ID or an extent pool number without the storage image ID, if the **-dev** parameter is specified. The extent pool number is a four-digit decimal number with no leading zeros, prefixed with the letter *P*. Even-numbered extent pools are associated with rank group 0. Odd-numbered extent pools are associated with rank group 1.

If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying detailed extent pool tier properties

```
dscli> showextpool -tier p2
```

Output

```
Date/Time: March 19, 2017 10:44:07 AM MST IBM DSCLI  
Version: 7.7.10.156 DS: IBM.2107-75APK91
```

| | |
|-------------------|-----------|
| Name | extpool_2 |
| ID | P2 |
| stgtype | fb |
| totlstor (2^30B) | 3601 |
| availstor (2^30B) | 3048 |
| resvdstor (2^30B) | 0 |
| rankgrp | 0 |
| numranks | 3 |
| numvols | 11 |
| status | below |
| %allocated | 15 |
| %available | 84 |
| configured | 3601 |
| allowed | 3601 |
| available | 3048 |

```

allocated          553
reserved           0
configuredCap (MiB/cyl) 442449
allowedCap (MiB/cyl) 442449
availableCap (MiB/cyl) 437829
allocatedCap (MiB/cyl) 4620
reservedCap (MiB/cyl) 0
%limit            100
%threshold        15
virextstatus      full
%virallocated     100
%viravailable     0
virconfigured     550
virallowed        550
viravailable      0
virallocated      550
virreserved       0
%virextlimit     -
%virextthreshold -

keygrp            -
opratio           1.4
opratiolimit      2
%allocated(ese)   15
%allocated(rep)   0
%allocated(std)   0
%allocated(over)  0
%virallocated(ese) 100
%virallocated(tse) 0
%virallocated(init) 0
%migrating(in)    0
%migrating(out)   0
numtiers          2
etmanaged         yes
etmigpauseremain -
etmonpauseremain -
etmonitorreset    -
extsize           21cyl

2016-07-26T14:00:00+07
=====Tier Distribution=====
Tier      Cap (GiB/mod1) %allocated %assigned
=====
FlashTier2 2121          84         0
ENT         436981       100        14

```

Output definitions

Name

The name that you assigned to the extent pool.

ID

The system assigned unique identifier for the extent pool object.

stgtype

The storage type that is associated with the extent pool. One of the following types is displayed:

- fb
- ckd

totlstor (2³⁰ Bytes)

The amount of storage that is associated with the extent pool in gibibytes (GiB).

availstor (2³⁰ Bytes)

The available storage for the designated extent pool in gibibytes (GiB).

resvdstor (2³⁰ Bytes)

The amount of reserved storage for the designated extent pool in gibibytes (GiB).

rankgrp

The rank group in which the designated extent pool is configured.

numranks

The number of ranks that are configured in the designated extent pool.

numvols

The number of logical volumes that are configured from the designated extent pool.

status

The extent status. One of the following values is displayed:

exceeded

The percent of real extents available is less than the real extent threshold.

below

The percent of real extents available is greater than the real extent threshold.

full

The %Extents available is zero.

%allocated

The percentage of real extents allocated. A value of 1 - 100 is displayed.

%available

The percentage of real extents that are available. A value of 1 - 100 is displayed.

configured

The number of real extents that are contained in the extent pool.

allowed

The number of real extents that are below the applicable extent limit.

available

The number of real extents of a specific type that are available for allocation to a logical volume.

allocated

The number of real extents of a specific type in the extent pool that are allocated to logical volumes or auxiliary volumes.

reserved

The number of deallocated real extents in the extent pool that are on ranks of the same extent type in the reserved state. In addition, this value is the number of deallocated extents above the applicable extent limit on ranks of the same extent type that are not in the reserved state.

configuredCap (MiB/cyl)

The total real capacity number. The capacity is reported in MiB for FB extent pool and reports the number of cylinders for CKD extent pool.

allowedCap (MiB/cyl)

The allowed real capacity number. The capacity is reported in MiB for FB extent pool and reported in number of cylinders for CKD extent pool.

availableCap (MiB/cyl)

The available real capacity number. The capacity is reported in MiB for FB extent pool and reported in number of cylinders for CKD extent pool.

allocatedCap (MiB/cyl)

The allocated real capacity number. The capacity is reported in MiB for FB extent pool and reported in number of cylinders for CKD extent pool.

reservedCap (MiB/cyl)

The reserved capacity. The capacity is reported in MiB for FB extent pool and reported in number of cylinders for CKD extent pool.

%limit

The maximum percentage of allocated real extents that are allowed in this extent pool.

%threshold

The minimum threshold percentage of the real extents available. When the percentage of the currently available real extents is less than this minimum percentage, notifications are sent and the extent status is reported as exceeded.

Note: A warning is generated when this percentage is exceeded by capacity allocation to Extent Space Efficient (ESE) volumes.



Warning: One third of threshold space is not usable for ESE volume migration.

Virextstatus

The virtual extent status. One of the following values is displayed:

exceeded

The virtual extents available percentage is less than the virtual extent threshold.

below

The virtual extents available (**viravailable**) as a percentage of the total extents (**virallowed**) is greater than the virtual extent threshold (**virextthreshold**).

full

The available virtual extents is zero.

%virallocated

The percentage of virtual extents that are allocated compared to the total virtual extents that are allowed. Valid values are 0 - 100.

%viravailable

The percentage of virtual extents that are available compared to the total virtual extents that are allowed. Valid values are 0 - 100.

Virconfigured

The number of virtual extents that are configured in the extent pool.

Virallowed

The number of virtual extents that are below the applicable virtual extent limit.

Viravailable

The number of virtual extents that are available for allocation to space-efficient volumes.

Virallocated

The number of virtual extents in the extent pool that are allocated to space-efficient volumes.

Virreserved

The number of deallocated virtual extents in the extent pool that are on ranks of the same extent type that are in the reserved state. In addition, this value The number of deallocated extents above the applicable extent limit on ranks of the same extent type that are not in the reserved state.

%virextlimit

The maximum value of the percentage of allocated virtual extents that can be allowed in this extent pool.

Note: If the virtual extent limit is not enabled, a " - " value is displayed.

%virextthreshold

The minimum threshold percentage of the virtual extents available. When the percentage of the currently available virtual extents is less than this minimum percentage and the virtual extent status is reported as exceeded.

Note: If the virtual extent limit is not enabled, a " - " value is displayed.

keygrp

The key group number that the extent pool is related to. A dash (-) means that either encryption is supported but not used, or encryption is not supported.

opratio

The overprovisioning ratio, which is the total provisioned capacity divided by total real capacity that is allowable for the volume.

opratiolimit

Specifies whether overprovisioning is allowed on the extent pool. The default value is 0 (unlimited overprovisioning allowed), whereas 1 means that no overprovisioning is allowed (with no assumed production impact resulting from reaching storage capacity limits on the system).

%allocated(ese)

The percentage of allocated real extents on ESE (Extent Space Efficient) volumes compared to the real capacity of the Extent Pool.

%allocated(rep)

The percentage of allocated real extents on space efficient repository compared to the real capacity of the Extent Pool.

%allocated(std)

The percentage of allocated real extents on standard volumes compared to the real capacity of the Extent Pool.

%allocated(over)

The percentage of allocated real extents used for overhead, such as to support space efficient storage, compared to the real capacity of the Extent Pool.

%virallocated(ese)

The percentage of allocated virtual extents on ESE (Extent Space Efficient) volumes compared to the virtual capacity of the Extent Pool.

%virallocated(tse)

The percentage of allocated virtual extents on TSE (Track Space Efficient) volumes compared to the virtual capacity of the Extent Pool.

%virallocated(init)

The percentage of allocated virtual extents being initialized compared to the virtual capacity of the Extent Pool.

%migrating(in)

The percentage of extents migrating into the extent pool compared to the real capacity of the extent pool. (This value is the percentage of migrating extents in the extent pool that have specified this extent pool as the target of the migration.)

%migrating(out)

The percentage of extents migrating out of the extent pool that is compared to the real capacity of the extent pool. (This value is the percentage of migrating extents in the extent pool that have specified this extent pool as the source of the migration.)

numtiers

The number of tiers in this extent pool.

etmanaged

Whether the extent pool is managed.

etmigpauseremain

The pause in the Easy Tier migration process. One of the following values is displayed:

OH1M -168H0M

The time (in hours and minutes) that remain of the pause in the Easy Tier migration process.

infinite

The Easy Tier migration remains paused until the resume action is submitted.

- (dash)

The Easy Tier migration is not paused.

unknown

The system failed to query the time that remains of the pause.

etmonpauseremain

The pause in the Easy Tier monitoring process. One of the following values is displayed:

OH1M-168H0M

The time (in hours and minutes) that remains of the pause in the Easy Tier monitoring process.

infinite

The Easy Tier monitoring remains paused until a resume action is submitted.

- (dash)

The Easy Tier monitoring is not paused.

unknown

The system failed to query the time that remains of the pause.

etmonitorreset

Easy Tier extent pool monitoring reset date is as follows:

date

The date of the last Easy Tier monitoring reset in ISO 8601 format: yyyy-MM-dd'T'HH:mm:ssZ, where:

yyyy

the year

MM

the month (01-12)

dd

the day (01-31)

T

the single letter T without quotes

HH

the hour (00-23)

mm

the minutes (00-59)

ss

the seconds (00-59)

Z

the time zone offset from UTC [-HHmm | +HHmm]

unknown

The date in which Easy Tier monitoring of this extent pool was last reset is not known.

unsupported

The Easy Tier extent pool management is not supported.

extsize

The extent size in the extent pool.

Note: In prior models, a fixed area on each rank was assigned to be used for volume metadata, which reduced the amount of space available for use by volumes. There is no fixed area for volume metadata, and this capacity is added to the space available for use. The metadata is allocated in the storage pool when volumes are created and is referred to as the pool overhead.

The amount of space that can be allocated by volumes is variable and depends on both the number of volumes and the logical capacity of these volumes. If thin provisioning is used, then the metadata is allocated for the entire volume when the volume is created, and not when extents are used, so over-provisioned environments have more metadata. For more information, see the *DS8900F Introduction and Planning Guide (GC27-8525)*.

1GiB

The extent pool storage type is FB and there is 1GiB in an extent in this extent pool.

16MiB

The extent pool storage type is FB and there is 16GiB in an extent in this extent pool.

1113cyl

The extent pool storage type is CKD and there are 1113 cylinders in an extent in this extent pool.

21cyl

The extent pool storage type is CKD and there are 21 cylinders in an extent in this extent pool.

Tier**FlashTier0**

The tier of high performance flash drives.

FlashTier1

The first tier of high capacity flash drives.

FlashTier2

The second tier of high capacity flash drives.

ENT

Enterprise tier; consists of drives with speeds of 10K RPM, 15K RPM, or a combination of drives of both speeds.

NL

Nearline tier; consists of high volume SATA or SAS Nearline disk drives.

Unknown

Tier is unknown.

Cap (GiB/mod1)

Capacity of this tier in GiB for FB pools, and mod1 for CKD pools.

%allocated

Capacity of this tier that has been allocated, including assigned capacity, as a percentage of the tier capacity.

%assigned

Capacity that is assigned to this tier as a percentage of the tier capacity. To allow Easy Tier, Easy Tier cooperative caching, and other functions to work correctly, the maximum assigned capacity is limited to 80% of the tier capacity.

Example 2: Displaying extent pool performance metrics

```
dscli> showextpool -metrics IBM.2107-75FA120/P101
```

Output

| ID | Date | real extcap | realext | real allocext | real extconv |
|-----------------------|----------------------|-------------|---------|---------------|--------------|
| IBM.2107-75FA120/P101 | 10/11/04 02:23:47 | 10000 | 10000 | 10000 | 10000 |

| dyrelocsource | dyreloctarget |
|---------------|---------------|
| 10000 | 10000 |

| virextcap | virext | dataencrypted |
|-----------|--------|---------------|
| 10000 | 100000 | yes |

Output definitions**ID**

The system assigned unique identifier for the extent pool object.

Date

The current time stamp for the extent pool performance counters.

realextcap

The real extent pool capacity in gibibytes (GiB).

realext

The number of real extents in the extent pool.

realallocext

The number of real allocated extents in the extent pool.

realextnconv

Specifies real extent conversions.

dyrelocsource

The number of extents that were sources of a dynamic extent relocation.

dyreloctarget

The number of extents that were targets of a dynamic extent relocation.

virextcap

The virtual extent pool capacity in gibibytes (GiB).

virext

The number of virtual extents in the extent pool.

dataencrypted

Specifies whether the data stored on the physical media is encrypted.

Address group specific commands

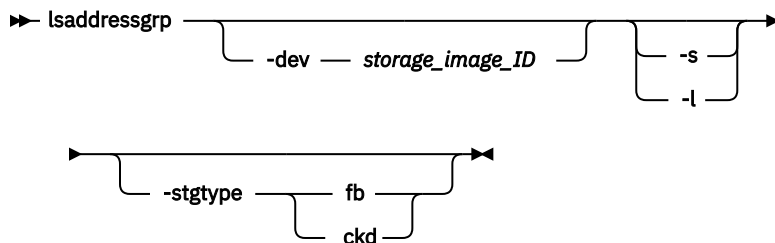
The **lsaddressgrp** command displays address group information.

lsaddressgrp

This command generates a report that displays a list of address groups for a storage system. It also provides the status information for each address group in the list.

lsaddressgrp

The **lsaddressgrp** command displays a list of address groups for a storage image and the status information for each address group in the list.



Parameters

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. Displays only the objects for the storage unit specified. The storage image ID is required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2107-75FA120

-s

(Optional). Displays the address group IDs only. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional). Displays the default output. You cannot use the **-l** and the **-s** parameters together.

-stgtype fb | ckd

(Optional). Displays only the address groups that are associated with the specified storage type.

Example: Displaying address groups' status information

```
dscli> lsaddressgrp -dev IBM.2107-75FA120 -1
```

Output

| ID | Stgtype | Basevolnum | Vols | LSSs | Confgvols |
|--------------------|---------|------------|---------|--------|-----------|
| IBM.2107-75FA120/0 | fb | 0000 | 4096 16 | 164096 | |
| IBM.2107-75FA120/1 | fb | 0100 | 4096 16 | 164096 | |
| IBM.2107-75FA120/2 | ckd | 0200 | 4096 16 | 164096 | |
| IBM.2107-75FA120/3 | ckd | 0300 | 4096 16 | 164096 | |

Output descriptions

ID*

The storage image address group unique identifier. The address number is a single hexadecimal character (0 - 9 or uppercase A - F).

Stgtype

The type of logical devices that are configured for the specified address group: fb - fixed block and ckd - count key data.

Basevolnum

The lowest logical volume number in the address group.

Vols

The number of logical volume numbers that are associated with the address group.

LSSs

The number of logical subsystems (LSSs) that are configured on the address group.

Confgvols

The number of logical volumes that are configured on the address group.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-1** parameter is specified.

Logical control unit specific commands

Commands are referenced for tasks that are associated with IBM Z logical control units.

Use the following logical control unit specific commands:

chlcu

Modifies a logical control unit.

lslcu

Generates a report that displays a list of logical control units for a storage system and the status information for each logical control unit in the list.

mklcu

Creates a logical control unit in a storage system. A logical control unit is configured to represent a grouping of logical CKD volumes.

rmlcu

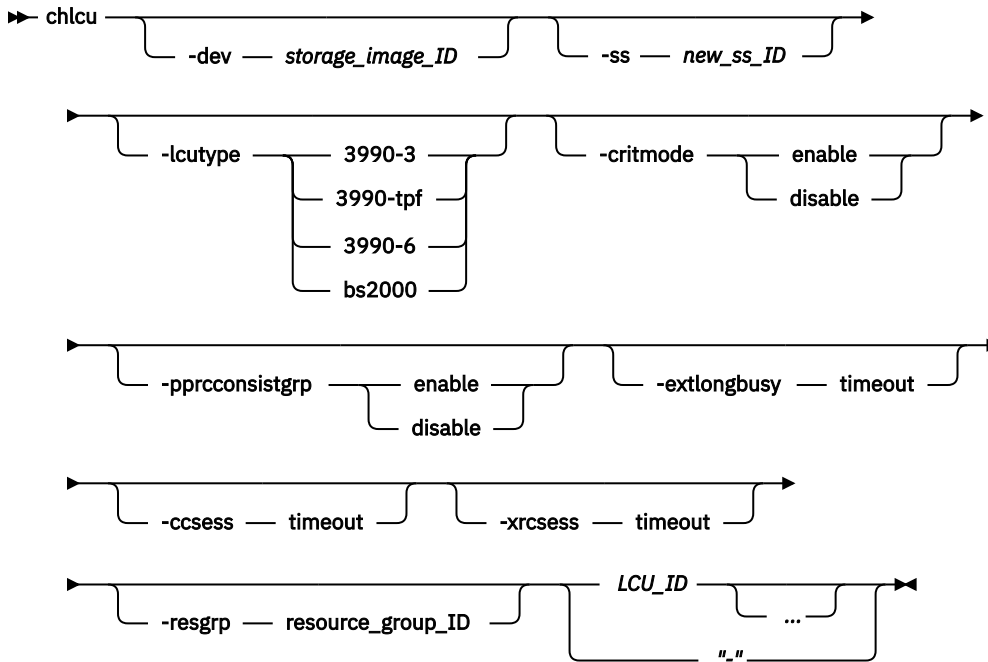
Deletes one or more specified logical control units.

showlcu

Generates a report that displays the detailed properties for the specified logical control unit.

chlcu

The **chlcu** command modifies a logical control unit.



Parameters

-dev *storage_image_ID*

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LCU subsystem ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-ss *new_ss_ID*

(Optional). Your new LCU subsystem ID value (valid range is hexadecimal 0x0001 - 0xFFFF). If this parameter is specified, multiple LCUs are not allowed. The new SSID that you specify replaces the existing SSID value in the initial target LCU ID.

Example: F010

-lcutype **3990-3** | **3990-tpf** | **3990-6** | **bs2000**

(Optional). Changes the target LCUs to the new LCU type:

3990-3

TYPE_3990_MODEL_3

3990-tpf

TYPE_3990_MODEL_3_for_TPF

3990-6

TYPE_3990_MODEL_6

BS2000

TYPE_BS_2000

-critmode **enable** | **disable**

(Restricted). The critical heavy mode setting in the target LCUs be enabled or disabled. Critical heavy mode controls the behavior of the remote mirror and copy (formerly PPRC) pairs that have a primary logical volume on this LCU and are in an LCU consistency group. See the **mkpprc** command for additional information.

You must have administrator privileges to specify this option.

-pprconsistgrp enable | disable

(Optional). Whether the remote mirror and copy consistency group state setting is enabled or disabled. Any volume that becomes suspended that is associated with the subsystem LSS passes into an extended Long Busy state unless a created consistency group has been received. Otherwise, the volume does not become long busy.

Note: A consistency group volume pair that is suspended will not go into an extended long busy state unless the primary volume is in a full duplex state before the suspension.

-extlongbusy timeout

(Optional). The time in seconds that an LCU consistency group volume stays long busy after reporting an error that causes a remote mirror and copy (formerly PPRC) suspension if a consistency group has not been created.

-ccsess timeout

(Optional). The concurrent copy session timeout in seconds setting. This value indicates how long (in seconds) any LCU volume in a concurrent copy session stays long busy before the concurrent copy session is suspended.

Example: 500

-xrcsess timeout

(Optional). The XRC session timeout value in seconds. This value indicates the time in seconds that any LCU volume in an XRC session stays long busy before the XRC session is suspended. The valid timeout range is 1 - 9999 seconds.

Example: 500

-resgrp resource_group_ID

(Optional) The resource group that the LCUs are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

LCU_ID ... | -

(Required). The one or more LCUs that are to be modified by this command. A LCU ID is two hexadecimal characters 00 - FE.

You must separate multiple IDs and multiple ID ranges with a space. This parameter accepts a fully qualified LCU ID (which includes the manufacture.machinetype-serial number/ID) or a shortened version if the *-dev* parameter is specified.

To specify a range of LCU IDs, separate the IDs with a hyphen (-).

If you have specified a new subsystem ID value with the *-ss* parameter, only one LCU ID can be specified.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: 00-03 08

Example: Modifying a logical control unit

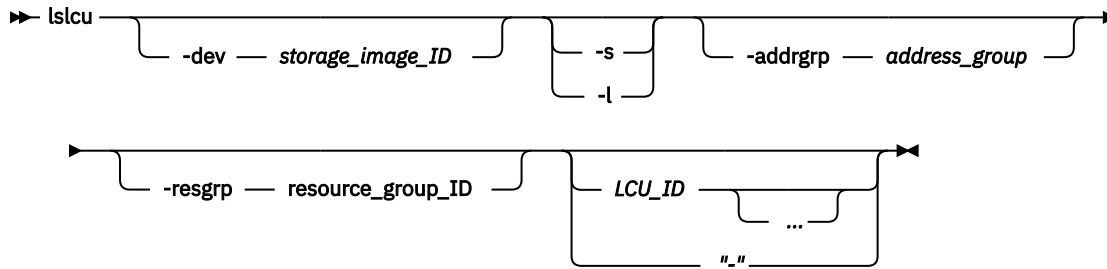
```
dscli> chlcu -dev IBM.2107-75FA120 -critmode enable 00-0F
```

Output

```
LCU 00 successfully modified.  
LCU 01 successfully modified.  
...  
LCU 0F successfully modified.
```

lslcu

The **lslcu** command displays a list of logical control units (LCUs) for a storage image and status information for each logical control unit in the list.



Parameters

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. Displays only the objects for the storage system that is specified. The storage image ID is required for the following conditions:

- A fully qualified LCU ID is not specified.
- The *dev* variable is not set in your profile or specified through the **setenv** command.
- The HMC is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

Example IBM.2107-75FA120

-s

(Optional). Displays LCU IDs only. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional). Use this parameter to display the default output plus resource groups. You cannot use the **-l** and the **-s** parameters together.

-addrgrp address_group

(Optional). An address group. Only the LCUs that belong to the specified address group are displayed. An address group is a single character in the range of 0 - 9 or A - F.

-resgrp resource_group_ID

(Optional) The LCUs that are assigned to the specified resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number.

LCU_ID ... | -

(Optional). The ID associated with an LCU. An LCU ID is two hexadecimal characters 00 - FE.

To specify a range of LCU IDs, separate the LCU IDs with a hyphen (-).

You must separate multiple LCU IDs or ranges of LCU IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 00-03 08

Example: Displaying LCUs' status information

```
dsccli> lslcu -dev IBM.2107-75FA120 -l
```

Output

| ID | Group | addr-grp | config-vols | subsys | con-base-type | resgrp |
|---------------------|--------------|-----------------|--------------------|---------------|----------------------|---------------|
| IBM.2107-75FA120/10 | 0 | 0 | 256 | 8010 | 3990-6 | RG0 |
| IBM.2107-75FA120/11 | 1 | 0 | 256 | 8011 | 3990-6 | RG0 |
| IBM.2107-75FA120/12 | 0 | 0 | 256 | 8012 | 3990-6 | RG0 |
| IBM.2107-75FA120/13 | 1 | 0 | 256 | 8013 | 3990-6 | RG0 |

Output definitions

ID*

The LCU ID.

The LCU ID is a unique identifier that is assigned to this logical control unit object. The ID includes the storage image ID and the two-digit LCU ID.

Group

The server that is managing the logical control unit group. The server is identified as either 0 or 1.

Addrgrp

The address group object of which the logical control unit is a member.

Configvols

The number of volumes, or logical devices assigned to the LCU ID. This number includes base CKD volumes and alias CKD volumes.

Subsys

The value that you assigned, or the default SSID value.

Conbasetype

The LCU type. The allowable values include the following LCU types:

- 3390-3
- 3390-tpf
- 3390-6 (this value is the default if no value is assigned)
- bs2000

resgrp+

The resource group ID that the LCU is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

Key:

*

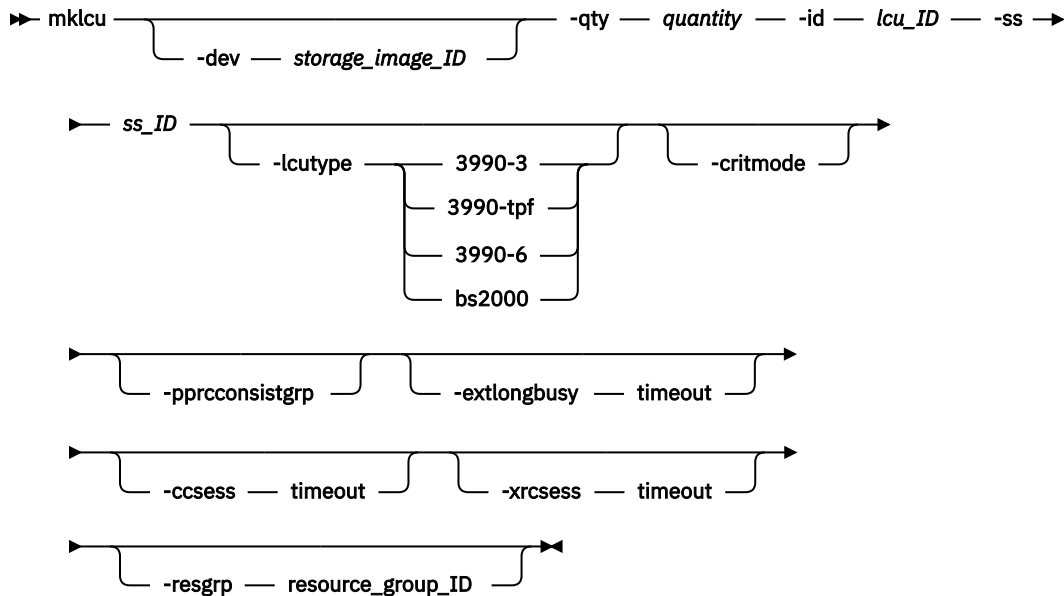
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-1** parameter is specified.

mklcu

The **mklcu** command creates a logical control unit (LCU) in a storage image.



Parameters

Notes:

1. A logical control unit is configured to represent a grouping of logical CKD volumes.
2. Multiple sequential LCU IDs can be created with a single request, but all logical control units must be of the same type and specify the same options.
3. The storage system has a 64 KB 256 volume address space that is partitioned into 255 logical subsystem (LSS) units, where each LSS contains 256 logical volume numbers. The 255 LSS units are assigned to one of 16 address groups, where each address group contains 16 LSSs, or 4 KB volume addresses.
4. LCUs are typically created in groups of 16, beginning at LSS address X'x0'.

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required for the following conditions:

- A fully qualified LCU ID is not specified.
- The *dev* variable is not set in your profile or specified through the **setenv** command.
- The HMC is aware of more than one storage image.

Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

Example IBM.2107-75FA120

-qty quantity

(Required). The number of LCU IDs to be created. You can specify a quantity value 1 - 255.

This command is rejected if any of the LCU IDs, which are based on the initial LCU ID and the quantity, are currently defined or are outside the range of supported LCU IDs. The valid LCU ID range is 00 - FE.

Example 16

-id lcu_ID

(Required). The LCU ID to be created, or the first LCU ID in a sequence of LCU IDs to be created. An LCU ID is two hexadecimal characters 00 - FE.

Example 00

-ss ss_ID

(Required). The subsystem ID that you assign. A subsystem ID is four hexadecimal characters 0x0001 - 0xFFFF. If multiple LCU IDs are being created, then the SSID value increments for each additional LCU ID that is created.

If 16 LCUs are created, starting with SSID 0x10, then the SSID values are 0x0010 - 0x001F.

Example 0010

-lcutype 3990-3 | 3990-tpf | 3990-6 | bs2000

(Optional). Specifies that one of the following types of LCU be created:

3990-3

type 3990 model 3

3990-tpf

type 3990 model 3 for tpf

3990-6

type 3990 model 6

bs2000

type bs 2000

-critmode

(Restricted). Specifies that critical heavy mode to enable. Critical Heavy mode controls the behavior of the remote copy and mirror pairs that have a primary logical volume on this LCU. The default value is disable.

You must have administrator privileges to specify this option. See the **mkpprc** command for more notes about the use of this parameter.

Note: If an attempt is made to create the LCU and enable the critical heavy mode but the user does not have the authority to enable the **-critmode** parameter, two messages are displayed when the command is processed:

- One message states that the LCU was successfully created.
- A second message states "Your user ID does not have the authority to perform this operation".

So, the LCU is created but the critical heavy mode is not enabled.

-pprcconsistgrp

(Optional). The remote mirror and copy consistency group state setting. Any volume that becomes suspended that is associated with the subsystem LSS passes into an extended Long Busy state unless the consistency group that was created previously was received. Otherwise, the volume does not become long busy.

Note: A consistency group volume pair that is suspended will not go into an extended long busy state unless the primary volume is in a full duplex state before the suspension.

-extlongbusy timeout

(Optional). The time in seconds that an LCU consistency group volume stays long busy after an error is reported that caused a remote mirror and copy suspension if a consistency group has not been created. The default value is 120 seconds.

-ccsess timeout

(Optional). The **concurrent copy session timeout** parameter as the time in seconds that any LCU volume in a concurrent copy session stays long busy before a concurrent copy session suspends. The valid timeout range is 1 - 9999 seconds. The default value is 300 seconds.

Example 500

-xrcsess timeout

(Optional). The XRC session timeout parameter as the time in seconds that any LCU volume in an XRC session stays long busy before the XRC session suspends. The valid timeout range is 1 - 9999 seconds. The default value is 300 seconds.

Example 500

-resgrp *resource_group_ID*

(Optional) The resource group that the LCUs are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number. The default is *RG0*.

Example: Creating an LCU

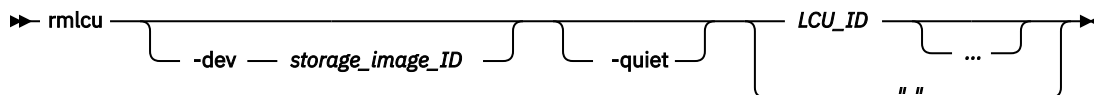
```
dsccli> mklcu -dev IBM.2107-75FA120 -qty 16 -id 80 -ss 2300
```

Output

```
LCU 80 successfully created.  
LCU 81 successfully created.  
...  
LCU 8F successfully created.
```

rmlcu

The **rmlcu** command deletes existing logical control units.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all logical control units, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-quiet

(Optional) Turns off the LCU removal confirmation prompt for this command.

LCU_ID ... | -

(Required) An array of one or more LCUs to be removed. This parameter accepts a fully qualified LCU ID or a shortened version, if the **-dev** parameter is specified. A LCU ID is two hexadecimal characters in the range 00 - FE.

To specify a range of LCU IDs, separate the LCU IDs with a hyphen (-).

You must separate multiple LCU IDs or ranges of LCU IDs with a blank space between each ID or range of IDs.

Example: 00-03 08

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive (-) command mode.

Example: Deleting an LCU

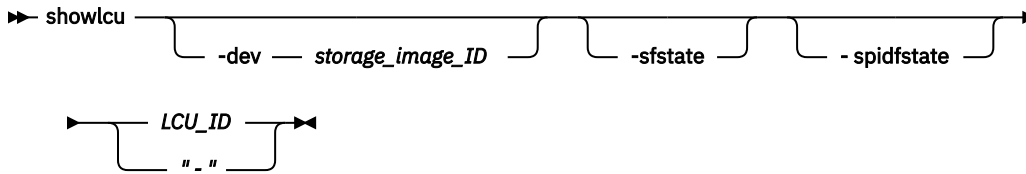
```
dsccli> rmlcu -dev IBM.2107-75FA120 00-0F
```

Output

```
Are you sure you want to delete LCU 00-0F ? y/n Y  
LCU 00 successfully deleted.  
Are you sure you want to delete LCU 01 ? y/n Y  
LCU 01 successfully deleted.  
...  
Are you sure you want to delete LCU 0F ? y/n Y  
LCU 0F successfully deleted.
```


showlcu

The **showlcu** command displays the detailed properties of an individual logical control unit (LCU).



Parameters

-dev storage_image_ID

(Optional). Specifies the storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the logical control unit, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-sfstate

(Optional) Displays a table at the end of the command output that contains the name, ID, and soft fence state for each volume in the specified LCU.

-spidfstate

(Optional) Displays a table at the end of the command output that contains the name, ID, and SPID (set path group ID) fence state for each volume in the specified LCU.

LCU_ID | -

(Required). Displays the properties for the specified logical control unit. The LCU ID is a 2-digit hexadecimal number in the range of 00 - FE.

Accepts a fully qualified LCU ID, which consists of the storage image ID or a shortened version without the storage image ID, if the **-dev** parameter is specified.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying detailed properties of an LCU

```
dscli> showlcu -dev IBM.2107-75FA120 10
```

Output

| ID | Group | Addr-grp | Config-vols | Subsys | Con-base-type |
|---------------------|-------|----------|-------------|--------|---------------|
| IBM.2107-75FA120/10 | 0 | 1 | 256 | 0010 | 3990-6 |

| Pprc-consist-grp | Xtndlbz-timeout | Ccsess-timout | Xrc-sess-timout | Crit-hvmode | resgrp |
|------------------|-----------------|---------------|-----------------|-------------|--------|
| Disabled | 120 secs | 300 secs | 300 secs | Disabled | RG0 |

Output definitions

ID

The unique identifier that is assigned to this logical control unit object. It includes the storage image ID and the 2-digit LCU ID: 00 - FE.

Group

The server that manages the logical control unit group. The displayed values are 0 or 1.

Addrgrp

The address group object that the logical control unit is a member of.

Confgvols

The number of volumes or the logical devices that are assigned to this LCU ID. This number includes base count key data (ckd) volumes and alias ckd volumes.

Subsys

The subsystem ID that you assigned to this logical control unit. The range of values that you selected from is 0001 - FFFF.

Conbasetype

The LCU type that you designated for the logical control unit. If you did not designate a type, the default value of 3990-6 is assigned and displayed.

Pprcconsistgrp

The assigned PPRC consistency group state setting. If you do not designate enabled, the default value of disabled is assigned.

Xtnldbztimout

The assigned extended long busy timeout value. If you do not designate a value, the default value of 120 seconds is assigned and displayed.

Ccsesstimout

The assigned concurrent copy session timeout value. If you do not designate a value, the default value of 300 seconds is assigned and displayed.

Xrcsesstimout

The assigned XRC session timeout value. If you do not designate a value, the default value of 300 seconds is assigned and displayed.

Crithvmode

Indicates whether the critical heavy mode for Remote Mirror and Copy operations is in effect. If you do not designate a value, the default value of Disabled is assigned and displayed.

resgrp

The resource group ID that the LCU is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

Example 2: Displaying detailed properties of an LCU

If you specify the **-sfstate** parameter, the output includes the soft fence state table.

```
dscli> showlcu -sfstate ef IBM.2107-75FA120 10
```

Output

```
Date/Time: September 22, 2016 8:43:04 AM MST
2107-1300861
ID                EF
Group            1
addrgrp          E
confgvols        4
subsys           0x1111
conbasetype      3990-6
pprcconsistgrp   Disabled
xtndlbztimout    120 secs
ccsesstimout     300 secs
xrcsesstimout    300 secs
crithvmode       Disabled
resgrp           RG0
=====Soft Fence State=====
```

```
Name ID   sfstate
=====
-   EFFC Disabled
-   EFFD Disabled
-   EFFE Disabled
ffff EFFF Disabled
```

Output definitions (-sfstate parameter is specified)

Name

The user-assigned nickname for this volume object.

ID

The unique identifier that is assigned to this volume object. A volume ID is four hexadecimal characters (0x0000 - 0xFEFF).

sfstate

The soft fence state. The following values are possible.

Enabled

The host has set this volume to the soft fence state.

Disabled

The host has not set this volume to the soft fence state.

N/A

The host cannot set this volume to the soft fence state. For example, an alias volume.

Output definitions (-spidfstate parameter is specified)

Name

The user-assigned nickname for this volume object.

ID

The unique identifier that is assigned to this volume object. A volume ID is four hexadecimal characters (0x0000 - 0xFEFF).

spidfstate

The soft fence state. The following values are possible.

Enabled

The volume is set to the SPID fence state by the host.

Disabled

The volume is not set to the SPID fence state by the host.

N/A

The volume is not capable of being set into the SPID fence state by the host. For example, an alias volume.

CKD logical volume specific commands

Commands are referenced for tasks that are associated with IBM Z count key data (CKD) logical volumes.

The following CKD logical volume specific commands are available:

chckdvol

Modifies the nickname that you assigned to the count key data (CKD) base volume.

initckdvol

Releases extents from a space-efficient logical volume, and removes (erases) data from standard volumes.

lsckdvol

Generates a report that displays a list of count key data (CKD) base and alias volumes in a storage system and the status information for each volume in the list.

manageckdvol

Initiates a change on count key data (CKD) volumes by executing a process.

mkaliasvol

Creates IBM Z CKD alias volumes (referred to as parallel access volumes or PAVs) in a storage system.

mkckdvol

Creates IBM Z count key data (CKD) base CKD volumes in a storage image.

rmckdvol

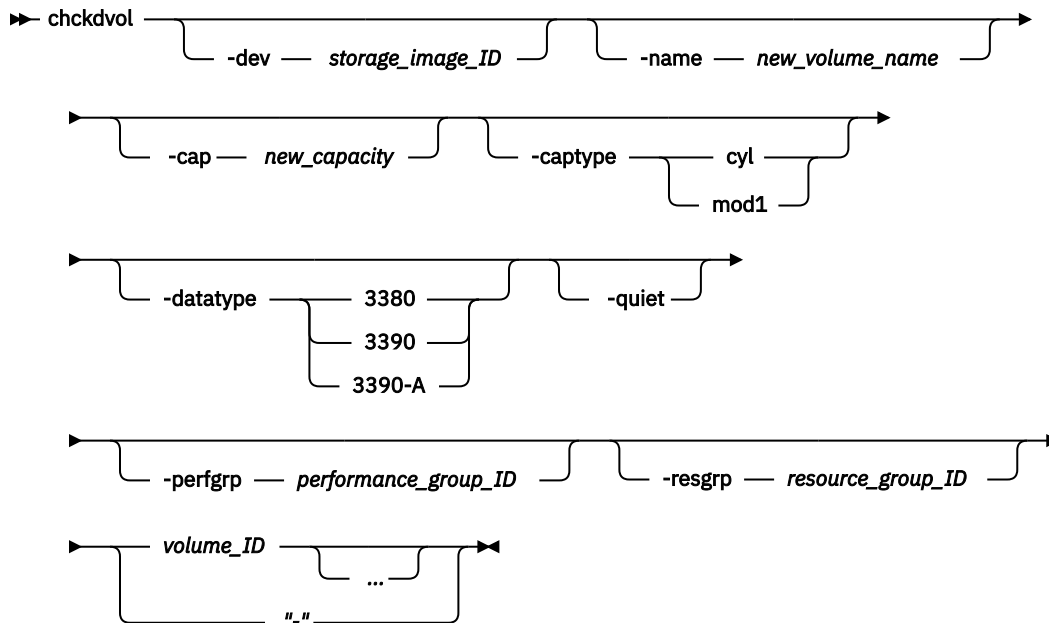
Deletes one or more specified count key data (CKD) base or alias volumes from a storage system.

showckdvol

Generates two reports. One report displays the detailed properties of a specified count key data volume. The other report displays the performance metrics for specified count key data volume.

chckdvol

The **chckdvol** command modifies the attributes that are associated with a count key data (CKD) base volume.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-name *new_volume_name*

(Optional) User specified nickname for this CKD base volume. This nickname should not exceed 16 characters. It can contain one of the following wildcards:

- (#d) - insert *volume_ID* (decimal format)
- (#h) - insert *volume_ID* (hexadecimal format)

-datatype **3380|3390|3390-A**

(Optional) The volume data type.

For Extended Addressing Volumes (EAV), which have a capacity greater than 65520 cylinders, the data type 3390-A must be specified. You can also specify the data type 3390-A for volumes smaller than 65520 cylinders.

Notes:

1. You can specify the data type 3390–A for storage system models only.
2. You must ensure that the volume data type is compatible with the host systems that access this volume.
3. You cannot use the **-datatype** parameter and the **-cap** parameter in the same command.

-cap *new_capacity*

(Optional) The quantity of CKD cylinders that you want to allocate to the specified volume. You can also use the **-captype** parameter to change the unit type of the capacity to mod1 units.

- 3380 volumes cannot be expanded.
- For 3390 volumes, the *new_capacity* value can be specified in increments of 1 in the range 1 - 65520 (849KiB to 55.68 GiB).
- For 3390–A volumes, for values less than 65520 cylinders, *new_capacity* is specified in increments of 1. Capacities greater than 65520 cylinders are specified in increments of 1113. The maximum volume size varies and depends on storage system model and type.

Notes:

1. Check your operating system documentation to ensure that volume expansion is supported before proceeding with the expansion.
2. If you expand a 3390 volume to an Extended Addressing Volume (EAV), the data type is changed to 3390-A.
3. Attempting to reduce the size returns an error and causes the transaction to fail.
4. You cannot use the **-datatype** parameter and the **-cap** parameter in the same command.

-captype *cyl* | *mod1*

(Optional) The unit type of the capacity given by using the **-cap** parameter. The default is *cyl*. A *mod1* unit is equivalent to 1113 cylinders, and 1263.28 cylinders is equivalent to 1 GiB. You must specify the **-cap** parameter to specify the **-captype**.

-quiet

(Optional) Turns off the CKD volume modification confirmation prompt for this command.

-perfggrp *performance_group_ID*

(Optional) The performance group ID that the volumes are assigned to. The performance group ID begins with the letters *PG*, and valid performance groups numbers are 0, and 16-31. The default is *PG0*.

-resgrp *resource_group_ID*

(Optional) The resource group that the volumes are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

***volume_ID ...* | -**

(Required) An array of one or more CKD base volume IDs or volume ID ranges to modify.

A volume ID range is defined by two volume IDs that are separated by a dash. Multiple volume IDs or volume ID ranges must be separated with a blank space between each ID.

Example: 0100-010F 0180-018F 0120

The volume ID format is four hexadecimal characters *LLVV* that represent the following values:

LL

The logical control unit number, 00 - FE

VV

The volume number, 00 - FF

You must fully qualify the volume ID with manufacturer, machine type, and serial number if you do not use the **-dev** parameter.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) if you are in the DS CLI interactive mode.

Example: Modifying CKD base volume attributes

```
dscli> chckdvol -dev IBM.2107-75FA120 -perfgrp PG18 0100
```

Output

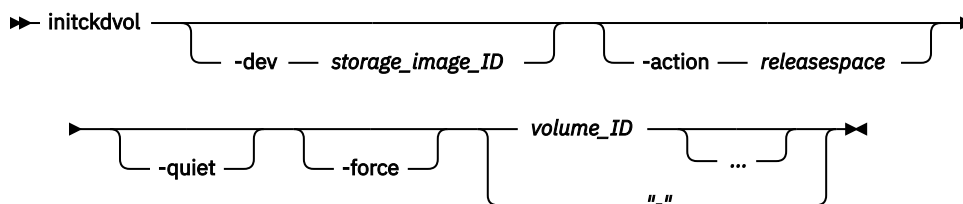
```
CKD volume 0100 successfully modified.
```

initckdvol

The **initckdvol** command initializes a logical volume and releases extents from a space-efficient logical volume.

For space efficient logical volumes, this command is used to release space. For TSE volumes, it releases tracks in the repository, reducing the repository allocated space. For ESE volumes, it releases extents in the extent pool being used, reducing the allocated extents.

For example, if a space-efficient logical volume has data that is stored on it that is no longer needed, use the **initfbvol** command to free the extents/tracks that were assigned to this logical volume. This allows the extents/tracks to be reused by other space-efficient logical volumes.



For example, if a space-efficient logical volume is used as a FlashCopy target volume and the data that is stored on these tracks are no longer needed, use the **initckdvol** command to free the extents that were assigned to this logical volume. This allows the extents to be reused by other space-efficient logical volumes.

Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-action *releasespace*

(Optional) Specifies that you want the system to release the repository space held by the designated space-efficient volume back to the repository. (The repository is the physical extents that provision the virtual extents for virtual space volumes.)

-quiet

(Optional) Turns off the confirmation prompt for the **-action** parameter.

-force

(Optional) Forces the action.

Note: For release 8.3 or later, if **-force** is not specified, the request fails when the volume is in a path group or in any kind of Copy Services relationship.

volume_ID ... | -

(Required) The volume ID format is four hexadecimal characters *LLVV*, that represent the following values:

LL

The logical control unit number, 00 - FE.

VV

The volume number, 00 - FF.

You must fully qualify the volume ID with manufacturer, machine type, and serial number if you do not use the **-dev** parameter.

To specify a range of volume IDs, separate the volume IDs with a dash.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive command mode.

Example: Releasing extents from a space-efficient logical volume

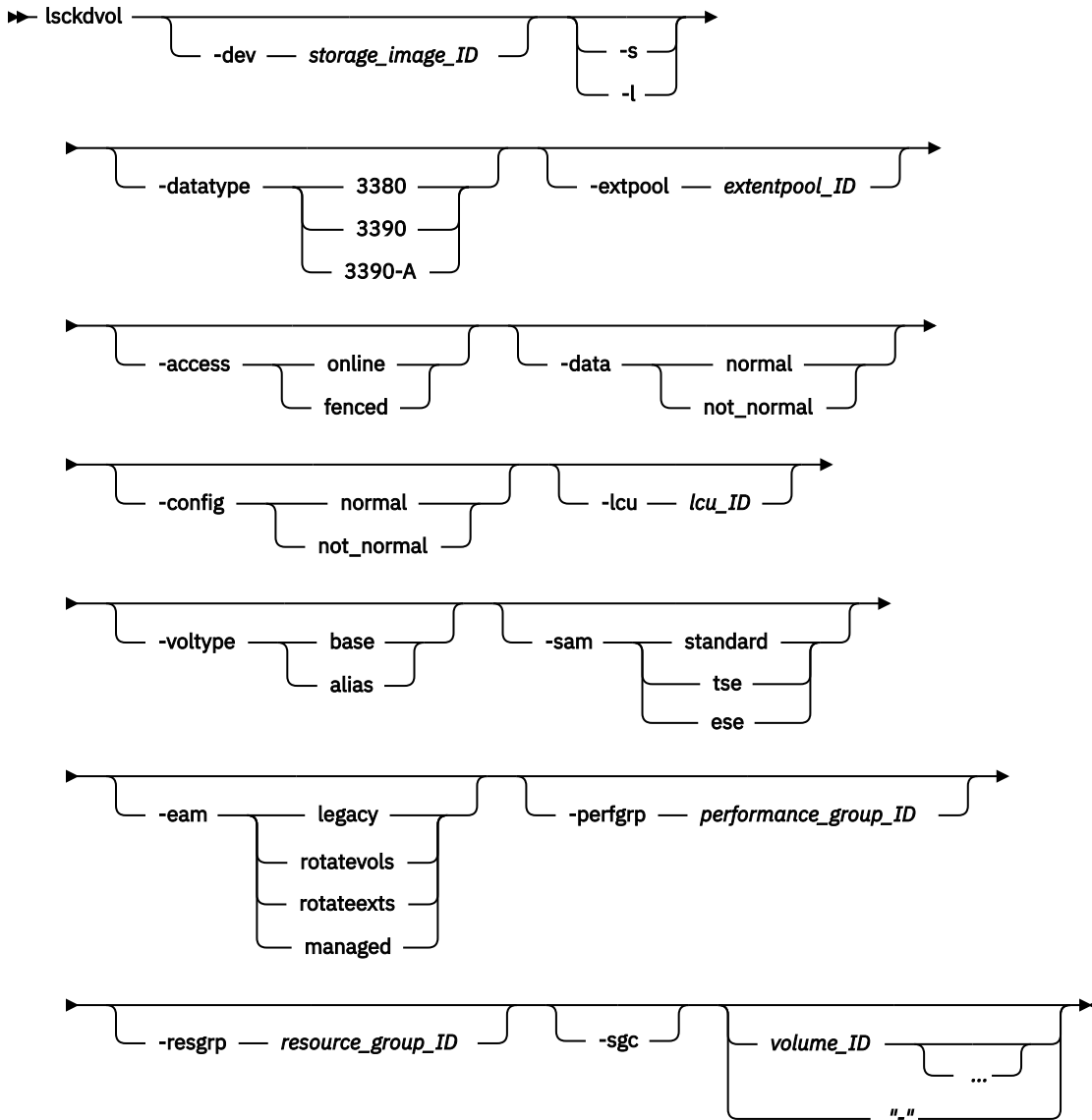
```
dscli> initckdvol -dev IBM.2107-75FA120 -action releasespace 0101
```

Output

```
CMUC00338W initckdvol: Are you sure that you want to submit the command  
releasespace for the CKD volume 0101?[Y/N]:y  
CMUC00341I initckdvol:: 0101: The command releasespace has  
completed successfully.
```

lsckdvol

The **lsckdvol** command displays a list of count key data (CKD) base and alias volumes in a storage image and status information, including Safeguarded Copy information for each volume in the list.



Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-s

(Optional) Displays the short output for the command. You cannot use the **-s** and **-l** parameters together.

-l

(Optional) Displays the long output for the command.

-datatype 3380 | 3390 | 3390-A

(Optional) Option to display only volumes that meet the designated volume data type.

Note: The data type 3390–A can be displayed for storage system models only.

-extpool extentpool_ID

(Optional) Option to display only volumes that are associated with the designated extent pool.

-access online | fenced

(Optional) Option to display only volumes with the specified access state.

-data normal | not_normal

(Optional) Option to display only the volumes that meet the criteria of the designated data state.

-config normal | not_normal

(Optional) Option to display only the volumes that meet the criteria of the designated configuration state.

-lcu lcu_ID

(Optional) Option to display only volumes with IDs that contain the specified logical control unit ID. Each logical control unit can contain up to 256 volumes. The LCU ID is a 2-digit hexadecimal number in the range of 00 - FE for the storage system.

Note: Including the **-lcu** parameter can significantly reduce response time because the entire storage system does not have to be queried.

-voltype base | alias

Specifies the type of CKD volumes that you want the system to display.

-sam standard | tse | ese

(Optional) Option to display only volumes that meet the criteria of the storage allocation method as follows:

standard

Volumes that are fully allocated with real extents.

tse

Track space-efficient logical volumes that contain a set of virtual extents that are associated with the space-efficient storage in the same extent pool.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.

ese

Extent space efficient logical volumes that are provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool.

-eam legacy | rotatevols | rotateexts | managed

(Optional) Option to display only volumes that meet the criteria of the extent allocation method as follows:

legacy

Specifies that the volume was created before the use of the current algorithm.

rotateexts

Specifies that volumes were created using storage-pool striping.

rotatevols

Specifies that each successive logical volume that is created is allocated on the next available rank in the extent pool.

managed

Specifies that the volume is in an extent pool managed by Easy Tier.

-perfgrp performance_group_ID

(Optional) Specifies the performance group ID that the volumes are assigned to. The performance group ID begins with the letters *PG*, and valid performance groups numbers are 0, and 16-31. The default is *PG0*.

-resgrp resource_group_ID

(Optional) The volumes that are assigned to the specified resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number.

-sgc

(Optional) Displays Safeguarded Copy information for the volumes.

volume_ID ... | -

(Optional) The volumes with the specified IDs. The volume ID format is four hexadecimal characters *LLVV* that represent the following values:

LL

Specifies the logical control unit number, 00 - FE

VV

Specifies the volume number, 00 - FF

To specify a range of volume IDs, separate the volume IDs with a dash (-).

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

Example: 0100-010F 0180-018F 0120

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying CKD base and alias volumes' status information

The following example is based on the output results for a volume with 3340 cylinders.

```
dscli> lsckdvol -dev IBM.2107-1300861 -l 1410
```

Output

| Name | ID | acc state | data state | config state | device MTM | volser | data type |
|----------------|------|-----------|------------|--------------|------------|--------|-----------|
| My_volume_1410 | 1410 | Online | Normal | Normal | 3390-9 | A03976 | 3390 |

| voltype | orgbvols | extpool | sam | cap (cyl) | cap (10 ⁹ B) | cap (2 ³⁰ B) |
|----------|----------|---------|----------|-----------|-------------------------|-------------------------|
| CKD base | - | P2 | standard | 3340 | 2.8 | 2.6 |

| reqcap (cyl) | eam | perfgrp | resgrp |
|--------------|--------|---------|--------|
| 3339 | legacy | PG18 | RG0 |

| safeguardedcap (cyl) | safeguardedloc |
|----------------------|----------------|
| 1234 | mypool_1 |
| 1234 | mypool_1 |
| 1234 | mypool_1 |
| 1234 | mypool_1 |

Output definitions**Name**

The nickname that you assigned to the designated volume object.

ID

The unique identifier that is assigned to the designated volume object

Accstate (access state)

One of the following designations can be displayed:

Online

The logical volume is accessible to a host.

Fenced

The logical volume is in the volume fenced state and is not accessible to the host.

" _ "

The logical volume is designated as a CKD alias volume.

Datastate

One of the following designations can be displayed:

Normal

Indicates that none of the other data states apply. The access state is Online.

Pinned

Indicates that none of the other data states apply and the logical volume has one or more pinned non-retryable tracks. The access state is Online.

Read only

The logical volume is read only because one or more extents on the logical volume are on a rank in the read only data state. The access state is Online.

Inaccessible

Indicates that one or more extents that are associated with the logical volume are on a rank that is in the inaccessible data state. The access state is Fenced.

Indeterminate data loss

Data states that do not apply because one of the specified conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - one of the following occurred:

- Committed write data was lost before it was destaged and the track identifiers that are associated with the data are unknown.
- Data was lost that indicated extents on the logical volume were active FlashCopy targets.

The access state is fenced.

Rank failed

Indicates that one or more extents that are associated with the logical volume are on a rank that is in the failed data state. The access state is Fenced.

Rank repairing

Indicates that one or more extents that are associated with the logical volume are on ranks that are in the repairing data state. The access state is Fenced.

Rank repaired

Indicates that one or more extents that are associated with the logical volume are on ranks that were in the repairing state, but are not in the repairing state now. The access state is Fenced.

Global inaccessible

The global metadata that is associated with the logical volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate. The access state is Fenced.

Global lost

Indicates that global metadata that is associated with the logical volume configuration has been lost. As a result, some of the data that is associated with the logical volume might be inaccurate. The access state is fenced.

NVS data inaccessible

Indicates that active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible. The access state is Fenced.

" _ "

The logical volume is designated as a CKD alias.

Configstate

One of the following configuration states are displayed:

Normal

There are no logical volume configuration operations in progress, and the volume is not being deconfigured, merged, or migrated.

Configuring

The logical volume is in the process of being configured for the first time.

Reconfiguring

The logical volume is in the process of allocating or deallocating extents due to a modification of the requested capacity attribute after initial creation.

Deconfiguring

The logical volume is in the process of being deleted.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the volume. If you have a volume in this state, use the **rmfbvol** command to delete each volume listed with the configuration state of "configuration error".

Merging

The volume is in the process of merging. For example, merging from one extent pool to a different extent pool.

Migrating

The volume is in the process of migrating, or waiting to be migrated.

Migration Cancelled

The volume was in the process of migrating and then the 'migcancel' action of the **manageckdvol** command was issued, leaving some of the extents waiting to be migrated in the source pool while other extents have already migrated to the target pool. Migration has stopped, and cannot be resumed. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Paused

The volume was in the process of migrating and then the 'migpause' action of the **manageckdvol** command was issued. Migration has stopped, but can be resumed.

Migration Error

The volume migration process failed to complete successfully. This state reflects an internal error condition and not an error in the request of the user to migrate a volume. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Reconfiguration error

The reconfiguration request did not complete successfully.

Deconfiguration error

Indicates that a request to delete a volume did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmfbvol** command for the designated volume.

Transposition Error

The volume is in an extent pool that was unsuccessfully merged. This state reflects an internal error condition. **Corrective action:** Use the **chextpool** command with the **-merge** parameter again to redrive the merge extent pool and to correct this state.

deviceMTM

One of the following device MTMs is displayed:

- 3380-2
- 3380-3
- 3390-3
- 3390-9
- 3390-A

Device MTM is determined by the CKD base volume data type and volume capacity (in cylinders).

Note: The device MTM 3390–A can be displayed for DS8000 storage system models only.

Volser

The base CKD volume serial number written by the user at track address 0x0000, record 3.

Datatype

The volume data type setting.

Voltype

The logical volume is one of the following types:

- CKD base
- CKD alias

Orgbvols (original base vol)

One of the following original base volumes is specified:

- The original base CKD volume ID to which this CKD alias volume is assigned.
- " - " is displayed for a CKD base volume type.

Note: For a CKD Alias type volume, the base and alias volume IDs are of a common LCU ID.

Extpool

The extent pool ID. Volume extents are allocated from this extent pool ID.

Note: Volumes that belong to an encrypted extent pool are encrypted. You can see the key group of an extent pool by using the **lsextpool -l**, or **showextpool** commands.

SAM

The storage allocation method. The following values are displayed:

standard

Designates that the system fully allocated the volume with real extents at volume creation time.

tse

Designates that a track space-efficient logical volume contains a set of virtual extents that are associated with the space-efficient storage in the same extent pool. Physical space for a given logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

ese

Designates that an extent space efficient logical volume is provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and de-allocated from the extent pool.

Cap (cyl)

The quantity of volume CKD cylinders that are available for host system access.

Cap (10⁹B)

The size of volume that is available for host system access in decimal gigabytes (GB).

Cap (2³⁰B)

The size of volume that is available for host system access in gibibytes (GiB).

Reqcap (cyl)

The requested quantity of volume CKD cylinders (for example, 3339).

EAM

The extent allocation method that will be used if the volume is migrated or expanded.

legacy

The volume was created before the use of the current algorithm.

rotateexts

The extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. This means that the extents for a particular volume will be allocated from one rank, while the extents for the next volume will be allocated from the next successive rank, and so on.

managed

The extents are currently managed by Easy Tier, and the extents for any new volumes are initially allocated across all available ranks in the lowest tier of storage.

" _ "

A dash (-) value is displayed if the extent allocation method does not apply, for example if the volume is a track space efficient (TSE) volume.

perfgrp

The performance group ID that the volume is assigned to. The performance group ID begins with the letters *PG* and ends with a decimal number.

resgrp

The resource group ID that the volume is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

safeguardedcap(cyl)

The amount of safeguarded virtual capacity that is reserved for the volume.

safeguardedloc

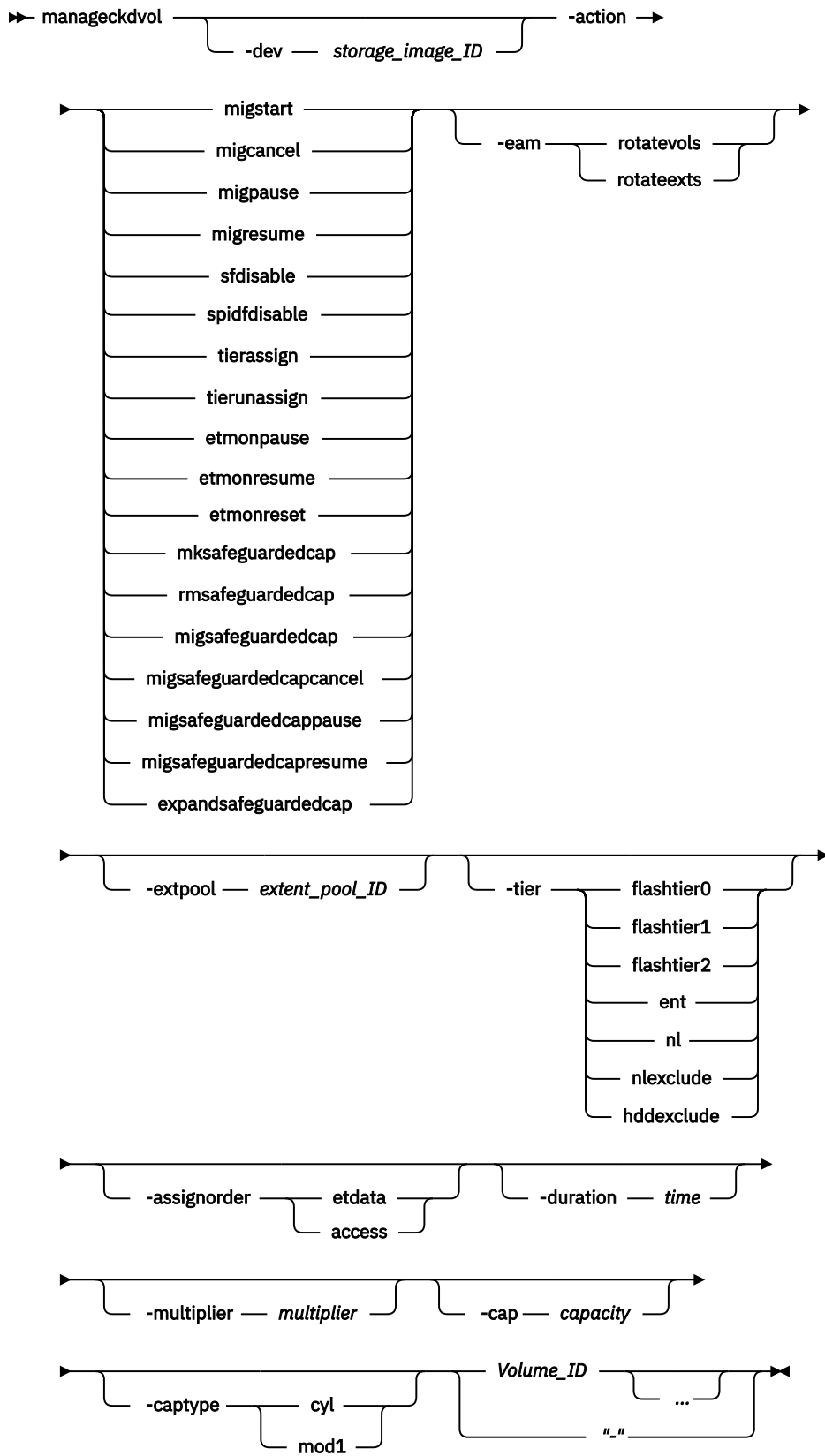
The pool where the safeguarded copies for the volume are written.

manageckdvol

The **manageckdvol** command starts a process to initiate a change on count key data (CKD) volumes.

Use this command to define safeguarded backup capacity for CKD volumes for which you want to enable for Safeguarded Copy.

Use Copy Services Manager to define a Safeguarded Copy schedule to create backups on a regular basis, such as hourly or daily.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-action migstart|migcancel|migpause|migresume|sfdisable|spidfdisable|tierassign|tierunassign|etmonpause|etmonresume|etmonreset|mksafeguardedcap|rmsafeguardedcap|migsafeguardedcap|migsafeguardedcapcancel|migsafeguardedcappause|migsafeguardedcapresume|expandsafeguardedcap

(Required) One of the following actions is to be performed:

migstart

Initiates volume migration on the specified volumes that are in the "normal" or "canceled" state. Volumes are placed into the migrating state. Volumes that are in the canceled state must have the original source or the destination extent pool as the value of the **-extpool** parameter.

migcancel

Cancels volume migration on the specified volumes that are in the migrating state. Volumes that have not yet started migrating data are defined to a "normal" state. Volumes that have started migrating data are define to a "canceled" state.

migpause

Pauses volume migration on the specified volumes that are in the migrating state. Volumes that have not yet started migration or that are in the middle of migration are put in the "paused" state.

migresume

Resumes volume migration on the specified volumes that are in the "paused" state.

sfdisable

Sends a soft fence reset command to each specified volume. This action cannot be used with any other parameter.

spidfdisable

Sends a set path group ID (SPID fence reset command to each specified volume. This action cannot be used with any other parameters.

tierassign

Initiates the assigning volume action on the specified volumes to the specified tier. The **-tier** option is required with this action.

Note: By assigning a volume to a tier, a process that migrates the data in the volume to the specified tier begins. You can check the progress of the migration by using the **showfbvol** or **showckdvol** command with the **-tier** parameter. However, there is a maximum capacity that can be assigned to each tier in a pool. If this maximum capacity is reached, then all of the volumes that are still migrating to that tier, because of assignment, pause their migrations. You can check how much total capacity has been assigned to a specific tier in a pool by using the **showextpool** command with the **-tier** parameter. If the maximum was reached, you can remedy the problem either by unassigning other volumes from the tier or by adding more capacity to the tier. Either method automatically restarts any paused migrations.

tierunassign

Initiates the unassigning volume action on the specified volumes.

etmonpause

Easy Tier monitoring of this volume is paused. During the pause, all Easy Tier storage migrations are unaffected, but no new migration plans are formed.

etmonresume

Easy Tier monitoring of this volume is resumed. All Easy Tier storage migrations are unaffected.

etmonreset

Easy Tier monitoring data (history), including migration plans are erased. All new plans are based on new monitoring data.

mksafeguardedcap

Creates the safeguarded backup capacity for one or more of the specified volumes.

rmsafeguardedcap

Deletes the safeguarded backup capacity, including all Safeguarded Copies, that were defined for one or more of the specified volumes.

migsafeguardedcap

Migrates the safeguarded backup capacity to a new pool for one or more of the specified volumes.

migsafeguardedcapcancel

Cancels migrating the safeguarded capacity to a new pool for one or more of the specified volumes.

migsafeguardedcappause

Pauses migrating the safeguarded backup capacity to a new pool for one or more of the specified volumes.

migsafeguardedcapresume

Resumes migrating the safeguarded backup capacity to a new pool for one or more of the specified volumes.

expandsafeguardedcap

Increases the safeguarded backup capacity for one or more of the specified volumes, without having to first delete existing backups or the Safeguarded Copy relationship.

-eam

(Optional) The extent allocation method as follows:

rotateexts

The extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. This means that the extents for a particular volume are allocated from one rank, while the extents for the next volume are allocated from the next successive rank, and so on.

Note: You can specify only the **-eam** parameter if **-action migstart** is also specified.

-extpool extent_pool_ID

(Optional) The multiplier value. Selecting the correct backup capacity multiplier depends on a number of factors. For example, the provisioned capacity being backed up, the number of copies, the interval over which the copies are kept, and the predicted destagerate of the volume data.

Note: When the command returns, the volume migration might still be occurring. It can be available for I/O and copy services during migration. Its configstate can indicate that it is migrating.

-multiplier multiplier

(Optional) The safeguarded virtual capacity multiplier value. Safeguarded virtual capacity is the amount of volume (virtual) capacity that is configured to store safeguarded backups for a safeguarded source. To configure the amount of virtual capacity that is required for safeguarded backups, you must determine an estimate for the safeguarded capacity multiplier.

Note: The size of the volume will be rounded to the nearest large extent. For CKD volumes, the size can be a multiple of 1113 cylinder granularity.

-cap capacity

(Optional) The safeguarded backup capacity for one or more specified volumes. The unit type is set with the parameter **-captype**, if the unit type is not set. The default is *cylinders*.

-captype cyl1 | mod1

(Optional) The unit type for safeguarded backup capacity. If the unit type is not set, the default is *cylinders*.

cyl

The capacity unit type as cylinders. This capacity unit type can be selected only for CKD storage. One cylinder = 15 tracks.

mod1

The capacity unit type in mod1 units. This capacity unit type can be selected only for CKD storage (mod1 = 1113 cylinders).

-tier flashtier0 | flashtier1 | flashtier2 | ent | nl | nlexclude | hddexclude
(Optional) Which tier the volume is assigned to. This option is required with the **-action tierassign** parameter.

flashtier0

The tier of high-performance flash drives.

flashtier1

The first tier of high capacity flash drives.

flashtier2

The second tier of high capacity flash drives.

ent

Enterprise tier, which consists of drives with speeds of 10K RPM, 15K RPM, or a mixture of 10K RPM and 15K RPM speeds.

nl

Nearline tier consists of high-volume disks that are either SATA or SAS Nearline drives.

nlexclude

Enterprise tiers but not a Nearline tier.

hddexclude

Any tier except enterprise (ENT) or nearline (NL).

"_ "

No assign action was specified.

-assignorder etdata|access

(Optional) The order in which the data is migrated. This option is valid only with the **-action tierassign** parameter.

etdata

While all data is scheduled to migrate, the migration order is based on the prioritization of the data as specified in the Easy Tier heat map. This value allows the specified volume to be pre-staged onto the specified tier. The value "etdata" is the default value if **-assignorder** is not specified.

access

While all data is scheduled to migrate, the data is migrated only when accessed. In other words, data that is never accessed is never migrated to the specified tier.

-duration time

(Optional) The hours of the pause time in ISO 8601 format. For example, **-duration 24H**. The maximum value of the time is a week, which is 168 hours (168H). You can specify this option only with **-action etmigpause** or **etmonpause** parameters.

Note: If you want the duration of the pause to be infinite, you must specify **-duration 0H**. Otherwise, if you do not specify a value with the **-duration** parameter, the default is 168H.

volume_ID ... | -

(Required) An array of one or more CKD base volume IDs or volume ID ranges to modify.

A volume ID range is defined by two volume IDs that are separated by a dash. Multiple volume IDs or volume ID ranges must be separated with a blank space between each ID.

Example: 0100-010F 0180-018F 0120

The volume ID format is four hexadecimal characters *LLVV* that represents the following values:

LL

The logical control unit number, 00 - FE

VV

The volume number, 00 - FF

You must fully qualify the volume ID with manufacturer, machine type, and serial number if you do not use the **-dev** parameter.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) if you are in the DS CLI interactive mode.

Example 1: Starting CKD volume migration for volume 0100

```
dscli> manageckdvol -dev IBM.2107-75FA120
-action migstart -extpool P2 0100
```

Output

```
CMUC00000I manageckdvol CKD Volume 0100 action migstart executed successfully.
```

Example 2: Expanding CKD volume safeguarded capacity for volume 1000

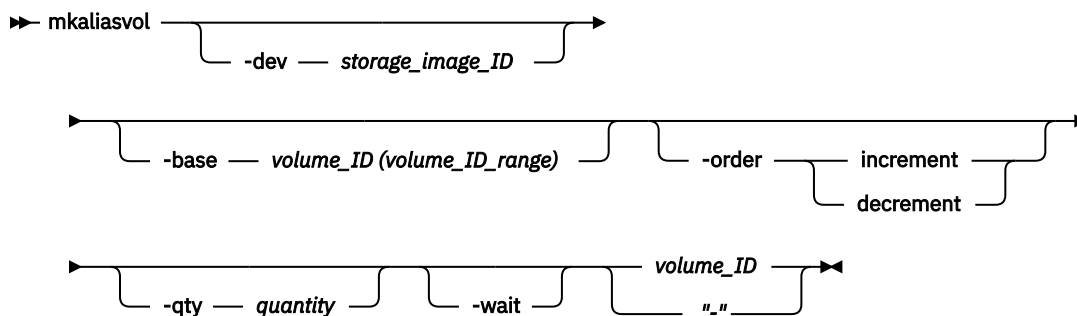
```
dscli> manageckdvol
-action expandsafeguardedcap -multiplier 4 1000
```

Output

```
CMUC00000I manageckdvol The expandsafeguardedcap action for CKD volume 1000 has completed.
```

mkaliasvol

The **mkaliasvol** command creates IBM Z CKD alias volumes (referred to as parallel access volumes or PAVs) in a storage image.



Parameters

Note: Volumes are automatically assigned to the FICON/ESCON - ALL volume group ID 10.

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-base *volume_ID (volume_ID_range)*

(Required) An existing base CKD volume ID or a volume ID range.

Note: You cannot use multiple volume IDs separated by commas and multiple ID ranges in combination. This combination is rejected.

Use the **-base** parameter to create one or more CKD alias volumes that are assigned to the specified base CKD volume ID. The LCU ID component for all volume IDs must be identical.

The alias volume IDs are assigned consecutively in the order specified by the **-order** parameter. The following examples show the processing affects of the **-order** parameter:

```
dscli> mkaliasvol -base 0000 -order increment -qty 2 0080
creates two alias volumes 0080 and 0081 for base volume 0000.
```

```
dscli> mkaliasvol -base 0000-003F -order increment -qty 2 0080
creates two alias volumes for each base volume as follows:
0080,0081 for base volume 0000
0082,0083 for base volume 0001
...
00FE,00FF for base volume 003F
```

-order increment | decrement

(Optional) The order in which alias volume IDs are assigned. For example:

```
dscli> mkaliasvol -base 0000-003F -order decrement -qty 2 00FF
creates two alias volumes for each base volume as follows:
00FF,00FE for base volume 0000
00FD,00FC for base volume 0001
...
0081,0080 for base volume 003F
```

Note: If the **-order** parameter is not specified the default value is decrement.

-qty quantity

(Optional) The number of alias volumes that are assigned to each specified CKD base volume.

If you do not specify the **-qty** parameter, then one alias volume is created for each base volume specified.

If you specify the **-qty** parameter, you have to indicate the number of alias volumes that you want to assign to each specified CKD base volume.

Note: The total number of base volumes plus the number of alias volumes must be less than or equal to 256.

-wait

(Optional) Delays the command response until the volume configuration processes complete.

volume_ID -

(Required) Identifies the starting alias volume ID in a sequence of volume IDs to be created

The volume ID format is four hexadecimal characters *LLVV* that represent the following values:

LL

The logical control unit number, 00 - FE

VV

The volume number, 00 - FF

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Creating CKD alias volume

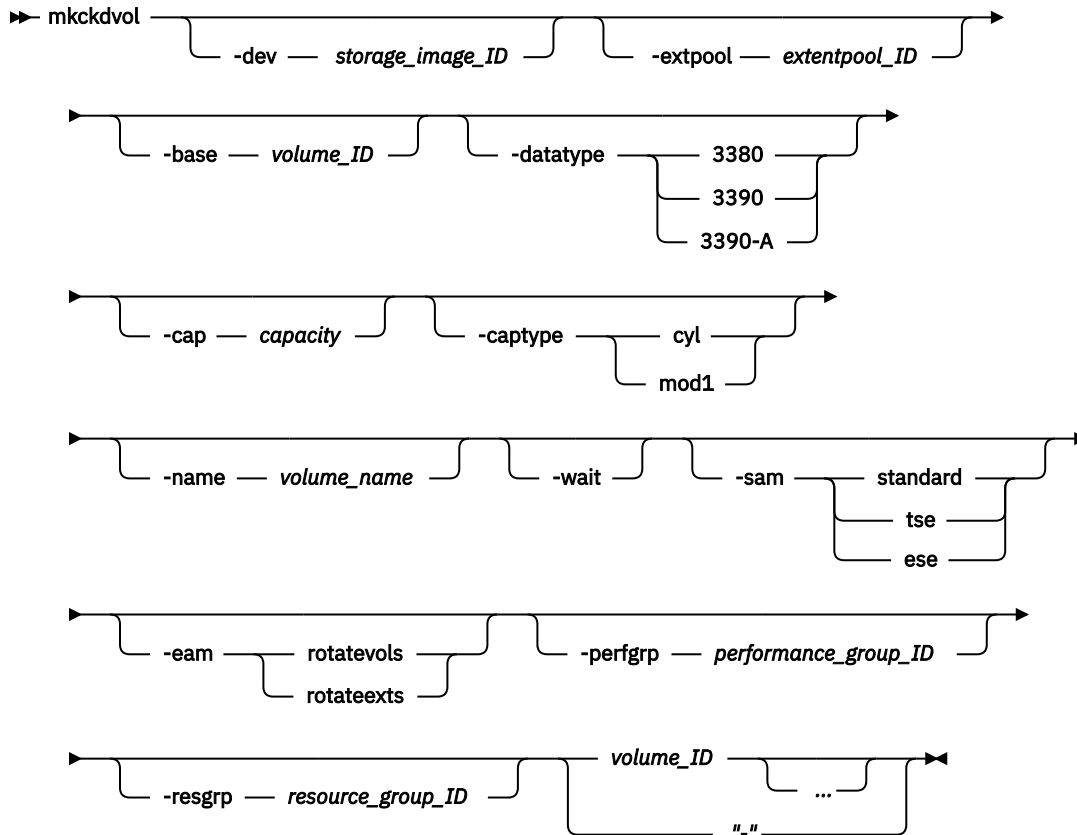
```
dscli> mkaliasvol -dev IBM.2107-75FA120 -base 0100-010F
-order decrement -qty 2 01FF
```

Output

```
CKD Volume 01FF successfully created.
CKD Volume 01FE successfully created.
...
CKD Volume 01E1 successfully created.
CKD Volume 01E0 successfully created.
```

mkckdvol

The **mkckdvol** command creates IBM Z count key data (CKD) base or CKD alias volumes in a storage image.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The **-dev** parameter temporarily overrides any defined value for *devid* for the current command. The storage image ID is required for the following situations:

- If you do not specify a fully qualified extent pool ID
- If you do not set the *devid* variable in your profile or through the **setenv** command
- If the HMC is aware of more than one storage image

-extpool *extentpool_ID*

(Optional) Creates the base or alias volumes from data extents that are contained in this extent pool. The extent pool storage type defines the volume storage type. An extent pool ID is a four-digit decimal number with no leading zeros, prefixed with the letter *P*.

Note: This parameter is ignored if the **-base** parameter is specified.

-base *volume_ID*

(Optional) An existing base CKD volume ID. The volume ID format is four hexadecimal characters *LLVV*, that represents the following values:

LL

The logical control unit number, 00 - FE

VV

The volume number, 00 - FF

Use the **-base** parameter to create one or more CKD alias volumes that are assigned to the specified base CKD volume ID. The LCU ID component for all volume IDs must be identical.

Note: Ensure that you use the **mkaliasvol** command rather than **mkckdvol** command to create alias volumes.

-datatype 3380|3390|3390-A

(Optional) The volume data type.

For Extended Addressing Volumes (EAV), which have a capacity greater than 65520 cylinders, the data type 3390-A must be specified. You can also specify the data type 3390-A for volumes smaller than 65520 cylinders.

If the **-datatype** or the **-3380** parameters are *not* specified, then the default data type is 3390-A for capacities greater than 65520 cylinders, and 3390 for smaller capacities.

Notes:

1. You can specify the data type 3390-A for DS8000 storage system models only.
2. You must ensure that the volume data type is compatible with the host systems that access this volume.
3. The **-datatype** parameter is ignored when the **-base** parameter is specified.
4. You cannot use the **-datatype** parameter and the **-3380** parameter in the same command.

-cap capacity

(Optional) The quantity of CKD cylinders that are allocated to this volume. The capacity can also be specified in mod1 units by using the **-captype** parameter.

- For 3380 volumes, the *capacity* value can be 2226 (1.59 GiB) or 3339 (2.37 GiB).
- For 3390 volumes, capacity can be specified in increments of 1 in the range 1 - 65520 (849KiB to 55.68 GiB).
- For 3390-A volumes, for values less than 65520 cylinders, capacity is specified in increments of 1. Capacities greater than 65520 cylinders are specified in increments of 1113. The maximum volume size varies and depends on the DS8000 model and type.

Note: This parameter is ignored if the **-base** parameter is specified, and this parameter is required if the **-base** parameter is not specified.

-captype cyl | mod1

(Optional) The unit type of the capacity that is given by using the **-cap** parameter. The default is cyl. A mod1 unit is equivalent to 1113 cylinders, and 1263.28 cylinders is equivalent to 1 GiB.

-name volume_name

(Optional) Your nickname for the CKD base volumes that are created by this command. Your volume name cannot exceed 16 characters. It can contain one of the following wildcards:

- (#d) insert volume ID (decimal)
- (#h) insert volume ID (hexadecimal)

Note: The **-name** parameter is ignored when the **-base** parameter is specified.

-wait

(Optional) The command response is delayed until the volume configuration processes complete.

-sam standard | tse | ese

(Optional) The storage allocation method as follows:

standard

Designates that the system fully allocates the volume with real extents at volume creation time. This value is the default.

tse

Designates that a track space-efficient logical volume contains a set of virtual extents that are associated with the space-efficient storage in the same extent pool. The physical space for a given

logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.

ese

Designates that an extent space efficient (ESE) logical volume is provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and de-allocated from the extent pool. ESE volumes are used for thin provisioning.

-eam rotatevols | rotateexts

(Optional) The extent allocation method as follows:

rotateexts

Specifies that the extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

Specifies that the extents for each new logical volume are allocated from each successive rank. This means that the extents for a particular volume will be allocated from one rank, while the extents for the next volume will be allocated from the next successive rank, and so on.

-perfgrp performance_group_ID

(Optional) The performance group ID that the volumes are assigned to. The performance group ID begins with the letters *PG*. The default is *PG0*.

-resgrp resource_group_ID

(Optional) The resource group that the volumes are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number. The default is *RG0*.

volume_ID ... | -

(Required) An array of one or more CKD base or alias volume IDs or volume ID ranges to be created. The volume IDs must share a common logical control unit ID.

Note: Volumes are automatically assigned to the FICON/ESCON – ALL volume group ID 10.

The volume ID format is four hexadecimal characters *LLVV*, that represents the following values:

LL

The logical control unit number, 00 - FE

VV

The volume number, 00 - FF

A volume ID range is defined by two volume IDs that are separated by a dash.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

Note: Multiple volumes can be created with a single request, but all volumes must have the same capacity, extent pool, and data type.

Example: 0100-010F 0180-018F 0120

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) if you are in the DS CLI interactive mode.

Example: Creating CKD base volumes

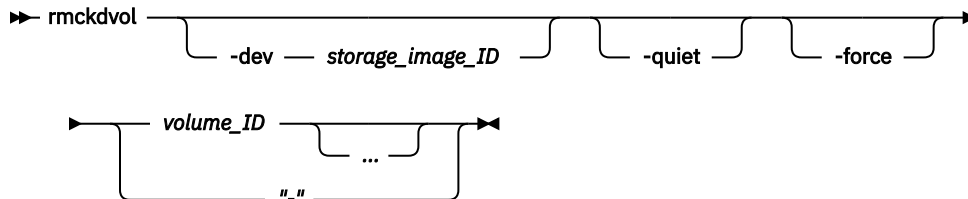
```
dsccli> mkckdvol -dev IBM.2107-75FA120
-extpool P1 -name my_volume_#d -cap 3339
-perfgrp PG17 -sam ese 0100 0101 0102 0103
```

Output

```
CKD volume 0100 successfully created.  
CKD volume 0101 successfully created.  
CKD volume 0102 successfully created.  
CKD volume 0103 successfully created.
```

rmckdvol

The **rmckdvol** command deletes count key data (CKD) base or alias volumes from a storage image.



Parameters

Note: Before Release 5.1, the storage system did not check before deleting a volume. With Release 5.1 and later, the storage system does not delete a volume that is in use. The phrase *in use* means that the volume is participating in a Copy Services relationship or is in a z/OS path group. Use the **-force** parameter to bypass the in-use checking and delete the volume.

A specific use of this command is made when you are confronted with a volume or volumes that are in a configuration state of "configuration error." To correct this configuration state, issue the **rmckdvol** command for each affected volume. You can specify a volume range according to the command specifications when it is appropriate.

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all logical volumes, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-quiet

(Optional) Turns off the volume removal confirmation prompt for this command.

-force

(Optional) Option to remove volumes without checking to see whether the volumes are in use. The phrase *in use* means that the volume is participating in a Copy Services relationship or is in a z/OS path group. If multiple volumes are specified and some are in use and some are not, the ones not in use are deleted.

volume_ID ... -

(Required) An array of one or more CKD base or CKD alias volume IDs or volume ID ranges to be removed. Accepts a fully qualified volume ID, which includes the storage image ID or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened volume ID format is four hexadecimal characters *LLVV*, that represents the following values:

LL

The logical control unit number, 00 - FE

VV

The volume number, 00 - FF that is contained by a logical control unit (logical subsystem).

Note: An alias volume that is associated with a CKD base volume is automatically deleted before deletion of the CKD base volume.

A volume ID range is defined by two volume IDs that are separated by a dash.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

Example: 0100-010F 0180-FEFF 0120

The ellipsis (...) means that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting a CKD base and alias volume

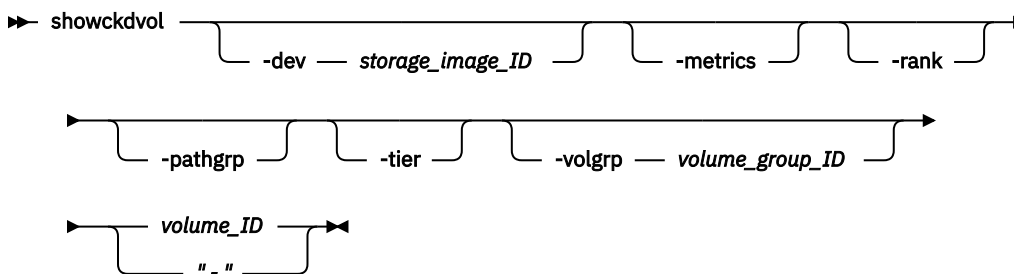
```
dsccli> rmckdvol -dev IBM.2107-75FA120 0000 0001
```

Output

```
The alias volumes associated with a CKD base volume are
automatically deleted before deletion of the CKD base volume.
Are you sure you want to delete CKD volume 0000? [y/n]
Are you sure you want to delete CKD volume 0001? [y/n]
```

showckdvol

The **showckdvol** command displays detailed properties of an individual count key data (CKD) volume. Detailed information includes performance metrics of a CKD volume and information about Safeguarded Copy capacity.



Parameters

Note: All performance counts are an accumulation from the most recent counter wrap or counter reset. A reset of the volume performance counters occurs in association with the following events:

- The storage system is turned on.
- A server failure occurred, and the server failover or failback sequence was initiated.

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter temporarily overrides any defined value for *dev* for the current command.

-metrics

(Optional) Displays the volume ID and performance metrics for the specified volume.

Notes:

1. All performance counts are an accumulation since the most recent counter wrap or counter reset. Volume performance counters are reset on a power-up sequence. Volume performance counters are reset by a server failover and failback sequence.
2. Do not use the **-metrics** parameter with the **-pathgrp**, **-rank**, **-tier**, or **-volgrp** parameters.

-pathgrp

(Optional) Displays the path group status table, which contains path group information. This information includes the path group ID, the grouped, reserved, and path mode status.

Do not use the **-pathgrp** parameter with the **-metrics**, **-rank**, **-tier**, or **-volgrp** parameters.

-rank

(Optional) A rank extents table is to be displayed. This table displays the set of ranks that the logical volume has extents that are configured on and the number of extents for that logical volume.

Do not use the **-rank** parameter with the **-metrics**, **-pathgrp**, **-tier**, or **-volgrp** parameters.

-tier

(Optional) Displays the tier distribution table. The table lists the set of tiers that have storage that is allocated for the specified logical volume and the percentage of the logical volume that is allocated on each tier.

Do not use the **-tier** parameter with the **-metrics**, **-pathgrp**, **-rank**, or **-volgrp** parameters.

-volgrp volume_group_ID

(Required if you do not specify the *volume_ID* parameter.) The CKD volumes that are associated with the designated volume group ID is to be displayed. Only one volume group for CKD volumes exists and it contains all volumes.

Notes:

- The **-volgrp** parameter can be used only when you are doing a query for performance metrics.
- Do not use the **-volgrp** parameter with the *volume_ID* parameter.
- Do not use the **-volgrp** parameter with the **-metrics**, **-pathgrp**, **-rank**, or **-tier** parameters.

volume_ID -

(Optional) The system displays detailed information about the designated volume. The volume ID format is four hexadecimal characters *LLVV* that represents the following values:

LL

The logical control unit number, 00 - FE.

VV

The volume number, 00 - FF.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying detailed CKD volume properties

Note: The following example is based on the use of the **showckdvol** command for a 3390 volume with 3339 cylinders. When the rank parameter is specified, a rank extents table is displayed at the end of the regular report.

```
dsccli> showckdvol -dev IBM.2107-1300861 -rank 1410
```

Output

| Name | ID | acc state | data state | config state | device MTM | volser | data type |
|----------------|------|-----------|------------|--------------|------------|--------|-----------|
| My_volume_1410 | 1410 | Online | Normal | Normal | 3390-3 | A03967 | 3390 |

| voltype | orgb-vols | addrgrp | extpool | exts | cap (cyl) | cap (2^30B) | cap (10^9B) | Ranks |
|----------|-----------|---------|---------|------|-----------|-------------|-------------|-------|
| CKD Base | - | 1 | P2 | 3 | 3339 | 2.6 | 2.8 | 2 |

| | | | | |
|------------|--------------------|------------|---------------------|-------------------|
| sam | repcapalloc | eam | reqcap (cyl) | cap (Mod1) |
| ESE | 1.7 | - | 3339 | 0.0 |

| | | | | | | | |
|-------------------------|----------------------------|--------------------------|-------------------------------|------------------|----------------------|----------------|---------------|
| realexten ts | virtualexten ts | realcap (cyl) | migrating cap(cyl) | migrating | migratingfrom | perfgrp | resgrp |
| 1 | 0 | 0 | - | PG0 | RG0 | | |

| | | | | |
|-------------------------|------------------------|------------------------|-------------------------|----------------------|
| tierassignstatus | tierassignerror | tierassignorder | tierassigntarget | %tierassigned |
| Assigning | - | ETdata | FlashTier0 | 54 |

| | | | |
|--------------------|-----------------------------|-----------------------|----------------------|
| safeguarded | safeguardedcap (cyl) | safeguardedloc | SGC Recovered |
| Yes | 1234 | mypool_1 | Yes |

=====Rank extents=====

| Rank | Extents | Rank Extents Capacity (cyl) |
|-------------|----------------|------------------------------------|
| R0 | 1 | 1113 |
| R2 | 2 | 1113 |

Output definitions (*-metrics* parameter not specified)

Name

The nickname that you assigned for this volume object.

ID

The unique identifier that is assigned to this volume object.

Accstate

One of the following values can be displayed:

Online

The logical volume is accessible to a host.

Fenced

The logical volume is in the volume fenced state and is not accessible to the host.

" _ "

The logical volume is designated as a CKD alias volume.

Datastate

One of the following values can be displayed:

Normal

None of the other data states apply. The access state is Online.

Pinned

None of the other data states apply and the logical volume has one or more pinned non-retryable tracks. The access state is Online.

Read only

The logical volume is read-only because one or more extents on the logical volume are on a rank in the read-only data state. The access state is Online.

Inaccessible

One or more extents that are associated with the logical volume are on a rank that is in the inaccessible data state. The access state is Fenced.

Virtual space fault

The logical volume has a space-efficient storage allocation method, and enough space was not available to convert a virtual logical track to a real logical track. The access state is Online.

Indeterminate data loss

The following data states do not apply and that one of the following conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - One of the following conditions occurred:

- Committed write data was lost before it was destaged and the track identifiers that are associated with the data are unknown.
- Data was lost that indicated extents on the logical volume were active FlashCopy targets.

The access state is Fenced.

Rank failed

One or more extents that are associated with the logical volume are on a rank that is in the failed data state. The access state is Fenced.

Rank repairing

One or more extents that are associated with the logical volume are on ranks that are in the repairing data state. The access state is Fenced.

Rank repaired

One or more extents that are associated with the logical volume are on ranks that were in the repairing state, but are not in the repairing state now. The access state is Fenced.

Global inaccessible

The global metadata that is associated with the logical volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate. The access state is Fenced.

Global lost data

Global metadata that is associated with the logical volume configuration was lost. As a result, some of the data that is associated with the logical volume might be inaccurate. The access state is Fenced.

NVS data inaccessible

Active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible. The access state is fenced.

The logical volume is designated as a CKD alias.

Configstate

One of the following values can be displayed:

Normal

No logical volume configuration operations are in progress, and the volume is not being deconfigured, merged, or migrated.

Configuring

The logical volume is being configured for the first time.

Reconfiguring

The logical volume is allocating or deallocating extents due to a modification of the requested capacity attribute after initial creation.

Deconfiguring

The logical volume is starting to be deleted.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the volume. If you have a volume in this state, use the **rmfbvol** command to delete each volume that is listed with the configuration state of "configuration error".

Merging

The volume is in the process of merging. For example, merging from one extent pool to a different extent pool.

Migrating

The volume is starting to be migrated, or waiting to be migrated.

Migration Cancelled

The volume was starting to be migrated and then the 'migcancel' action of the **manageckdvol** command was entered. This process left some of the extents waiting to be migrated in the source pool while other extents were already migrated to the target pool. Migration stopped, and cannot be resumed. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Paused

The volume was starting to be migrated and then the 'migpause' action of the **manageckdvol** command was entered. Migration stopped, but can be resumed.

Migration Error

The volume migration process failed to complete successfully. This state reflects an internal error condition and not an error in the user's request to migrate a volume. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Reconfiguration error

The reconfiguration request did not complete successfully.

Deconfiguration error

A request to delete a volume did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmfbvol** command for the designated volume.

Transposition Error

The volume is in an extent pool that was unsuccessfully merged. This state reflects an internal error condition. *Corrective action:* Use the **chextpool** command with the **-merge** parameter again to redrive the merge extent pool and to correct this state.

deviceMTM

One of the following device MTMs can be displayed:

- 3380-2
- 3380-3
- 3390-3
- 3390-9

Volser

The volume serial number. A volume serial number is 6 bytes of data, displayed as 6 characters.

Datatype

The volume data type setting (3380 or 3390).

Voltype

The logical volume is one of the following types:

- CKD base
- CKD alias

Orgbvols (original base vol)

One of the following original base volumes can be specified:

- The original base CKD volume ID to which this CKD alias volume is assigned.

Note: For a CKD Alias type volume, the base and alias volume IDs share a common LCU ID.

- " - " is displayed for a CKD base volume type.

Addrgrp

The address group that contains this volume object. An address group ID is one hexadecimal character (0 - F).

Extpool

The extent pool ID.

Note: Volumes that belong to an encrypted extent pool are encrypted. You can see the key group of an extent pool by using the **lsextentpool -1**, or **showextentpool** commands.

Exts

The number of real and virtual extents that are used by the designated volume ID.

Cap(cyl)

The quantity of volume cylinders that are available for host system access.

Cap (2^30B)

The size of volume that is available for host system access in gibibytes (GiB).

Cap (10^9B)

The size of volume that is available for host system access in decimal gigabyte (GB) units.

Ranks

The number of ranks the volume on.

SAM

The storage allocation method. The following values are displayed:

standard

The system fully allocated the volume with real extents at volume creation time.

tse

A track space-efficient logical volume contains a set of virtual extents that are associated with the space-efficient storage in the same extent pool. Physical space for a given logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.

ese

An extent space efficient logical volume is provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and de-allocated from the extent pool.

Repcapalloc

The allocated physical repository capacity of the track space-efficient storage. This value is calculated on the available repository capacity as a result of writes to the track space-efficient volume. This value is displayed in the format of X.Y, where X is in whole gibibytes (1 GiB = 2³⁰ B). Y represents tenths of a GiB, which is limited to a single digit (0 - 9).

Note: A " - " value is displayed in this column if the value displayed in the SAM column is Standard or ESE.

EAM

The extent allocation method that is used if the volume is migrated or expanded. One of the following values is displayed:

legacy

The volume was created before the use of the current algorithm.

rotatexts

The extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. This approach means that the extents for a particular volume is allocated from one rank. The extents for the next volume will be allocated from the next successive rank, and so on.

managed

The extents are currently managed by Easy Tier, and the extents for any new volumes are initially allocated across all available ranks in the lowest tier of storage.

" _ "

A " - " value is displayed if the extent allocation method does not apply, for example, track space-efficient logical volumes.

Reqcap (cyl)

The requested quantity of volume CKD cylinders (for example, 3339).

cap (Mod1)

The quantity of Mod1 units (Mod1 = 1113 cylinders).

realextents

The number of real extents that are used by the logical volume.

virtualextents

The number of virtual extents that are used by the logical volume.

realcap (cyl)

The number of cylinders used by the specified logical volume.

migratingcap (cyl)

The number of cylinders for the specified volume that are currently being migrated.

migrating

The number of extents for the specified volume that are currently being migrated.

migratingfrom

A list of one or more extent pool IDs where the extents are migrating from. If no migrating extents exist, a dash "-" is displayed. Unknown is displayed if information about the extent pool IDs is not available.

pergrp

The performance group ID that the volume is assigned to. The performance group ID begins with the letters *PG* and ends with a decimal number.

resgrp

The resource group ID that the volume is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

tierassignstatus

Status of assigning a volume to a target tier.

Assign Pending

An assign action was specified, but has not started.

Assign Pending Hardware

An assign action was specified, but paused because of a hardware condition.

Assigning

An assign action is in progress.

Assigned

The volume was assigned to the specified tier.

Unassign Pending

An unassign action was specified, but has not started.

Error

An assign action that failed. See the **tierassignerror** value for the reason.

Unknown

An assign action was specified, but the specific action is unknown.

" _ "

No assign action was specified (none).

tierassignerror

Failure reason if the status is Error.

Easy Tier not active

Easy Tier is not active. See the **etmanaged** column from **lsextpool** to see whether the volume is in a pool that is managed by Easy Tier.

Use `manageckdvol -action tierunassign` to unassign the volume, ensure that the pool is managed by Easy Tier (see **chsi**), and then use `manageckdvol -action tierassign` to assign the volume again.

Target Tier not available

The specified target tier does not currently exist. Use `manageckdvol -action tierunassign` to unassign the volume, ensure that space is available on the specified tier, and then use `manageckdvol -action tierassign` to assign the volume again.

Tier definitions have changed

The target tier was valid, but defined tiers changed internally and the target tier is no longer valid. Use `manageckdvol -action tierunassign` to unassign the volume, and then use `manageckdvol -action tierassign` to assign the volume again.

" _ "

The assign action status is not "Error".

tierassignorder

Method that is used to define the assigning order.

Access

Assign extents only when accessed.

ETdata

Assign high usage extents first, based on East Tier data.

Unknown

Unknown assigning order method.

" _ "

No assigning action was specified.

tierassigntarget

Assigning action target tier.

FlashTier0

The tier of high performance flash drives.

FlashTier1

The first tier of high capacity flash drives.

FlashTier2

The second tier of high capacity flash drives.

ENT

Enterprise tier consists of drives with speeds of 10K RPM, 15K RPM, or a combination of drives of both speeds.

NL

Nearline (NL) tier consists of high volume SATA or SAS Nearline disk drives.

HDDExclude

Any tier except enterprise (ENT) or nearline (NL).

NLExcluded

Enterprise tiers but not a Nearline tier.

Unknown

Assigning action was specified, but the target tier is unknown.

" _ "

No assigning action was specified.

%tierassigned

Percentage of the volume that is assigned. The value is 0 (zero) if the volume is not assigned to a tier.

etmonpauseremain

The pause in Easy Tier monitoring. One of the following values is displayed:

OH1M-168H0M

The time (in hours and minutes) that remains of the pause in the Easy Tier monitoring process.

infinite

Easy Tier monitoring remains paused until a resume action is submitted.

-

A dash (-) specifies that Easy Tier monitoring is not paused.

unknown

The system failed to query the time that remains of the pause.

etmonitorreset

Easy Tier extent pool monitoring reset date is as follows:

date

The date of the last Easy Tier monitoring reset in ISO 8601 format: yyyy-MM-dd 'T' HH:mm:ssZ, where

yyyy

The year

MM

The month (01-12)

dd

The day (01-31)

T

The single letter T without quotes

HH

The hour (00-23)

mm

The minutes (00-59)

ss

The seconds (00-59)

Z

The time zone offset from UTC [-HHmm | +HHmm]

unknown

The date in which Easy Tier monitoring of this extent pool was last reset is not known.

unsupported

Easy Tier extent pool management is not supported.

safeguarded

Whether Safeguarded Copy is enabled for the specified volume.

safeguardedcap(cyl)

The amount of safeguarded backup capacity that is reserved for Safeguarded Copies.

safeguardedcapstate

The state of the volume that contains safeguarded virtual capacity for the volume.

Normal

No volume expansion operations are in progress.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the volume. If you have a volume in this state, use the **rmfbvol** command to delete each volume listed with the configuration state of "configuration error".

Configuring

The volume is in the process of being configured for the first time.

Deconfiguring

The volume is in the process of being deleted.

Deconfiguration error

Indicates that a request to delete a volume did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmfbvol** command for the designated volume.

Expanding

The volume is expanding.

Global inaccessible

The global metadata that is associated with the volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate. The access state is Fenced.

Global lost

Indicates that global metadata that is associated with the volume configuration has been lost. As a result, some of the data that is associated with the volume might be inaccurate. The access state is fenced.

Inaccessible

Indicates that one or more extents that are associated with the volume are on a rank that is in the inaccessible data state. The access state is Fenced.

Indeterminate data loss

Data states that do not apply because one of the specified conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - one of the following occurred:

- Committed write data was lost before it was destaged and the track identifiers that are associated with the data are unknown.
- Data was lost that indicated extents on the volume were active FlashCopy targets.

The access state is fenced.

Merging

The volume is in the process of merging. For example, merging from one extent pool to a different extent pool.

Migrating

The volume is in the process of migrating, or waiting to be migrated.

Migration Cancelled

The volume was in the process of migrating and then the 'migcancel' action of the **manageckdvol** command was issued, leaving some of the extents waiting to be migrated in the source pool while other extents have already migrated to the target pool. Migration has stopped, and cannot be resumed. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Paused

The volume was in the process of migrating and then the 'migpause' action of the **manageckdvol** command was issued. Migration has stopped, but can be resumed.

Migration Error

The volume migration process failed to complete successfully. This state reflects an internal error condition and not an error in the request of the user to migrate a volume. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

NVS data inaccessible

Indicates that active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible. The access state is Fenced.

Pinned

Indicates that none of the other data states apply and the volume has one or more pinned non-retryable tracks. The access state is Online.

Rank failed

Indicates that one or more extents that are associated with the volume are on a rank that is in the failed data state. The access state is Fenced.

Rank repairing

Indicates that one or more extents that are associated with the volume are on ranks that are in the repairing data state. The access state is Fenced.

Rank repaired

Indicates that one or more extents that are associated with the volume are on ranks that were in the repairing state, but are not in the repairing state now. The access state is Fenced.

Read only

The volume is read only because one or more extents on the volume are on a rank in the read only data state. The access state is Online.

Reconfiguring

The volume is in the process of allocating or deallocating extents due to a modification of the requested capacity attribute after initial creation.

Reconfiguration error

The reconfiguration request did not complete successfully.

Transposition Error

The volume is in an extent pool that was unsuccessfully merged. This state reflects an internal error condition. **Corrective action:** Use the **chextpool** command with the **-merge** parameter again to redrive the merge extent pool and to correct this state.

safeguardedloc

The pool where the Safeguarded Copies are written to.

SGC Recovered

Whether the volume has been recovered to a recovery volume.

Output definitions (*-rank* parameter specified)**Rank (Rank Extent table)**

The rank ID.

Extents (Rank Extents table)

The number of extents for the volume on the rank.

Rank Extents Capacity (cyl)(Rank Extents table)

The number of cylinders for the volume on the rank.

Example: Displaying performance metrics of an individual count key data (CKD) volume

The following tables represent the headers that are displayed on the output reports that are associated with the **showckdvol** command by using the **-metrics** parameter.

dscli> showckdvol -metrics IBM.2107-75FA120/0101

Output

| ID | Date | norm rdrqts | norm rdhits | norm write req | norm write hits | seq read reqs | seq read hits | seq write req |
|-----------------------|--------------------------|----------------|----------------|----------------------|-----------------------|---------------------|---------------------|---------------------|
| IBM.2107-75FA120/0101 | 10/11 /04 02:23:49 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| seqwrite- hits | cachfwr- reqs | cachfwr- hits | cachfwr- reqs | cachfwr- hits | inbcach- load | bypass- cach | seq DASD trans |
|-------------------|------------------|------------------|------------------|------------------|------------------|-----------------|----------------------|
| 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| DASD- trans | cache- trans | NVS- spadel | norm write ops | seqwrite- ops | rec cache mis | qwrite- prots | CKDir- trkac |
|----------------|-----------------|----------------|----------------------|------------------|---------------------|------------------|-----------------|
| 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| CKD irtrk hits | cachsp- delay | timelow- ifact | phread | phwrite | phwrite | phbyte- read | phbyte- writ |
|----------------------|------------------|-------------------|--------|---------|---------|-----------------|-----------------|
| 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| recmo- reads | sfile trk reads | contam- wrts | PPRC- trks | NVS- spallo | timeph- read | timeph- write | byte- read |
|-----------------|-----------------------|-----------------|---------------|----------------|-----------------|------------------|---------------|
| 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| bytewrit | timeread | timewrite | zHPFRead | zHPFWrite |
|----------|----------|-----------|----------|-----------|
| 10000 | 10000 | 10000 | - | - |

| zHPFPrefetchReq | zHPFPrefetchHit |
|-----------------|-----------------|
| 0 | 0 |

| GMCollisionsSidefileCount | GMCollisionsSendSyncCount |
|---------------------------|---------------------------|
| 0 | 0 |

Output definitions (-metrics parameter specified)

ID

The unique identifier that is assigned to this volume object.

Date

The current time stamp for the volume performance counters.

normrdqts

The number of normal read operations that are assigned by a host to a volume.

normrdhits

The number of normal read operations where data did not move to or from a storage device.

normwritereq

Write Normal I/O Requests

normwritehits

DASD Fast Write I/O Request Hits

seqreadreqs

Search/Read Sequential I/O Requests

seqreadhits

Search/Read Sequential I/O Request Hits

seqwritereq

Write Sequential I/O Requests

seqwritehits

DASD Fast Write Sequential I/O Request Hits

cachfwrreqs

Search/Read Cache Fast Write I/O Requests

cachfwrhits

Search/Read Cache Fast Write I/O Request Hits

cachfwreqs

Cache Fast Write I/O Requests

cachfwhits

Cache Fast Write I/O Requests Hits

inbcachload

Inhibit Cache Loading I/O Requests that operate with DASD

bypasscach

Bypass Cache I/O Requests

seqDASDtrans

Sequential DASD to Cache Transfer Operations

DASDtrans

DASD to Cache Transfer Operation Count

cachetrans

Cache to DASD Transfer Operation Count

NVSspadel

DASD Fast Write Operations Delayed Due to nonvolatile storage Space Constraints

normwriteops

Normal 'DASD Fast Write' Write Operation Counts

seqwriteops

Sequential Access 'DASD Fast Write' Write Operation Counts

reccachemis

Number of record cache Read Misses

qwriteprots

Quick Write Promotes

CKDirtrak

Irregular Track Accesses

CKDirtrkhits

Irregular Track Accesses Hits

cachspdelay

Operations Delayed Due To Cache Space Constraints

timelowifact

Milliseconds of lower interface I/O activity for the indicated device.

phread

Physical Storage Read Operations

phwrite

Physical Storage Write Operations

phbyteread

Physical storage bytes read in 128 KB increments.

phbytewrit

Physical storage bytes written in 128 KB increments.

recmoreads

The record mode read operations

sfiletrkreads

The number of tracks that are read from the Concurrent Copy or XRC Sidefile.

contamwrts

The number of contaminating writes for a Concurrent Copy or XRC volume

PPRCtrks

The number of tracks or portion of tracks that were transferred to the secondary device of a PPRC pair.

NVSspallo

The NVS space allocations

timephread

The physical storage read response time in 16 ms increments.

timephwrite

The physical storage write response time in 16 ms increments.

byteread

The number of bytes that are read in 128 KB increments

bytewrit

The number of bytes that are written in 128 KB increments.

timeread

The accumulated response time for all read operations.

timewrite

The accumulated response time for all write operations.

zHPFRead

The High Performance FICON (HPF) Read I/O Requests for volume performance statistics.

zHPFWrite

The HPF Write I/O Requests for volume performance statistics.

zHPFPrefetchReq

The number of HPF Pre-fetch I/O requests.

zHPFPrefetchHit

The number of HPF Pre-fetch I/O request hits.

GMCollisionsSidefileCount

The number of Global Mirror Collisions sidefile.

GMCollisionsSendSyncCount

The number of Global Mirror Collisions Send Synchronous Count.

Example: Displaying a tier distribution table of an individual count key data (CKD) volume

If you specify the **-tier** parameter, a tier distribution table is appended to the end of the display.

```
dsccli> showckdvol -tier 0000
```

Output

```

Name          myvol0800
ID            0800
accstate      Online
datastate     Normal
configstate   Normal
...
migrating     20
perfgrp       PG0
migratingfrom P0
resgrp        RG1
tierassignstatus Assigning
tierassignerror -
tierassignorder ETdata
tierassigntarget FlashTier0
%tierassigned 54
etmonpauseremain 1H44M
etmonitorreset 2013-07-26T14:00:00+07
===== Tier Distribution =====
Tier %allocated
=====
FlashTier0    54
ENT           46

```

Output definitions (*-tier* parameter is specified)

Tier

Tier ID

FlashTier0

The tier of high performance flash drives.

FlashTier1

The first tier of high capacity flash drives.

FlashTier2

The second tier of high capacity flash drives.

ENT

Enterprise tier consists of drives with speeds of 10K RPM, 15K RPM, or a combination of drives of both speeds.

NL

Nearline (NL) tier consists of high volume SATA or SAS Nearline disk drives.

Unknown

Assigning action was specified, but the target tier is unknown.

Example: Using the *-pathgrp* parameter

If you specify the *-pathgrp* parameter and no path groups exist for this volume, the following message displays:

```
CMUC00234I lscckdvol: No Path Groups found.
```

If you specify the *-pathgrp* parameter and path groups exist for this volume, a path group status table appends to the resulting output.

```
dscli> showckdvol -pathgrp efff
```

Output

```

Name          efff
ID            EFFF
accstate      Online
datastate     Normal
configstate   Normal
...
migrating     0
perfgrp       PG31
migratingfrom -
resgrp        RG62
=====Path Group status=====
GroupID      State      Reserve   Mode      Sysplex
=====
800002B9472827CA78BC17  Ungrouped  Disabled  Single    N/A

```

| | | | | |
|------------------------|-----------|----------|------------|--------|
| 880005B9472827CAAD6FBA | Grouped | Disabled | Multi-path | N/A |
| 800009B9472827CAC684B9 | Ungrouped | Disabled | Single | PLEXM1 |

Output definitions (*-pathgrp* parameter is specified)

GroupID

The path group ID. An 11-byte value that is displayed as 22 hexadecimal characters.

Note: The path group ID is supplied by the host and is not interpreted further by the storage system. This process means that the hosts are free to define, or redefine, the meaning of this value with no impact to the storage system. However, some programs such as ICKDSF break down the ID into distinct fields with the following partial display of the ICKDSF logical path status table.

```

+-----+-----+
|          PATH GROUP ID          | ...
+-----+-----+-----+-----+
| ID | SERIAL | CPU | CPU TIME |
|   |        |    | STAMP   | ...
+-----+-----+-----+-----+
|800002|B947  |2827|CA78BC17| ...
+-----+-----+-----+-----+
|880005|B947  |2827|CAAD6FBA| ...
+-----+-----+-----+-----+
|800009|B947  |2827|CAC684B9| ...
+-----+-----+-----+-----+

```

For more information, see the *ICKDSF User's Guide and Reference*. Go to <https://www-01.ibm.com/servers/resourceink/svc00100.nsf/pages/zOSV2R3gc350033?OpenDocument> to access the ICKDSF PDF.

State

The grouped state of this path group. Valid state values are "Grouped" or "Ungrouped".

Reserve

The reserved state of this path group. Valid state values are "Enabled" or "Disabled".

Mode

The path mode for this path group. Valid mode values are "Single" or "Multi-path".

Sysplex

The z/OS sysplex name. If the name is not set or available, N/A is displayed.

Logical subsystem specific commands

Commands are referenced for tasks that are associated with Open Systems logical subsystems.

The following logical subsystem specific commands are available:

ch1ss

Modifies one or more logical subsystems.

ls1ss

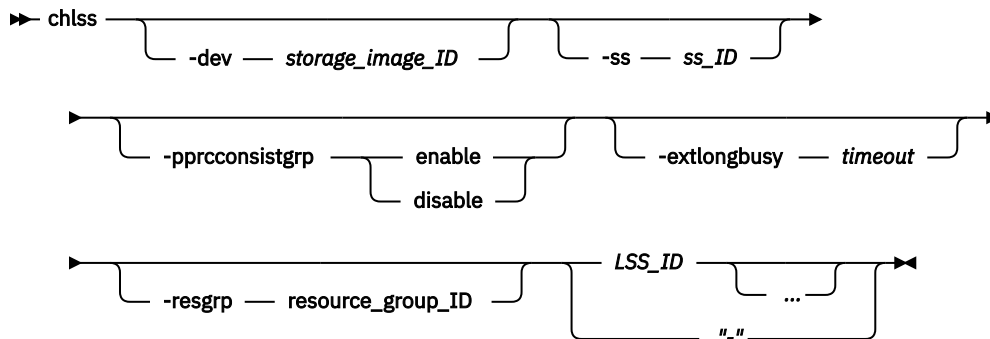
Generates a report that displays a list of logical subsystems (LSSs) for a storage system and the status information for each logical subsystem in the list.

show1ss

Generates a report that displays the detailed properties of a specified LSS.

chlss

The **chlss** command modifies a logical subsystem.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for all logical subsystems, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-ss ss_ID

(Optional). The subsystem ID of the logical subsystem. The subsystem ID that you specify replaces the existing subsystem ID in the initial target LSS ID.

The ID is in the format 0001 - FFFF.

Example: 013F

-pprconsistgrp enable | disable

(Optional) Enables a volume that is associated with a logical subsystem to become suspended and enter an extended long busy state if it has not received a notification that a consistency group has been created. Otherwise, the volumes associated with the LSS do not go to a long-busy state.

Note: A consistency group volume pair that is suspended will not go into an extended long busy state unless the primary volume is in a full duplex state before the suspension.

-extlongbusy timeout

(Optional) The time in seconds that an LSS consistency group volume stays long busy after reporting an error that causes a remote mirror and copy suspension if a consistency group has not been created. The default value for new LSSs is 60 seconds (1 minute).

-resgrp resource_group_ID

(Optional) The resource group that the LSSs are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

LSS_ID ... | -

(Required) One or more LSSs to be modified by this command. An LSS ID is two hexadecimal characters 00 - FE.

To specify a range of LSS IDs, separate the IDs with a hyphen.

You must separate multiple LSS IDs or ranges of LSS IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: 00-03 08

Example: Modifying a logical subsystem

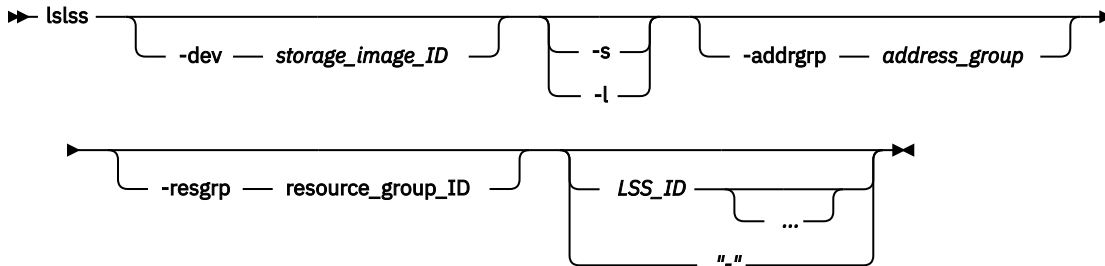
```
dscli> chlss -dev IBM.2107-75FA120 -extlongbusy 120 06 0F
```

Output

```
LSS 06 successfully modified.  
LSS 0F successfully modified.
```

lslss

The **lslss** command displays a list of logical subsystems (LSSs) for a storage image and status information for each logical subsystem in the list.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devId* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devId* for the current command.

-s

(Optional) Displays LSS IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output plus the SSID and resource group ID. You cannot use the **-l** and the **-s** parameters together.

-addrgrp *address_group*

(Optional) Displays only LSSs that belong to the specified address group. An address group is a single hexadecimal character (0 - F).

-resgrp *resource_group_ID*

(Optional) Displays only the LSSs that are assigned to the specified resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number.

LSS_ID ... | -

(Optional) The logical subsystem IDs. An LSS ID is two hexadecimal characters 00 - FE.

To specify a range of logical subsystem IDs, separate the logical subsystem IDs with a hyphen.

You must separate multiple logical subsystem IDs or ranges of logical subsystem IDs with a blank space between each ID or range of IDs.

Example: 00-03 08

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of LSSs and their status for a storage image

The following table represents the headers that are displayed on the output report that is associated with the **lslss** command using the **-l** parameter.

```
dscli> lslss -dev IBM.2107-75FA120 -l
```

Output

| ID | Group | Addrgrp | Stgtype | Confgvols | Subsys | resgrp |
|---------------------|-------|---------|---------|-----------|--------|--------|
| IBM.2107-75FA120/10 | 0 | 1 | fb | 256 | FF10 | RG0 |
| IBM.2107-75FA120/11 | 1 | 1 | fb | 256 | FF11 | RG0 |
| IBM.2107-75FA120/12 | 0 | 1 | fb | 256 | FF12 | RG0 |

Output definitions

ID*

The unique identifier that is assigned to this logical subsystem object. The identifier includes the storage image ID and a 2-digit hexadecimal number for the LSS ID. The LSS ID can be in the range of 00 - FE.

Group

The server that is managing the logical subsystem group. The server is identified as either 0 or 1.

Addrgrp

The address group object of which the logical subsystem is a member.

Stgtype

The type of storage volumes that are contained by this logical subsystem. The displayed value is either fb (fixed block) or ckd (count key data).

Confgvols

The number of volumes currently assigned to this logical subsystem.

Subsys+

The user assigned, or default SSID value.

resgrp+

The resource group ID that the LSS is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

Key:

*

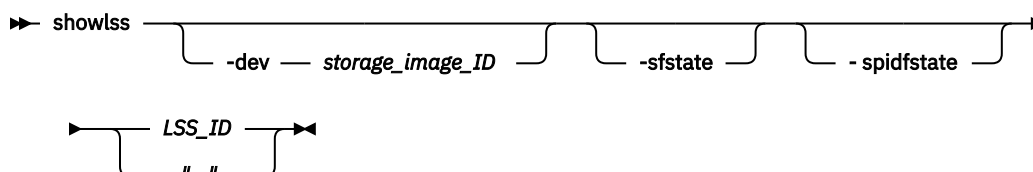
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

showlss

The **showlss** command displays detailed properties of a logical subsystem (LSS).



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified LSS ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-sfstate

(Optional) Displays a table at the end of the command output that contains the name, ID, and soft fence state for each volume in the specified LSS.

-spidfstate

(Optional) Displays a table at the end of the command output that contains the name, ID, and SPID (Set Path Group ID) fence state for each volume in the specified LCU.

LSS_ID | -

(Required) Displays the properties for the specified logical subsystem. This parameter accepts a fully qualified LSS ID, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is two hexadecimal digits in the range 00 - FE.

The following example is a fully qualified LSS ID: IBM.2107-75FA120/10

The following example is a shortened version of the LSS ID when the **-dev** parameter is specified:

```
dscli> showlss -dev IBM.2107-75FA120 10
```

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying detailed properties of an LSS

```
dscli> showlss IBM.2107-75FA120/10
```

Output

| ID | Group | Addrgrp | Stgtype | Confgvols |
|-----------------|-------|---------|---------|-----------|
| 2107-75FA120/10 | 0 | 1 | fb | 256 |

| Subsys | Pprcconsistgrp | Xtnldbztimout | resgrp |
|--------|----------------|---------------|--------|
| FF10 | Disabled | 60 secs | RG0 |

Output definitions

ID

The unique identifier that is assigned to this logical subsystem. It includes the storage image ID and the 2 digit LSS ID 00 - FE.

Group

The server that manages the logical subsystem. The displayed values are 0 or 1.

Addrgrp

The address group object that the logical subsystem is a member of.

Stgtype

The type of storage volumes contained by this logical subsystem. The value displayed is fb (fixed block) or ckd (count key data)

Confgvols

The number of volumes that are assigned to this logical subsystem.

Subsys

The user assigned, or default SSID value.

Pprcconsistgrp

The assigned PPRC consistency group state setting. If you do not designate enabled, the default value of disabled is assigned.

Xtnldbztimout

The assigned extended long busy timeout value. LSSs are created with an extended long busy timeout value of 60 seconds.

resgrp

The resource group ID that the LSS is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

Example 2

If you specify the **-sfstate** parameter, the output includes the soft fence state table.

```
dscli> showlss -sfstate 14
Date/Time: September 22, 2016 3:18:07 PM MST IBM.
DS: IBM.2107-75LH321
ID                14
Group             0
addrgrp          1
stgtype          fb
confgvols        16
subsys           0xFF14
pprcconsistgrp   Disabled
xtndlbztimout    60 secs
resgrp           RG0
=====Soft Fence State=====
Name              ID      sfstate
=====
RegrFBVol1 1400 Disabled
RegrFBVol1 1401 Disabled
RegrFBVol1 1402 Disabled
RegrFBVol1 1403 Disabled
RegrFBVol1 1404 Disabled
RegrFBVol1 1404 Disabled
RegrFBVol1 1405 Disabled
RegrFBVol1 1406 Disabled
RegrFBVol1 1407 Disabled
RegrFBVol1 1408 Disabled
RegrFBVol1 1409 Disabled
RegrFBVol1 140A Enabled
RegrFBVol1 140B Enabled
RegrFBVol1 140C Enabled
RegrFBVol1 140D Enabled
RegrFBVol1 140E Enabled
RegrFBVol1 140F Enabled
dscli>
```

Output definitions (**-sfstate** parameter is specified)

Name

The user-assigned nickname for this volume object.

ID

The unique identifier that is assigned to this volume object. A volume ID is four hexadecimal characters (0x0000 - 0xFEFF).

sfstate

The soft fence state. The following values are possible.

Enabled

The host has set this volume to the soft fence state.

Disabled

The host has not set this volume to the soft fence state.

N/A

The host cannot set this volume to the soft fence state. For example, an alias volume.

Output definitions (-spidfstate parameter is specified)

Name

The user-assigned nickname for this volume object.

ID

The unique identifier that is assigned to this volume object. A volume ID is four hexadecimal characters (0x0000 - 0xFEFF).

spidfstate

The soft fence state. The following values are possible.

Enabled

The volume is set to the SPID fence state by the host.

Disabled

The volume is not set to the SPID fence state by the host.

N/A

The volume is not capable of being set into the SPID fence state by the host. For example, an alias volume.

Fixed block logical volume specific commands

Commands are referenced for tasks that are associated with Open Systems fixed block logical volumes.

The following fixed block logical volume specific commands are available:

chfbvol

Modifies the name or data type of a fixed block volume.

initfbvol

Releases extents from a space-efficient logical volume, and removes (erases) data from standard volumes.

lsfbvol

Generates a report that displays a list of fixed block volumes in a storage system and the status information for each volume in the list.

managefbvol

Initiates a change on fixed block (FB) volumes by executing a process.

mkfbvol

Creates open systems fixed block volumes in a storage system.

rmfbvol

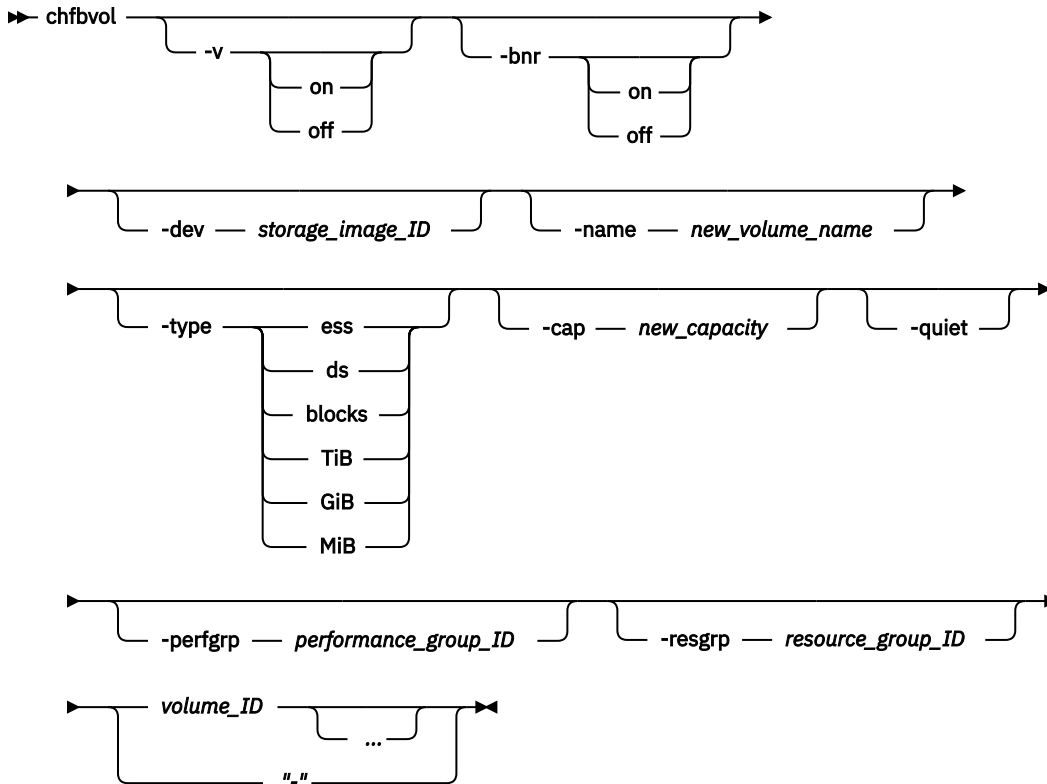
Deletes one or more specified fixed block volumes from a storage system.

showfbvol

Generates two types of reports. The first report displays the detailed properties for a specified fixed block volume. The second report displays the performance metrics for a specified fixed block volume.

chfbvol

The **chfbvol** command is used to change the name or capacity of a fixed block volume.



Parameters

-v on | off

(Optional) Turns verbose mode on or off. The default is off. You can specify `-v on` or `-v off` to turn verbose mode on or off; but if you specify only `-v`, you get an error.

-bnr on | off

(Optional) Turns the banner on or off. The default is on. You can specify `-bnr on` or `-bnr off` to turn the banner on or off; but if you specify only `-bnr`, you get an error.

-dev storage_image_ID

(Optional) The storage image ID, which consists of the manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the `devId` variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for `devId` for the current command.

-name new_volume_name

(Optional) The nickname for this volume. A nickname cannot exceed 16 characters.

-type ess | ds | blocks

(Optional) The unit type of capacity that is specified by the **-cap** parameter.

ess

The unit is 10^9 bytes.

ds

The unit is 2^{30} bytes.

blocks

The unit is 512 blocks.

TiB

The unit is tebibytes (TiB) 2⁴⁰ bytes.

GiB

The unit is gibibytes (GiB) 2³⁰ bytes.

MiB

The unit is mebibytes (MiB) 2²⁰ bytes.

Note: If the **-type** parameter is not specified, the LUN is created as type *ds*.

-cap *new_capacity*

(Optional) The storage size that you want to allocate to the specified volume. Check your operating system documentation to ensure that volume expansion is supported before you proceed with the expansion.

- If the **-type** parameter is omitted or the **-type ds** parameter is specified, the *new_capacity* value is the volume size in gibibytes (GiB), where 1 gibibyte (GiB) = 1 073 741 824 (2³⁰ bytes).
- If the **-type ess** parameter is specified, the *new_capacity* value is the volume size in gigabytes (GB), to the nearest 1/10 GB (format *xxxx.x*), where one GB = 1 000 000 000 (10⁹ bytes).
- If the **-type blocks** parameter is specified, the *new_capacity* value is the volume size in 512 byte blocks.

Notes:

1. The maximum volume size varies and depends on storage system model and type.
2. If you attempt to reduce the volume size, the command fails.

-quiet

(Optional) Turns off the confirmation prompt for this command.

-perfggrp *performance_group_ID*

(Optional) The performance group ID that the volumes are assigned to. The performance group ID begins with the letters *PG*. The default is *PG0*.

-resgrp *resource_group_ID*

(Optional) The resource group that the volumes are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

***volume_ID ...* | -**

(Required) One or more volume IDs to be modified. The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

You must fully qualify the volume ID with manufacturer, machine type, and serial number if you do not use the **-dev** parameter.

To specify a range of volume IDs, separate the volume IDs with a hyphen.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

Example: 0100-010F 0180-018F 0120

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive command mode.

Example 1: Changing the name or capacity of a fixed block volume

```
dscli> chfbvol -dev IBM.2107-75FA120 -cap 5 0100 0101
```

Output

```
FB volume 0100 successfully modified.  
FB volume 0101 successfully modified.
```

Example 2: Changing the name or capacity of a fixed block volume

```
dscli> chfbvol -cap 2 -quiet 0510
```

Output

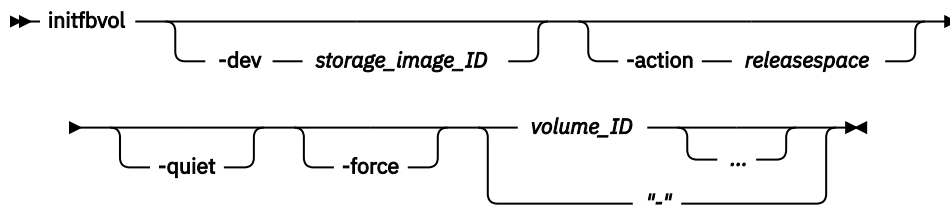
```
CMUC00332W chfbvol:  
Some host operating systems do not support changing the volume size.  
Data can be at risk if the host does not support this action.  
Are you sure that you want to resize the volume? [y/n]: y  
CMUC00026I chfbvol: FB volume 0510 successfully modified.
```

initfbvol

The **initfbvol** command initializes a logical volume and releases extents from a space-efficient logical volume.

For space-efficient logical volumes, this command is used to release space. For TSE volumes, it releases tracks in the repository, reducing the repository allocated space. For ESE volumes, it releases extents in the extent pool being used, reducing the allocated extents.

For example, if a space-efficient logical volume has data that is stored on it that is no longer needed, use the **initfbvol** command to free the extents/tracks that were assigned to this logical volume. This allows the extents/tracks to be reused by other space-efficient logical volumes.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-action **releasespace**

(Optional) Releases the repository space held by the designated space-efficient volume back to the repository. (The repository is the physical extents that provision the virtual extents for virtual space volumes.)

-quiet

(Optional) Turns off the modification confirmation prompt for the **-action** parameter.

-force

(Optional) Forces the action.

Note: For release 8.3 or later, if **-force** is not specified, the request fails when the volume is in a volume group or in any kind of Copy Services relationship.

volume_ID - | ...

(Required) The volume ID that you want the system to release the repository space from. The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *LLVV*, where:

LL

The logical control unit number, 00 - FE.

VV

The volume number, 00 - FF.

You must fully qualify the volume ID with manufacturer, machine type, and serial number if you do not use the **-dev** parameter.

To specify a range of volume IDs, separate the volume IDs with a dash.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive command mode. The ellipsis (...) indicates that, optionally, you can specify multiple values.

Example: Initializing a logical volume and releasing extents from a space-efficient logical volume

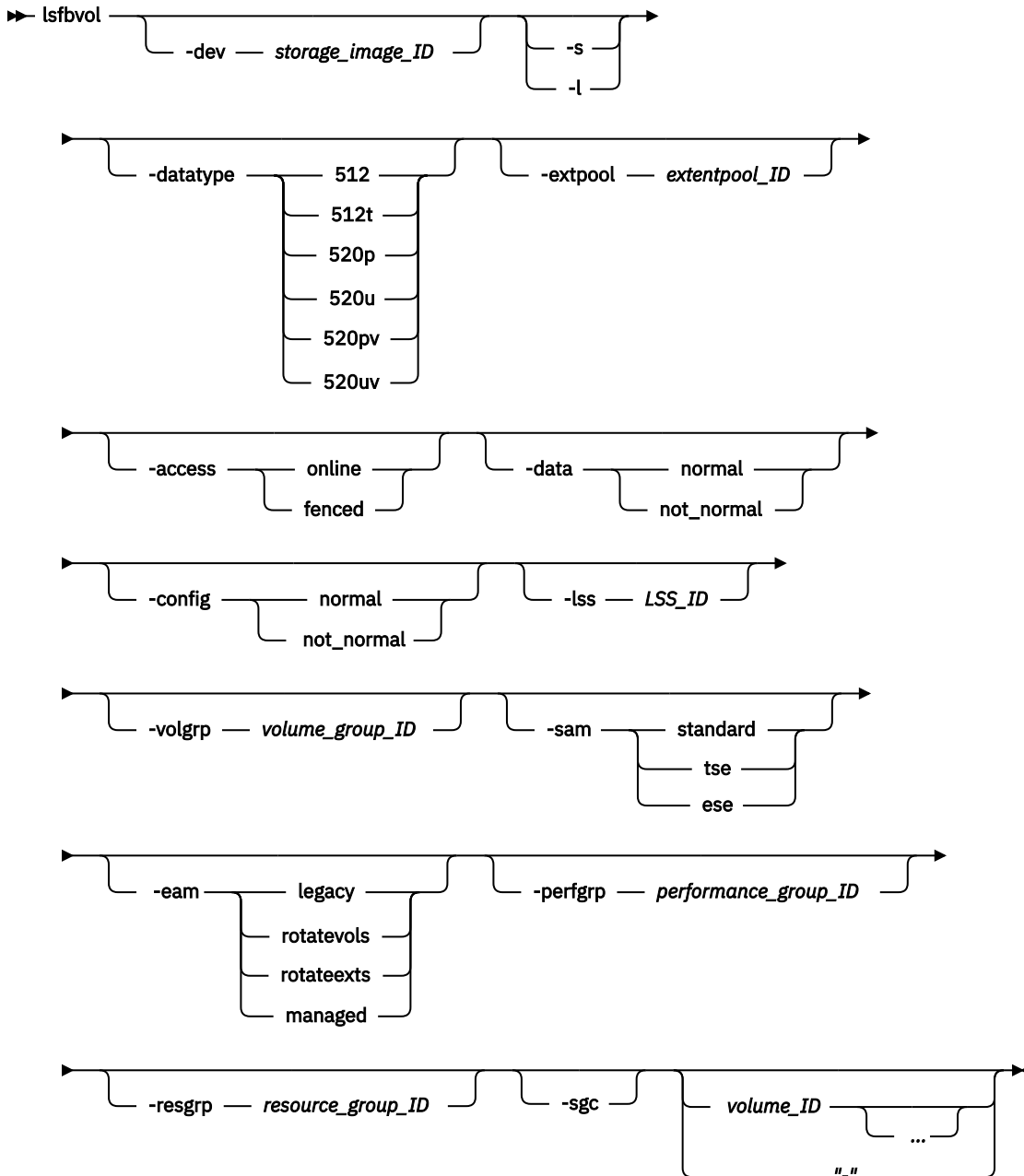
```
dsccli> initfbvol -dev IBM.2107-75FA120 -action releasespace 0101
```

Output

```
CMUC00338W initfbvol: Are you sure that you want to submit the command
_releasespace for the FB volume 0101?[Y/N]:y
CMUC00341I initfbvol:: 0101: The command releasespace has
completed successfully.
```

lsfbvol

The **lsfbvol** command displays a list of fixed block (FB) volumes in a storage image and status information, including Safeguarded Copy information for each volume in the list.



Parameters

Note: For a storage system that is heavily configured, specify the **-lss** or the **-volgrp** parameter as part of your command.

-dev *storage_image_ID*

(Optional) Displays the storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs. It is also required if you do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

- s**
(Optional) Displays only the volume IDs. You cannot use the **-l** and the **-s** parameters together.
- l**
(Optional) Displays default output plus extra attributes that are identified as long output in the Output definitions list. You cannot use the **-l** and the **-s** parameters together.
- datatype 512 | 512t | 520p | 520u | 520pv | 520uv**
(Optional) Displays volumes of the specified volume data type. Standard 2107/1750 volume (512), T10-DIF algorithm protection (512t), System i protected (520p), System i unprotected (520u), IBM i protected variable size (520pv), IBM i unprotected variable size (520uv).
- extpool extentpool_ID**
(Optional) Displays volumes that are sourced from the specified extent pool. An extent pool ID is a four-digit decimal number with no leading zeros, prefixed with the letter P.
- access online | fenced**
(Optional) Displays volumes with the specified access state.
- data normal | not_normal**
(Optional) Displays volumes with the specified data state.
- config normal | not_normal**
(Optional) Displays volumes with the specified configuration.
- lss LSS_ID**
(Optional) Displays volumes with IDs that contain the specified logical subsystem ID. Each logical subsystem can contain up to 256 volumes. A logical subsystem ID is two hexadecimal characters 00 - FE.
- volgrp volume_group_ID**
(Optional) Displays volumes that are assigned to the specified volume group ID. A volume group ID is a four-digit decimal number, with no leading zeros, prefixed by the letter V. For example, V123.
- sam standard | tse | ese**
(Optional) The storage allocation method as follows.
 - standard**
Fully allocates the volume with real extents when it creates the volumes.
 - tse**
Creates track space-efficient volumes. After creation, these space-efficient volumes contain a set of virtual extents that are associated with the space-efficient storage in the same extent pool. The physical space for a given logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.
 - ese**
Provisions an extent space efficient logical volume with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and deallocated from the extent pool.
- eam legacy | rotatevol | rotateexts | managed**
(Optional) Displays only volumes that meet the criteria of the designated extent allocation method as follows:
 - legacy**
Volumes that were created before the current algorithms were implemented.
 - rotateexts**
The extents for each new logical volume are allocated across all available ranks, also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. The extents for a particular volume are allocated from one rank, while the extents for the next volume are allocated from the next successive rank, and so on.

managed

The extents are currently managed by Easy Tier, and the extents for any new volumes are initially allocated across all available ranks in the lowest tier of storage.

-perfgrp performance_group_ID

(Optional) Displays only the volumes that belong to the specified performance group. The performance group ID begins with the letters *PG*.

-resgrp resource_group_ID

(Optional) Displays only the volumes that are assigned to the specified resource group ID. The resource group ID begins with the letters *RG* and ends with a decimal number.

-sgc

(Optional) Displays Safeguarded Copy information for the volumes.

volume_ID ... | -

(Optional) Displays volumes with the specified IDs. The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

X

The address group, 0-F.

To specify a range of volume IDs, separate the volume IDs with a hyphen.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 0100-010F 0180-018F 0120

Example: Displaying a list of fixed block (FB) volumes in a storage image and status information, including Safeguarded Copy information for each volume in the list

The following tables represent the headers that are displayed on the output report that is associated with the **lsfbvol** command using the **-l** parameter.

```
dscli> lsfbvol -dev IBM.2107-75FA120 -l -volgrp V2
```

Output

| Name | ID | accstate | datastate | config state | device MTM | data type |
|----------------|------|----------|-----------|--------------|------------|-----------|
| My_volume_0001 | 0100 | Online | Normal | Normal | 2107-900 | FB 512 |
| My_volume_0002 | 0102 | Online | Normal | Normal | 2107-A07 | FB 520P |

| Name | ID | accstate | datastate | config state | device MTM | data type |
|------------------------|------|----------|-----------|--------------|------------|-----------|
| My_ _volume 0003 | 0103 | Online | Normal | Normal | 2107-900 | FB 512 |
| My_ _volume 0004 | 0104 | Online | Normal | Normal | 2107-099 | FB 520UV |
| My_ _volume 0007 | 0105 | Online | Normal | Normal | 2107-050 | FB 520PV |

| extpool | sam | captype | cap (2^30B) | cap (10^9B) | cap (blocks) | volgrp |
|---------|----------|---------|-------------|-------------|--------------|--------|
| P21 | standard | DS | 64.0 | - | 134217728 | V2 |
| P31 | standard | iSeries | 128.0 | 68.7 | 268435456 | V2 |
| P21 | standard | ESS | - | 35.0 | 68359424 | - |
| P0 | standard | iSeries | 5.0 | 5.4 | 10485760 | - |
| P0 | standard | iSeries | 5.0 | 5.4 | 10485760 | - |

| reqcap (blocks) | eam | perfgrp | resgrp |
|-----------------|------------|---------|--------|
| 2097152 | legacy | PG1 | RG0 |
| 2097152 | rotateexts | PG1 | RG0 |
| 2097152 | legacy | PG1 | RG0 |
| 10485760 | rotateexts | PG0 | RG0 |
| 10485760 | rotateexts | PG0 | RG0 |

| GUID | safeguardedcap (2^30B) | safeguardedloc |
|--|------------------------|----------------|
| 60050763CXFFC03 D000000000000000100 | 16.0 | mypool_1 |
| 60050763CXFFC03 D000000000000000101 | 16.0 | mypool_1 |
| 60050763CXFFC03 D000000000000000102 | 16.0 | mypool_1 |
| 60050763CXFFC03 D000000000000000103 | 16.0 | mypool_1 |

Output definitions

Name

The nickname that you assigned for the specified volume object.

ID

The unique identifier that is assigned to this volume object.

Accstate

One of the following access states are displayed: Online or Fenced.

Online

The logical volume is accessible to a host.

Fenced

The logical volume is in the volume fenced state and is not accessible to the host.

Datstate

One of the following data states are displayed:

Normal

None of the other data states apply. The access state is Online.

Read only

The logical volume is read only because one or more extents on the logical volume are on a rank in the read only data state. The access state is Online.

Inaccessible

One or more extents that are associated with the logical volume are on a rank that is in the inaccessible data state. The access state is fenced.

Virtual space fault

The logical volume has a storage allocation method of track space-efficient. Not enough space was available to convert a virtual logical track to a real logical track. The access state is Online.

Indeterminate data loss

The following data states do not apply and that one of the following conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - one of the conditions occurred:

- Committed write data was lost before it was destaged and the track identifiers that are associated with the data are unknown.
- Data was lost that indicates that extents on the logical volume were active FlashCopy targets.

The access state is fenced.

Rank failed

One or more extents that are associated with the logical volume are on a rank that is in the Failed data state. The access state is Fenced. This data state transitions to the Rank repairing state if the rank transitions to the Rank repairing state through use of the repair array function.

Rank Repairing

One or more extents that are associated with the logical volume are on ranks in the repairing data state. The access state is fenced.

Rank Repaired

One or more extents that are associated with the logical volume are on ranks that were in the repairing state, but are not in the repairing state now. The access state is fenced.

Global inaccessible

The global metadata that is associated with the logical volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate. The access state is fenced.

Global lost data

Global metadata that is associated with the logical volume configuration was lost. As a result, some of the data that is associated with the logical volume might be inaccurate. The access state is fenced.

NVS data inaccessible

Active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible. The access state is fenced.

Configstate

One of the following configuration states is displayed:

Normal

No logical volume configuration operations are in progress, and the volume is not being deconfigured, merged, or migrated.

Configuring

The logical volume is in the process of being configured for the first time.

Reconfiguring

The logical volume is allocating or deallocating extents due to a modification of the requested capacity attribute after initial creation.

Deconfiguring

The logical volume is being deleted.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the volume. If you have a volume in this state, use the **rmfbvol** command to delete each volume that is listed with the configuration state of "configuration error".

Merging

The volume is merging. For example, merging from one extent pool to a different extent pool.

Migrating

The volume is migrating, or waiting to be migrated.

Migration Cancelled

The volume was migrating and then the 'migcancel' action of the **manageckdvol** command was issued. Some of the extents were waiting to be migrated in the source pool while other extents already migrated to the target pool. Migration stopped, and cannot be resumed. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Paused

The volume was migrating and then the 'migpause' action of the **manageckdvol** command was issued. Migration stopped, but can be resumed.

Migration Error

The volume migration process failed to complete successfully. This state reflects an internal error condition and not an error in the request of the user to migrate a volume. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Reconfiguration error

The reconfiguration request did not complete successfully.

Deconfiguration error

A request to delete a volume did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmfbvol** command for the designated volume.

Transposition Error

The volume is in an extent pool that was unsuccessfully merged. This state reflects an internal error condition. **Corrective action** Use the **chextpool** command with the **-merge** parameter again to redrive the merge extent pool and to correct this state.

deviceMTM

The volume device type and model. The volume MTM (machine type, model) is determined by the fixed block volume data type and the volume capacity (in GB). The machine type is either 2107 or 1750; however, the MTM can be any one of the following, depending on your system:

2107-900

A standard 2107 volume.

1750-500

A standard 1750 volume.

xxxx-A0x

The xxxx is a 2107 or 1750. The value A0 indicates a System i protected volume (for example, 2107-A01 or 1750-A07).

xxxx-A8x

The xxxx is 2107 or 1750. The value A8 indicates a System i unprotected volume (for example, 2107-A81 or 1750-A87).

2107-050

The machine type is 2017. The value 050 indicates that the volume is a System i unprotected variable size volume.

2107-099

The machine type is 2107. The value 099 indicates that the volume is a System i protected variable size volume.

Datatype

The volume data type setting. One of the following values is displayed:

- FB 512
- FB 512T
- FB 520P
- FB 520U
- FB 520PV
- FB 520UV

Extpool

The extent pool ID. Volume extents are allocated from this extent pool ID.

Note: Volumes that belong to an encrypted extent pool are encrypted. You can see the key group of an extent pool by using the **lsxtpool -1**, or **showxtpool** commands.

SAM

The storage allocation method. The following values are displayed:

standard

The system fully allocated the volume with real extents at volume creation time.

tse

A track space-efficient logical volume contains a set of virtual extents that are associated with the space-efficient storage in the same extent pool. Physical space for a given logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

ese

An extent space efficient logical volume is provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and deallocated from the extent pool.

Captype

The capacity unit type that is used at volume creation. One of the following values is displayed:

ESS

The capacity unit is decimal gigabytes (GB).

DS

The capacity unit is gibibytes (GiB).

DS/ESS

The capacity unit is gibibytes (GiB) or decimal gigabytes (GB).

Blocks

The capacity unit is 512B.

iSeries

The capacity unit was not specified at volume creation. This fixed block volume was created only for iSeries.

Cap (2³⁰B)

The size of the volume that is available for host system access in gibibytes (GiB).

Note: " - " is displayed if the capacity unit type of the volume is ESS (captype=ESS)

Cap (10⁹B)

The size of the volume that is available for host system access in decimal gigabyte (GB) units.

Note: " - " is displayed if the capacity unit type of the volume is DS (captype=DS)

Cap (blocks)

The quantity of volume logical blocks that are available for host system access.

Volgrp

The volume groups (excluding default volume groups) that a volume belongs to.

Multiple volume groups that are associated with the volume are separated by a comma.

A " - " is displayed if no volume groups exists that are associated with the volume.

Unknown displays if information about the volume groups is not available.

Reqcap (blocks)

The requested quantity of volume logical blocks (for example, 3339).

EAM

The extent allocation method that is used if the volume is migrated or expanded.

legacy

The volume was created before the use of the current algorithm.

rotateexts

The extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. This means that the extents for a particular volume are allocated from one rank, while the extents for the next volume are allocated from the next successive rank, and so on.

managed

The extents are currently managed by Easy Tier, and the extents for any new volumes are initially allocated across all available ranks in the lowest tier of storage.

" - "

A dash " - " value is displayed if the extent allocation method does not apply, for example if the volume is a track space efficient (TSE) volume.

perfgrp

The performance group ID that the volume is assigned to. The performance group ID begins with the letters *PG* and ends with a decimal number.

resgrp

The resource group ID that the volume is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

GUID

The GUID (Globally Unique Identifier): The NAA (Network Addressing Authority) unique value that identifies a volume object.

safeguardedcap(2^30B)

The amount of safeguarded virtual capacity that is reserved for the volume.

safeguardedloc

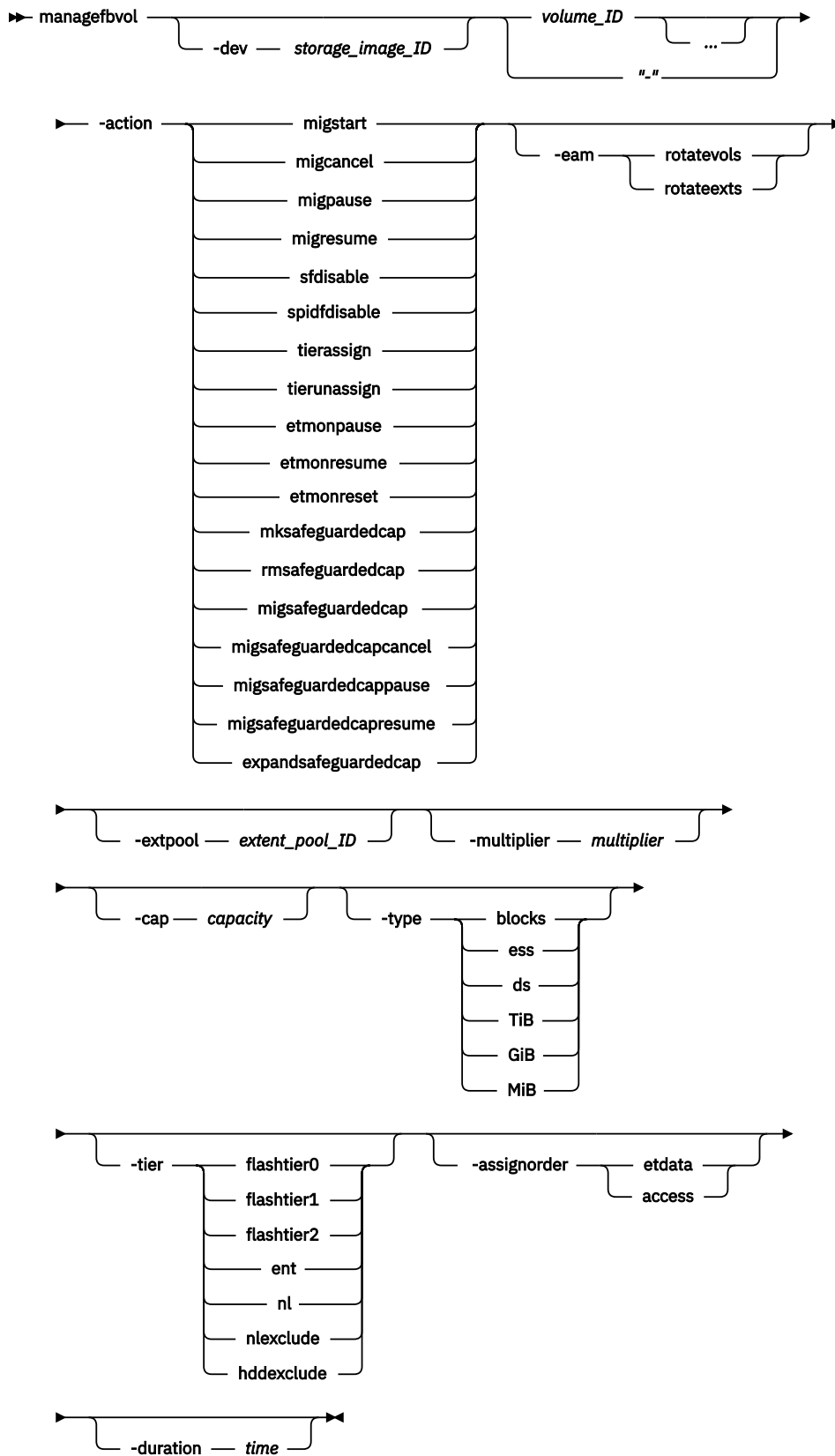
The pool where the safeguarded copies for the volume are written.

managefbvol

The **managefbvol** command initiates a change on fixed block (FB) volumes when the command processes.

Use this command to define safeguarded backup capacity for FB volumes for which you want to enable for Safeguarded Copy.

Use Copy Services Manager to define a Safeguarded Copy schedule to create backups on a regular basis, such as hourly or daily.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

volume_ID ... | -

(Required) One or more volume IDs to be modified. The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0 - F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

You must fully qualify the volume ID with manufacturer, machine type, and serial number if you do not use the **-dev** parameter.

To specify a range of volume IDs, separate the volume IDs with a hyphen. Separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

Example: 0100-010F 0180-018F 0120

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive command mode.

-action migstart|migcancel|migpause|migresume|sfdisable|spidfdisable|tierassign|tierunassign|etmonpause|etmonresume|etmonreset|mksafeguardedcap|rmsafeguardedcap|migsafeguardedcap|migsafeguardedcapcancel|migsafeguardedcappause|migsafeguardedcapresume|expandsafeguardedcap

(Required) One of the following actions are to be performed:

migstart

Initiates volume migration on the specified volumes that are in the "normal" or "canceled" state. Volumes are placed into the migrating state. Volumes that are in the cancelled state must have the original source or the destination extent pool as the value of the **-extpool** parameter.

migcancel

Cancels volume migration on the specified volumes that are in the migrating state. Volumes that have not yet started migration are put in the "normal" state, and volumes that are in the middle of migration are put in the "canceled" state.

migpause

Pauses volume migration on the specified volumes that are in the migrating state. Volumes that have not yet started migration or that are in the middle of migration are put in the "paused" state.

migresume

Resumes volume migration on the specified volumes that are in the "paused" state.

sfdisable

Sends a soft fence reset command to each specified volume. This action cannot be used with any other parameter.

spidfdisable

Sends a set path group ID (SPID) fence reset command to each specified volume. This action cannot be used with any other parameters.

tierassign

Initiates the assigning volume action on the specified volumes to the specified tier. The **-tier** option is required with this action.

Note: By assigning a volume to a tier, a process that migrates the data in the volume to the specified tier begins. You can check the progress of the migration by using the **showfbvol** or **showckdvol** command with the **-tier** parameter. However, there is a maximum capacity that can be assigned to each tier in a pool. If this maximum capacity is reached, a new assign command to that tier is rejected due to insufficient capacity. You can check how much total capacity has been assigned to a specific tier in a pool by using the **showextpool** command with the **-tier** parameter. If, due to a configuration change, the assign operation reaches the maximum capacity on the target tier before all volumes are assigned, the remaining volumes enter the Assign Pending Hardware state. The migration of those volumes to the target tier are paused.

tierunassign

Initiates the unassigning volume action on the specified volumes.

etmonpause

Easy Tier monitoring of this volume will be paused. During the pause, all Easy Tier storage migrations are unaffected, but no new migration plans will be formed.

etmonresume

Easy Tier monitoring of this volume will be resumed. All Easy Tier storage migrations are unaffected.

etmonreset

All Easy Tier monitoring data (history), including migration plans are erased. All new plans will be based on new monitoring data.

mksafeguardedcap

Creates the safeguarded backup capacity for one or more of the specified volumes.

rmsafeguardedcap

Deletes the safeguarded backup capacity, including all safeguarded copies, that was defined for one or more of the specified volumes.

migsafeguardedcap

Migrates the safeguarded backup capacity to a new pool for one or more of the specified volumes.

migsafeguardedcapcancel

Cancels migrating the safeguarded capacity to a new pool for one or more of the specified volumes.

migsafeguardedcappause

Pauses migrating the safeguarded backup capacity to a new pool for one or more of the specified volumes.

migsafeguardedcapresume

Resumes migrating the safeguarded backup capacity to a new pool for one or more of the specified volumes.

expandsafeguardedcap

Increases the safeguarded backup capacity for one or more of the specified volumes, without having to first delete existing backups or the Safeguarded Copy relationship.

-eam

(Optional) The extent allocation method as follows:

rotateexts

Designates that extents that are allocated to a logical volume are successively rotated through the ranks within an extent pool. This parameter is the default value.

rotatevols

Designates that each successive logical volume that is created is allocated on the next available rank in the extent pool.

Note: You can specify the **-eam** parameter only if **-action migstart** is also specified.

-extpool extent_pool_ID

(Optional) Changes the extent pool ID of the volume so that the volume migrates to the new extent pool. Accepts either a fully qualified extent pool ID including storage image ID or a shortened version if the `-dev` parameter is used. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter P.

Note: When the command returns, the volume migration might still be occurring. It is available for I/O and copy services during migration. Its configstate indicates that it is migrating.

-multiplier multiplier

(Optional) The safeguarded virtual capacity multiplier value. Safeguarded virtual capacity is the amount of volume (virtual) capacity that is configured to store safeguarded backups for a safeguarded source. To configure the amount of virtual capacity that is required for safeguarded backups, you must determine an estimate for the safeguarded capacity multiplier.

-cap capacity

(Optional) The safeguarded backup capacity for one or more specified volumes. The unit type is set with the parameter `-type`, if the unit type is not set. The default is *GiB*.

-type blocks | ess | ds | TiB | GiB | MiB

(Optional) The unit type of the safeguarded backup capacity. If the unit type is not set, the default is *GiB*.

blocks

The capacity unit type as blocks. This capacity unit type can be selected only for fixed block storage. One block = 512 Bytes.

ess

The unit is 10⁹ bytes.

ds

The unit is 2³⁰ bytes.

TiB

The unit is terabytes (TiB) 2⁴⁰ bytes.

GiB

The unit is gibibytes (GiB) 2³⁰ bytes.

MiB

The unit is mebibytes (MiB) 2²⁰ bytes.

-tier flashtier0 | flashtier1 | flashtier2 | ent | nl | nlexclude | hddexclude

(Optional) Which tier the volume is assigned to. This option is required with the `-action tierassign` parameter.

flashtier0

The tier of high performance flash drives.

flashtier1

The first tier of high capacity flash drives.

flashtier2

The second tier of high capacity flash drives.

ent

Enterprise tier that consists of drives with speeds of 10K RPM, 15K RPM, or a mixtures of 10K RPM and 15K RPM speeds.

nl

Nearline tier consists of high-volume disks that are either SATA or SAS Nearline drives.

NLExclude

Enterprise tiers but not a Nearline tier.

HDDexclude

Any tier except enterprise (ent) or nearline (nl).

-assignorder etdata|access

(Optional) The order in which the data is migrated. This option is valid only with the **-action tierassign** parameter.

etdata

While all data is scheduled to migrate, the migration order is based on the prioritization of the data as specified in the Easy Tier heat map. This value allows the specified volume to be pre-staged onto the specified tier. This is the default value if **-assignorder** is not specified.

access

While all data is scheduled to migrate, the data is migrated only when accessed. In other words, data that is never accessed is never migrated to the specified tier.

-duration time

(Optional) The hours of the pause time in ISO 8601 format. For example, `-duration 24H`. The maximum value of the time is a week, which is 168 hours (168H). You can specify this option only with `-action etmigpause` or `etmonpause` parameters.

Note: If you want the duration of the pause to be infinite, you must specify `-duration 0H`. Otherwise, if you do not specify a value with the **-duration** parameter, the default is 168H.

Example 1: Deleting the backup capacity for FB volume 000F

```
dscli> managefbvol -dev IBM.2107-75FA120  
-action migstart -extpool P2 0100
```

Output:

```
CMUC00568W managefbvol: Are you sure you want to delete the backup capacity for FB volume 000F?  
[y/n]: y  
CMUC00573I managefbvol: Backup capacity for FB volume 000F is successfully deleted.
```

Example 2: Expanding safeguarded capacity for volume 3301

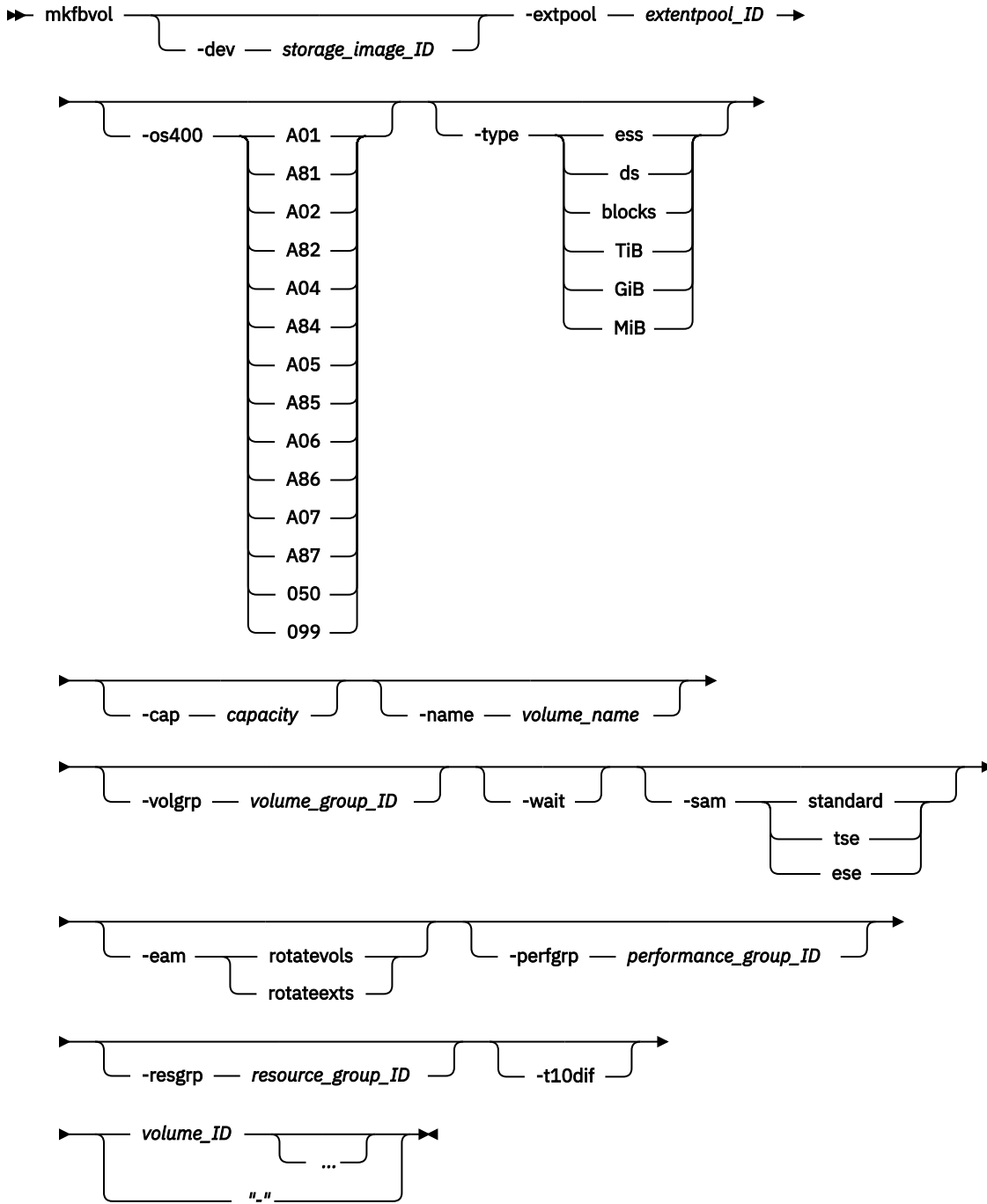
```
dscli> managefbvol -multiplier 2 -action expandsafeguardedcap 3301
```

Output:

```
CMUC00430I managefbvol: The expandsafeguardedcap action for FB volume 3301 has completed
```


mkfbvol

The **mkfbvol** command creates open systems fixed block (FB) volumes in a system.



Parameters

Notes:

1. You can create multiple volumes with one command; however, all volumes must have the same capacity, extent pool, and data type.
2. If host attachment volume groups are not created, create temporary volume groups and assign new fixed block volumes to the temporary volume groups. Create the volume groups according to the volume type and capacity characteristics.

3. To use the `-sam tse` parameter, you must have previously created space-efficient storage (using the `mksestg` command) for the extent pool.

-dev storage_image_ID

(Optional) The storage image ID, which includes a value for the manufacturer, machine type, and serial number. The `-dev` parameter temporarily overrides any defined value for `devid` for the current command. The storage image ID is required for the following situations:

- If you do not specify a fully qualified extent pool ID
- If you do not set the `devid` variable in your profile or through the `setenv` command
- If the HMC is aware of more than one storage image

-extpool extentpool_ID

(Required) Creates the base or alias volumes from data extents that are contained in this extent pool. The extent pool storage type defines the volume storage type. An extent pool ID is a four-digit decimal number with no leading zeros, prefixed with the letter *P*.

-os400 A01 | A81 | A02 | A82 | A04 | A84 | A05 | A85 | A06 | A86 | A07 | A87 | 050 | 099

(Optional) The OS/400 volume options. If this parameter is not specified, the default standard 2107/1750 volume is created.

This parameter, with a specified *Axx* value, is required if the `-cap` parameter is not specified because the *Axx* values also indicate a specific capacity. However, because the *Oxx* values do not indicate any capacity, the `-cap` parameter is required with the *Oxx* values to specify the capacity of the IBM i volume.

The storage sizes and the data types for this volume are listed in the following table:

| Volume | Volume Size | Volume | Volume Size |
|-----------------|-------------|-----------------|-------------|
| A01 protected | 8.59 GB | A81 unprotected | 8.59 GB |
| A81 unprotected | 8.59 GB | A01 protected | 8.59 GB |
| A02 protected | 17.55 GB | A82 unprotected | 17.55 GB |
| A82 unprotected | 17.55 GB | A02 protected | 17.55 GB |
| A05 protected | 35.17 GB | A85 unprotected | 35.17 GB |
| A85 unprotected | 35.17 GB | A05 protected | 35.17 GB |
| A04 protected | 70.56 GB | A84 unprotected | 70.56 GB |
| A84 unprotected | 70.56 GB | A04 protected | 70.56 GB |
| A06 protected | 141.12 GB | A86 unprotected | 141.12 GB |
| A86 unprotected | 141.12 GB | A06 protected | 141.12 GB |
| A07 protected | 282.35 GB | A87 unprotected | 282.35 GB |
| A87 unprotected | 282.35 GB | A07 protected | 282.35 GB |
| 050 unprotected | variable | 099 protected | variable |

Decimal gigabyte (GB) is 10⁹ bytes.

Note: You must ensure that the volume data type is compatible with the host systems that can access this volume.

-type ess | ds | blocks

(Optional) The unit type of capacity that is specified by the `-cap` parameter.

ess

The unit is decimal gigabytes (GB) 10⁹ bytes.

ds

The unit is gibibytes (GiB) 2³⁰ bytes.

blocks

The unit is 512 blocks.

TiB

The unit is tebibytes (TiB) 2⁴⁰ bytes. This value is an alias of ds.

GiB

The unit is gibibytes (GiB) 2³⁰ bytes.

MiB

The unit is mebibytes (MiB) 2²⁰ bytes.

Notes:

1. If the **-type** parameter is not specified, the lun is created as type **ds**.
2. The **-type** parameter is ignored when the **-os400** parameter is specified.

-cap capacity

(Optional) The storage size that is allocated to this volume object. The maximum volume size varies and depends on model and type.

Note: This parameter is required if the **-os400** parameter is not specified.

- If the **-type** parameter is omitted or the **-type ds** parameter is specified, the capacity value is the volume size in gibibytes (GiB), where one gibibyte (GiB) = 1 073 741 824 (2³⁰ bytes).
- If the **-type ess** parameter is specified, the capacity value is the volume size in gigabytes (GB), to the nearest 1/10 GB (format xxxx.x), where 1 GB = 1 000 000 000 (10⁹ bytes).
- If the **-type blocks** parameter is specified, the capacity value is the volume size in 512-byte blocks.

-name volume_name

(Optional) Your nickname for this volume. The nickname can be 16 characters in length and can contain one of the following wildcard characters:

- #d decimal volume ID
- #h hexadecimal volume ID

-volgrp volume_group_ID

(Optional) Which volume group the volumes are assigned. A volume group ID is a four-digit decimal number with no leading zeros, prefixed with the letter V.

-wait

(Optional) Delays the command response until the volume configuration processes complete.

Note: If you specify this parameter, you must wait until your original command processes completely before you can enter a new command.

-sam standard | tse | ese

(Optional) The storage allocation method as follows:

standard

Designates that you want the system to fully allocate the volume with real extents when it creates the volumes. This value is the default.

tse

Designates that you want the system to create track space-efficient volumes. After creation, these space-efficient volumes contain a set of virtual extents that are associated with the space-efficient storage in the same extent pool. The physical space for a given logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

To use this subparameter, you must have previously created space-efficient storage (by using the **mksestg** command) for the extent pool.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.

ese

Designates that an extent space efficient (ESE) logical volume is provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and de-allocated from the extent pool. ESE volumes are used for thin provisioning.

Note: To use this subparameter, you must have previously created space-efficient storage (by using the **mksestg** command) for the extent pool.

-eam rotateexts | rotatevols

(Optional) The extent allocation method as follows:

rotateexts

The extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. This means that the extents for a particular volume will be allocated from one rank, while the extents for the next volume will be allocated from the next successive rank, and so on.

-perfgp performance_group_ID

(Optional) The performance group ID that the volumes are assigned to. The performance group ID begins with the letters *PG*. The default is *PG0*.

-resgrp resource_group_ID

(Optional) The resource group that the volumes are assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number. The default is *RG0*.

Note: If you create any fixed block LSSs with this command, the LSSs are assigned to the same resource group as the logical volumes.

-t10dif

(Optional) The CRC-16-T10-DIF algorithm is being used to store data.

Note: The **-t10dif** and **-os400** parameters cannot be used together.

volume_ID ... | -

(Required) An array of one or more fixed block volume IDs to be created. The volumes must share a common logical subsystem ID.

The volume ID format is four hexadecimal characters *XYZZ* that represents the following values.

X

The address group, 0–F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

To specify a range of volume IDs, separate the volume IDs with a dash (-).

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

Example: 0100-010F 0180-018F 0120

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Creating open systems fixed block (FB) volumes in a system

```
dscli> mkfbvol -dev IBM.2107-75FA120
-extpool P1 -name my_vol_#d -type ess -cap 8.6
-sam ese 0100 0101 0102 0103
```

Output

```
FB volume 0100 successfully created.
FB volume 0101 successfully created.
FB volume 0102 successfully created.
FB volume 0103 successfully created.
```

Example 2: Creating open systems fixed block (FB) volumes in a system

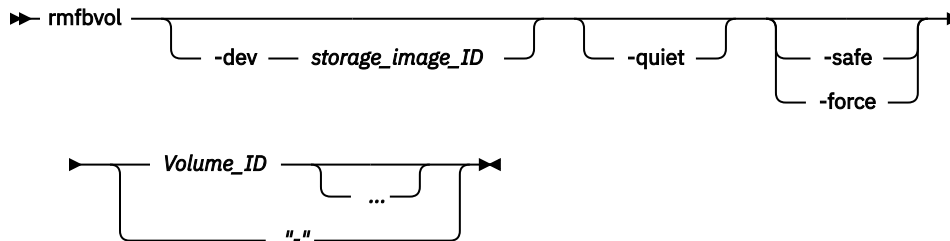
```
dscli> mkfbvol -extpool p0 -os400 050 -cap 5 0002
```

Output

```
CMUC00025I mkfbvol: FB volume 0002 successfully created.
```

rmfbvol

The **rmfbvol** command deletes fixed block volumes from a storage image.



Parameters

Notes:

1. You can use this command when there are volumes that are in the configuration error state. To correct this configuration state, issue the **rmfbvol** command for each affected volume. You can specify a volume range according to the command specifications when it is appropriate.
2. Before Release 5.1, the storage system did not check before deleting a volume. With Release 5.1 and later, the storage system does not delete a volume that is in use. The phrase *in use* means that the volume is participating in a Copy Services relationship or is in a z/OS path group. Use the **-force** parameter to bypass the in-use checking and delete the volume. Use the **-safe** parameter for an additional check for volume participation in a non-default volume group before deleting the volume.

-dev storage_image_ID

(Optional) The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID for all logical volumes, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev* for the current command.

-quiet

(Optional) Turns off the volume removal confirmation prompt for this command.

-safe

(Optional) Runs a check to see whether the specified volumes are assigned to any non-default volume groups. If any volumes are still assigned to a user-defined volume group, the **rmfbvol** command fails without deleting any volumes. During this occurrence, messages are provided which list the volumes that are still assigned to a user-defined volume group.

Notes:

- If there is any reason that the system cannot run the check, the **rmfbvol** command fails and no volumes are deleted.
- The **-safe** and **-force** parameters cannot be specified at the same time.

-force

(Optional) Deletes specified volumes without checking to see whether the volumes are in use. The phrase *in use* means that the volume is participating in a Copy Services relationship or is in a z/OS path group. If multiple volumes are specified and some are in use and some are not, the ones not in use can be deleted.

Note: The **-safe** and **-force** parameters cannot be specified at the same time.

Volume_ID ... | -

(Required) An array of one or more fixed block volume IDs to be removed. This parameter also accepts a fully qualified volume ID, which includes the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified.

Example of -dev parameter use

If you specify the **-dev** parameter, you can use the shortened version of the **Volume_ID** parameter as follows:

```
dscli> rmfbvol -dev IBM.2107-75FA120 0100-010F 0180-018F 0120
```

If you do not specify the **-dev** parameter and you specify the *Volume_ID* variable, you must use the fully qualified version of the volume ID as follows:

```
dscli> rmfbvol IBM.2107-75FA120/0100-010F 0180-018F 0120
```

The volume ID is a 32 bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0–F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

To specify a range of volume IDs, separate the volume IDs with a hyphen.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Deleting fixed block volumes from a storage image

```
dscli> rmfbvol -dev IBM.2107-75FA120 0100 0101
```

Output

```
Are you sure you want to delete 0100? y/n Y
Volume 0100 successfully deleted.
Are you sure you want to delete 0101? y/n Y
Volume 0101 successfully deleted.
```

Example: Removing a range of Volume IDs

```
dscli> rmfbvol -dev IBM.2107-75FA120 0005-0024
```

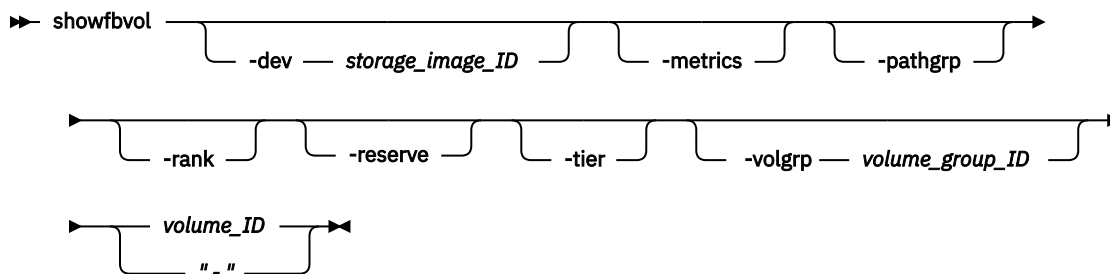
```

CMUC00027W rmbvol: Are you sure you want to delete FB
volume 0005-0024?
[y/n]:y
CMUC00028I rmbvol: FB volume 0005 successfully deleted.
CMUC00028I rmbvol: FB volume 0006 successfully deleted.
CMUC00028I rmbvol: FB volume 0007 successfully deleted.
CMUC00028I rmbvol: FB volume 0008 successfully deleted.
CMUC00028I rmbvol: FB volume 0009 successfully deleted.
CMUC00028I rmbvol: FB volume 000A successfully deleted.
CMUC00028I rmbvol: FB volume 000B successfully deleted.
CMUC00028I rmbvol: FB volume 000C successfully deleted.
CMUC00028I rmbvol: FB volume 000D successfully deleted.
CMUC00028I rmbvol: FB volume 000E successfully deleted.
CMUC00028I rmbvol: FB volume 000F successfully deleted.
CMUC00028I rmbvol: FB volume 0010 successfully deleted.
CMUC00028I rmbvol: FB volume 0011 successfully deleted.
CMUC00028I rmbvol: FB volume 0012 successfully deleted.
CMUC00028I rmbvol: FB volume 0013 successfully deleted.
CMUC00028I rmbvol: FB volume 0014 successfully deleted.

```

showfbvol

The **showfbvol** command displays detailed properties for an individual fixed block (FB) volume. Detailed information includes performance metrics of an FB volume and information about Safeguarded Copy capacity.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID. It is also required if you do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-metrics

(Optional) Displays volume ID and performance metrics for the specified volume.

Notes:

1. All performance counts are an accumulation since the most recent counter wrap or counter reset. Volume performance counters are reset on a power-up sequence. Volume performance counters are reset by a server failover and failback sequence.
2. Do not use this parameter with the **-pathgrp**, **-rank**, **-reserve**, **-tier**, or **-volgrp** parameters.

-pathgrp

(Optional) Displays the path group status table, which contains path group information. This information includes the path group ID, the grouped, reserved, and path mode status.

Do not use this parameter with the **-metrics**, **-rank**, **-reserve**, **-tier**, or **-volgrp** parameters.

-rank

(Optional) A rank extents table is to be displayed. This table displays the set of ranks that the logical volume has extents that are configured on and the number of extents for that logical volume.

Note: Do not use this parameter with the **-metrics**, **-pathgrp**, **-reserve**, **-tier**, or **-volgrp** parameters.

-reserve

(Optional) Displays the SCSI reserve status table, which contains SCSI reserve information. This information includes the WWPN, type, and the I/O port ID.

Do not use this parameter with the **-metrics**, **-pathgrp**, **-rank**, **-tier**, or **-volgrp** parameters.

-sgc recovered

(Optional) Whether the relation is a safeguarded recovery.

-tier

(Optional) Displays the tier distribution table. The set of tiers are displayed with allocated storage for the specified logical volume and the percentage of the logical volume that is allocated on each tier.

Do not use this parameter with the **-metrics**, **-pathgrp**, **-rank**, **-reserve**, or **-volgrp** parameters.

-volgrp volume_group_ID

(Required if you do not specify the *volume_ID* parameter.) The fixed block volumes that are associated with the designated volume group ID are to be displayed.

Notes:

1. You can use the **-volgrp** parameter only when you are doing a query for performance metrics.
2. Do not use the **-volgrp** parameter with the *volume_ID* parameter.
3. Do not use the **-volgrp** parameter with the **-metrics**, **-pathgrp**, **-rank**, **-reserve**, or **-tier** parameters.

volume_ID | -

(Required if you do not specify the **-volgrp** parameter.) Displays information for the specified volume. This parameter accepts a fully qualified volume ID, which consists of the *storage_image_ID* or a shortened version without the storage image ID, if you specify the **-dev** parameter. The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0-F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Note: Do not use the *volume_ID* parameter with the **-volgrp** parameter.

Example: Showing volume properties

The following tables represent the headers that are displayed on the output reports that are associated with the **showfbvol** command that uses the **-rank** parameter. When the rank parameter is specified, a rank extents table is also displayed. It appears at the end of the regular report.

Note: The example output is based on using the **showfbvol** command for a 1.0 gibibyte (GiB) volume. When the rank parameter is specified, a rank extents table is displayed at the end of the regular report.

```
dscli> showfbvol -dev IBM.2107-1300861 -rank 0000
```

Output

| Name | ID | acc state | data state | config state | device MTM | data type | addrgrp |
|-------------|------|-----------|------------|--------------|------------|-----------|---------|
| RegrFB Vol1 | 0006 | Online | Normal | Normal | 2107-900 | FB 512 | 0 |

| extpool | exts | captype | cap (2^30B) | cap (10^9B) | cap (blocks) | volgrp | ranks | dbexts |
|---------|------|---------|-------------|-------------|--------------|--------|-------|--------|
| P0 | 1 | DS | 1.0 | - | 2097152 | - | 1 | 0 |

| sam | repcapalloc | eam | reqcap (blocks) |
|----------|-------------|---------|-----------------|
| Standard | - | managed | 2097152 |

| realexents | virtualextents | migrating | perfgrp | migratingfrom | resgrp |
|------------|----------------|-----------|---------|---------------|--------|
| 1 | 2 | 0 | PGO | - | RG0 |

| etmonpauseremain | etmonitorreset | GUID |
|------------------|----------------|----------------------------------|
| - | unknown | 6005076303XXC0XD0000000000000000 |

| safeguarded | safeguardedcap (2^30B) | safeguardedloc | SGC Recovered |
|-------------|------------------------|----------------|---------------|
| Yes | 16.0 | mypool_1 | Yes |

=====Rank extents=====

| Rank | Extents | Capacity(MiB) |
|------|---------|---------------|
| R0 | 1 | 1 |
| R2 | 2 | 1 |

Output definitions (*-metrics* parameter not specified)

Name

The nickname that you assigned for this volume object.

ID

The unique identifier that is assigned to this volume object.

Accstate

One of the following access states are displayed: Online or Fenced.

Online

The logical volume is accessible to a host.

Fenced

The logical volume is in the volume fenced state and is not accessible to the host.

Datstate

One of the following data states are displayed:

Normal

None of the other data states apply. The access state is Online.

Pinned

None of the other data states apply and the logical volume has one or more pinned non-retryable tracks. The access state is Online.

Read only

The logical volume can be read but not written to because one or more extents on the logical volume are on a rank in the read only data state. The access state is Online.

Inaccessible

One or more extents that are associated with the logical volume are on a rank that is in the inaccessible data state. The access state is Fenced.

Virtual space fault

The logical volume has a storage allocation method of extent space-efficient or track space-efficient. Not enough space was available to convert a virtual logical track to a real logical track. The access state is Online.

Indeterminate data loss

The following data states do not apply and that one of the following conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - one of the following conditions occurred:

- Committed write data was lost before it was de-staged and the track identifiers that are associated with the data are unknown.
- Data was lost that indicated extents on the logical volume were active FlashCopy targets.

The access state is Fenced.

Rank failed

One or more extents that are associated with the logical volume are on a rank that is in the Failed data state. The access state is Fenced. This data state changes to Rank repairing if the rank changes to the Rank repairing state through use of the repair array function.

Rank Repairing

One or more extents that are associated with the logical volume are on ranks in the repairing data state. The access state is Fenced.

Rank Repaired

One or more extents that are associated with the logical volume are on ranks that were in the repairing state, but are not in the repairing state now. The access state is Fenced.

Global inaccessible

Global metadata that is associated with the logical volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate. The access state is Fenced.

Global lost

Global metadata that is associated with the logical volume configuration was lost. As a result, some of the data that is associated with the logical volume might be inaccurate. The access state is Fenced.

NVS data inaccessible

Active nonvolatile storage (NVS) data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible. The access state is Fenced.

Configstate

One of the following configuration states are displayed:

Normal

No logical volume configuration operations are in progress, and the volume is not being deconfigured, merged, or migrated.

Configuring

The logical volume is being configured for the first time.

Reconfiguring

The logical volume is allocating or de-allocating extents due to a modification of the requested capacity attribute after initial creation.

Deconfiguring

The logical volume is being deleted.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the volume. If you have a volume in this state, use the **rmfbvol** command to delete each volume that is listed with the configuration state "configuration error".

Merging

The volume is being merged. For example, merging from one extent pool to a different extent pool.

Migrating

The volume is migrating, or waiting to be migrated.

Migration Cancelled

The volume was migrating and then the 'migcancel' action of the **manageckdvol** command was issued. This process left some extents waiting to be migrated in the source pool while other extents were migrated to the target pool. Migration stopped, and cannot be resumed. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Paused

The volume was migrating and then the 'migpause' action of the **manageckdvol** command was issued. Migration stopped, but can be resumed.

Migration Error

The volume migration process failed to complete successfully. This state reflects an internal error condition and not an error in the user's request to migrate a volume. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Reconfiguration error

The reconfiguration request did not complete successfully.

Deconfiguration error

A request to delete a volume did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmfbvol** command for the designated volume.

Transposition Error

The volume is in an extent pool that was unsuccessfully merged. This state reflects an internal error condition. **Corrective action:** Use the **chextpool** command with the **-merge** parameter again to redrive the merge extent pool and to correct this state.

device MTM

The volume device type and the machine type. The volume MTM value is determined by the fixed block volume data type and the provisioned capacity (in GB). The machine type is either 2107 or 1750; however, the MTM value can be any one of the following depending on your system:

2107-900

A standard 2107 volume.

1750-500

A standard 1750 volume.

xxxx-A0x

The xxxx is 2107 or 1750; the A0 indicates a System i protected volume (for example, 2107-A01 or 1750-A07).

xxxx-A8x

The xxxx is 2107 or 1750; the A8 indicates a System i unprotected volume (for example, 2107-A81 or 1750-A87).

Datatype

The volume data type setting. One of the following values is displayed:

- FB 512
- FB 512T
- FB 520P
- FB 520U

Addrgrp

The address group that contains the designated volume object. An address group ID is one hexadecimal character (0 - F).

Extpool

The extent pool ID. Volume extents are allocated from this extent pool ID.

Note: Volumes that belong to an encrypted extent pool are encrypted. You can see the key group of an extent pool by using the **lsxtpool -1**, or **showxtpool** commands.

Exts

The number of real and virtual extents that are used by the designated volume ID.

Capttype

The capacity unit type that is used at volume creation. One of the following values is displayed:

ESS

The capacity unit is decimal gigabytes (GB).

DS

The capacity unit is gibibytes (GiB).

DS/ESS

The capacity unit is gibibytes (GiB) or decimal gigabytes (GB).

Blocks

The capacity unit 512 B.

iSeries

The capacity unit was not specified at volume creation. This fixed block volume was created for IBM Z systems.

cap (MiB)

The size of volume that is available for host system access in MiB(2^{20} B).

Cap (2³⁰B)

The size of the volume that is available for host system access in gibibytes GiB(2^{30} B).

Note: " - " is displayed if the capacity unit type of the volume is ESS (capttype=ESS)

Cap (10⁹B)

The size of volume that is available for host system access in decimal gibibytes GiB(10^9 B).

Note: " - " is displayed if the capacity unit type of the volume is DS (capttype=DS)

Cap blocks

The quantity of volume logical blocks that are available for host system access.

Volgrp

The volume groups (excluding default volume groups) that a volume belongs to.

Multiple volume groups that are associated with the volume are separated by a comma.

A " - " displays if no volume groups exist that are associated with the volume.

Unknown displays if information about the volume groups is not available.

Ranks

The number of ranks that the volume resides on.

SAM

The storage allocation method. The following values are displayed:

standard

Designates that the system fully allocated the volume with real extents at volume creation time.

tse

Designates that a track space-efficient logical volume contains a set of virtual extents that are associated with the space-efficient storage in the same extent pool. Physical space for a given logical track on a track space-efficient logical volume is dynamically allocated and deallocated from the repository in the space-efficient storage.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.

ese

Designates that an extent space efficient logical volume is provisioned with a set of virtual extents that are associated with the space efficient storage in the same extent pool. Physical space for an extent space efficient logical volume is dynamically allocated and deallocated from the extent pool.

Repcapalloc

The allocated physical repository capacity of the track space-efficient storage. This value is calculated on the available repository capacity as a result of writes to the track space-efficient volume. This value is displayed in the format of X.Y, where X is in whole gibibytes (GiB) and Y represents tenths of a GiB, which is limited to a single digit (0 - 9). .

Note: A " - " value is displayed in this column.

EAM

The extent allocation method that is to be used if the volume is migrated or expanded. One of the following values is displayed:

legacy

Designates that the volume was created before the use of the current algorithm.

rotateexts

The extents for each new logical volume are allocated across all available ranks, and is also known as storage-pool striping. This value is the default.

rotatevols

The extents for each new logical volume are allocated from each successive rank. This means that the extents for a particular volume will be allocated from one rank, while the extents for the next volume will be allocated from the next successive rank, and so on.

managed

The extents are currently managed by Easy Tier, and the extents for any new volumes are initially allocated across all available ranks in the lowest tier of storage.

" - "

The value " - " is displayed if the extent allocation method does not apply, for example, track space-efficient logical volumes.

Reqcap (blocks)

The requested quantity of volume logical block (for example, 3339).

realextents

The number of real extents that are used by the logical volume.

virtualextents

The number of virtual extents that are used by the logical volume.

realcap(MiB)

The number of real capacity that is used by the logical volume in MiB(2²⁰B).

migrating

The number of extents for this volume that are currently being migrated.

migratingcap(MiB)

The capacity for this volume that is being migrated in MiB(2²⁰B).

migratingfrom

A list of one or more extent pool IDs where the extents are migrating from. If no migrating extents exist, a dash "-" is displayed. Unknown is displayed if information about the extent pool IDs is not available.

perfgrp

The performance group ID that the volume is assigned to. The performance group ID begins with the letters *PG* and ends with a decimal number.

resgrp

The resource group ID that the volume is assigned to. The resource group ID begins with the letters *RG* and ends with a decimal number.

tierassignstatus

Status of assigning a volume to a target tier.

Assign Pending

An assign action was specified, but has not started.

Assign Pending Hardware

An assign action was specified, but not started because of a hardware condition.

Assigning

An assign action is in progress.

Assigned

The volume was assigned to the specified tier.

Unassign Pending

An unassign action was specified, but has not started.

Error

An assign action failed. See the **tierassignerror** value for the reason.

Unknown

An assign action was specified, but the specific action is unknown.

" - "

No assign action was specified (none).

tierassignerror

Failure reason if assign action status is Error.

Easy Tier not active

Easy Tier is not active. See the **etmanaged** column from **lsextpool** to view whether the volume is in a pool that is managed by Easy Tier.

Use `manageckdvol -action tierunassign` to unassign the volume, ensure that the pool is managed by Easy Tier (see **chsi**), and then use `manageckdvol -action tierassign` to assign the volume again.

Target Tier not available

The specified target tier does not currently exist. Use `manageckdvol -action tierunassign` to unassign the volume, ensure that space is available on the specified tier, and then use `manageckdvol -action tierassign` to assign the volume again.

Tier definitions have changed

The target tier was valid, but defined tiers changed internally and the target tier is no longer valid. Use `manageckdvol -action tierunassign` to unassign the volume, and then use `manageckdvol -action tierassign` to assign the volume again.

" _ "

The assign status is not Error.

tierassignorder

The method that is used to define the assigning order.

Access

Assign extents only when accessed.

ETdata

Assign high usage extents first, based on Easy Tier data.

Unknown

Unknown assigning order method.

" _ "

No assign action was specified.

tierassigntarget

Assign action target tier.

FlashTier0

The tier of high performance flash drives.

FlashTier1

The first tier of high capacity flash drives.

FlashTier2

The second tier of high capacity flash drives.

ENT

Enterprise tier that consists of drives with speeds of 10K RPM, 15K RPM, or a mixtures of 10K RPM and 15K RPM speeds.

NL

Nearline tier consists of high-volume disks that are either SATA or SAS Nearline drives.

HDDExclude

Any tier except Enterprise (ENT) or Nearline (NL).

NLExclude

Enterprise tiers but not a Nearline tier.

" _ "

No assign action was specified.

%tierassigned

The percentage of the provisioned capacity that is assigned. The value is 0 (zero) if the volume is not assigned to a tier.

etmonpauseremain

The pause in Easy Tier monitoring. One of the following values is displayed:

OH1M-168H0M

The time (in hours and minutes) that remains of the pause in the Easy Tier monitoring process.

infinite

Easy Tier monitoring remains paused until a resume action is submitted.

-

The dash (-) specifies that Easy Tier monitoring is not paused.

unknown

The system failed to query the time that remains of the pause.

etmonitorreset

Easy Tier extent pool monitoring reset date is as follows.

date

The date of the last Easy Tier monitoring reset in ISO 8601 format: yyyy-MM-dd 'T' HH:mm:ssZ, where

yyyy

Year

MM

Month (01-12)

dd

Day (01-31)

T

Single letter T without quotes

HH

Hour (00-23)

mm

Minutes (00-59)

ss

Seconds (00-59)

Z

Time zone offset from UTC [-HHmm | +HHmm]

unknown

The date in which Easy Tier monitoring of this extent pool was last reset is not known.

unsupported

Easy Tier extent pool management is not supported.

GUID

The GUID (Globally Unique Identifier): The NAA (Network Addressing Authority) unique value that identifies a volume object.

safeguarded

Whether Safeguarded Copy is enabled for the specified volume.

safeguardedcap(cyl)

The amount of safeguarded backup capacity that is reserved for Safeguarded Copies.

safeguardedcapstate

The state of the volume that contains safeguarded virtual capacity for the volume.

Normal

No volume expansion operations are in progress.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the volume. If you have a volume in this state, use the **rmfbvol** command to delete each volume that is listed with the configuration state of "configuration error".

Configuring

The volume is in the process of being configured for the first time.

Deconfiguring

The volume is being deleted.

Deconfiguration error

A request to delete a volume did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmfbvol** command for the designated volume.

Expanding

The volume is expanding.

Global inaccessible

The global metadata that is associated with the volume configuration is inaccessible. Some of the data that is associated with the volume might be inaccurate. The access state is fenced.

Global lost data

Global metadata that is associated with the volume configuration was lost. As a result, some of the data that is associated with the volume might be inaccurate. The access state is fenced.

Inaccessible

One or more extents that are associated with the volume are on a rank that is in the inaccessible data state. The access state is fenced.

Indeterminate data loss

The following data states do not apply and that one of the following conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - one of the conditions occurred:

- Committed write data was lost before it was destaged and the track identifiers that are associated with the data are unknown.
- Data was lost that indicates that extents on the volume were active FlashCopy targets.

The access state is fenced.

Merging

The volume is merging. For example, merging from one extent pool to a different extent pool.

Migrating

The volume is migrating, or waiting to be migrated.

Migration Cancelled

The volume was migrating and then the 'migcancel' action of the **manageckdvol** command was issued. Some of the extents were waiting to be migrated in the source pool while other extents already migrated to the target pool. Migration stopped, and cannot be resumed. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Error

The volume migration process failed to complete successfully. This state reflects an internal error condition and not an error in the request of the user to migrate a volume. If you have a volume in this state, try to migrate it again to the original source or target extent pool.

Migration Paused

The volume was migrating and then the 'migpause' action of the **manageckdvol** command was issued. Migration stopped, but can be resumed.

NVS data inaccessible

Active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible. The access state is fenced.

Rank failed

One or more extents that are associated with the volume are on a rank that is in the Failed data state. The access state is Fenced. This data state transitions to the Rank repairing state if the rank transitions to the Rank repairing state through use of the repair array function.

Rank Repaired

One or more extents that are associated with the volume are on ranks that were in the repairing state, but are not in the repairing state now. The access state is fenced.

Rank Repairing

One or more extents that are associated with the volume are on ranks in the repairing data state. The access state is fenced.

Read only

The logical volume is read only because one or more extents on the volume are on a rank in the read only data state. The access state is Online.

Reconfiguration error

The reconfiguration request did not complete successfully.

Reconfiguring

The volume is allocating or deallocating extents due to a modification of the requested capacity attribute after initial creation.

Transposition Error

The volume is in an extent pool that was unsuccessfully merged. This state reflects an internal error condition. **Corrective action** Use the **chextpool** command with the **-merge** parameter again to redrive the merge extent pool and to correct this state.

Virtual space fault

The volume has a storage allocation method of track space-efficient. Not enough space was available to convert a virtual logical track to a real logical track. The access state is Online.

safeguardedloc

The pool where the Safeguarded Copies are written to.

SGC Recovered

Whether the volume has been recovered to a recovery volume.

Output definitions (-rank parameter specified)**Rank (Rank Extent table)**

The rank ID.

Extents (Rank Extents table)

The number of extents for the volume on the rank.

Capacity(MiB)(Rank Extents table)

The capacity for the volume on the rank in MiB (2²⁰B).

Example: Showing performance metrics

The following tables represent the headers that are displayed on the output reports that are associated with the **showfbvol** command using the **-metrics** parameter.

```
dscli> showfbvol -metrics IBM.2107-75FA120/0101
```

Output

| ID | Date | norm rdreqs | norm rdhits | norm write req | norm write hits | seq read reqs | seq read hits | seq write req |
|-----------------------|--------------------------|----------------|----------------|----------------------|-----------------------|---------------------|---------------------|---------------------|
| IBM.2107-75FA120/0101 | 10/11 /04 02:23:49 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| seqwrite- hits | cachfwr- reqs | cachfwr- hits | cachfw- reqs | cachfw- hits | inbcach- load | bypass- cach | seq DASD trans |
|-------------------|------------------|------------------|-----------------|-----------------|------------------|-----------------|----------------------|
| 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| DASD-trans | cache-trans | NVS-spadel | norm write ops | seqwrite-ops | rec cache mis | qwrite-prots | CKDir-trkac |
|------------|-------------|------------|----------------|--------------|---------------|--------------|-------------|
| 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 0 |

| CKD irtrk hits | cachsp-delay | timelow-ifact | phread | phwrite | phwrite | phbyte-read | phbyte-writ |
|----------------|--------------|---------------|--------|---------|---------|-------------|-------------|
| 0 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| recmo-reads | sfile trk reads | contam-wrts | PPRC-trks | NVS-spallo | time-phread | timeph-write | byte-read |
|-------------|-----------------|-------------|-----------|------------|-------------|--------------|-----------|
| 10000 | 0 | 0 | 10000 | 10000 | 10000 | 10000 | 10000 |

| bytewrit | timeread | timewrite | zHPFRead | zHPFWrite |
|----------|----------|-----------|----------|-----------|
| 10000 | 10000 | 10000 | - | - |

| zHPFPrefetchReq | zHPFPrefetchHit | GMCollisions-SidefileCount | GMCollisions-SendSyncCount |
|-----------------|-----------------|----------------------------|----------------------------|
| 0 | 0 | 0 | 0 |

Output definitions (*-metrics* parameter specified)

ID

The unique identifier that is assigned to this volume object.

Date

The current time stamp for the volume performance counters.

normrdqrts

Search/Read Normal I/O Requests.

normrdhits

Search/Read Normal I/O Requests instances.

normwritereq

Write Normal I/O Requests.

normwritehits

DASD Fast Write I/O Request instances.

seqreadreqs

Search/Read Sequential I/O Requests.

seqreadhits

Search/Read Sequential I/O Request instances.

seqwritereq

Write Sequential I/O Requests.

seqwritehits

DASD Fast Write Sequential I/O Request instances.

cachfwrreqs

Search/Read Cache Fast Write I/O Requests.

cachfwrhits

Search/Read Cache Fast Write I/O Request instances.

cachfwreqs

Cache Fast Write I/O Requests.

cachfwhits

Cache Fast Write I/O Requests instances.

inbcachload

Inhibit Cache Loading I/O Requests that operate with DASD.

bypasscach

Bypass Cache I/O Requests.

seqDASDtrans

Sequential DASD to Cache Transfer Operations.

DASDtrans

DASD to Cache Transfer Operation Count.

cachetrans

Cache to DASD Transfer Operation Count.

NVSspadel

DASD Fast Write Operations Delayed Due to nonvolatile storage Space Constraints.

normwriteops

Normal 'DASD Fast Write' Write Operation Counts.

seqwriteops

Sequential Access 'DASD Fast Write' Write Operation Counts.

reccachemis

Number of record cache Read Misses.

qwriteprots

Quick Write Promotes.

CKDirtrak

Irregular Track Accesses. The value 0 (zero) is displayed for a fixed block volume.

CKDirtrkhits

Irregular Track Accesses instances. The value 0 (zero) is displayed for a fixed block volume.

cachspdelay

Operations Delayed Due To Cache Space Constraints.

timelowifact

The milliseconds of lower interface I/O activity for the indicated device.

phread

Physical Storage Read Operations.

phwrite

Physical Storage Write Operations.

phbyteread

Physical Storage Bytes Read in 128 KB increments.

phbytewrit

Physical Storage Bytes Written in 128 KB increments.

recmoreads

Record Mode Read Operations.

sfiletrkreads

The number of tracks that are read from the Concurrent Copy or XRC Sidefile. The value 0 (zero) is displayed for a fixed block volume.

contamwrts

The Number of Contaminating writes for a Concurrent Copy or XRC volume. The value 0 (zero) is displayed for a fixed block volume.

PPRCtrks

The number of tracks or portion of tracks that were transferred to the secondary device of a PPRC pair.

NVSspallo

The NVS Space Allocations.

timephread

The Physical Storage Read Response Time in 16 ms increments.

timephwrite

The Physical Storage Write Response Time in 16 ms increments.

byteread

The number of Bytes read in 128 KB increments.

bytewrit

The number of Bytes written in 128 KB increments.

timeread

The accumulated response time for all read operations.

timewrite

The accumulated response time for all write operations.

zHPFRead

The HPF Read I/O Requests for volume performance statistics.

zHPFWrite

The HPF Write I/O Requests for volume performance statistics.

zHPFPrefetchReq

The number of HPF Pre-fetch I/O requests.

zHPFPrefetchHit

The number of HPF Pre-fetch I/O request hits.

GMCollisionsSidefileCount

The number of Global Mirror Collisions sidefile.

GMCollisionsSendSyncCount

The number of Global Mirror Collisions Send Synchronous Count.

Example: Showing tier statistics

```
dscli> showfbvol -tier 0000
```

Output

```

Name                myvol0800
ID                  0800
accstate            Online
datastate           Normal
configstate         Normal
...
migrating           20
perfgrp             PG0
migratingfrom       P0
resgrp              RG1
tierassignstatus    Assigning
tierassignerror     -
tierassignorder     ETdata
tierassigntarget    FlashTier0
%tierassigned       54
etmonpauseremain   1H44M
etmonitorreset      2013-07-26T14:00:00+07
===== Tier Distribution =====
Tier %allocated
=====
FlashTier0          54
ENT                  46

```

Output definitions (*-tier* parameter is specified)

Tier

Tier ID

FlashTier0

The tier of high performance flash drives.

FlashTier1

The first tier of high capacity flash drives.

FlashTier2

The second tier of high capacity flash drives.

ENT

Enterprise tier, which consists of drives with speeds of 10K RPM, 15K RPM, or a combination of drives of both speeds.

NL

Nearline tier, which consists of high volume SATA or SAS Nearline disk drives.

Unknown

Tier is unknown.

%allocated

The percentage of provisioned capacity on this tier.

Example 4: Using the *-pathgrp* parameter

If you specify the *-pathgrp* parameter and no path groups exist for this volume, the following message is displayed.

```
CMUC00234I lsfbvol: No Path Groups found.
```

If you specify the *-pathgrp* parameter and path groups exist for this volume, a path group status table is appended to the resulting output.

```
dscli> showfbvol -pathgrp efff
```

Output

```
Name          efff
ID            EFFF
accstate      Online
datastate     Normal
configstate   Normal
...
migrating     0
perfgroup    PG31
migratingfrom -
resgroup      RG62
=====Path Group status=====
GroupID      State      Reserve   Mode      Sysplex
=====
800002B9472827CA78BC17  Ungrouped  Disabled  Single    N/A
880005B9472827CAAD6FBA  Grouped    Disabled  Multi-path N/A
800009B9472827CAC684B9  Ungrouped  Disabled  Single    PLEXM1
```

Output definitions (*-pathgrp* parameter is specified)

GroupID

The path group ID. An 11-byte value that is displayed as 22 hexadecimal characters.

Note: The path group ID is supplied by the host and is not interpreted further by the storage system. This means that the hosts are free to define, or redefine, the meaning of this value with no impact to the storage system. However, some programs such as ICKDSF break down the ID into distinct fields with the following partial display of the ICKDSF logical path status table.

```
+-----+
|          PATH GROUP ID          | ...
+-----+-----+-----+-----+
| ID | SERIAL | TYPE | CPU | CPU TIME |
|    |        |     |    |         | ...
```

```

+-----+-----+-----+-----+
|800002|B947  |2827|CA78BC17| ...
+-----+-----+-----+-----+
|880005|B947  |2827|CAAD6FBA| ...
+-----+-----+-----+-----+
|800009|B947  |2827|CAC684B9| ...
+-----+-----+-----+-----+

```

For more information, see [ICKDSF User's Guide and Reference](#).

State

The grouped state of this path group. Valid state values are "Grouped" or "Ungrouped".

Reserve

The reserved state of this path group. Valid state values are "Enabled" or "Disabled".

Mode

The path mode for this path group. Valid mode values are "Single" or "Multi-path".

Sysplex

The z/OS sysplex name. If the name is not set or available, N/A is displayed.

Example 5: Using the -reserve parameter

If you specify the **-reserve** parameter and there are no SCSI reservations for this volume, the following message is displayed.

```
CMUC00234I lsfbv01: No SCSI reservations found.
```

If you specify the **-reserve** parameter and SCSI reservations exist for this volume, the SCSI reservation attributes and a SCSI reserve port table is appended to the resulting output.

```
dscli> showfbv01 -reserve 0200
```

Output

```

ID                0200
accstate          Online
datastate         Normal
configstate       Normal
...
migrating         0
perfgrp          PG0
migratingfrom    -
resgrp           RG0
=====SCSI Reserve Status=====
PortID WWPN                ReserveType
=====
I0040  500507630310003D  Persistent
I0041  500507630310403D  Persistent
-      50050763080805BB  Persistent
-      50050763080845BB  Persistent

```

Output definitions (-reserve parameter is specified)

PortID

The I/O port ID. If the host is online, then the I/O port ID is displayed and is formatted as a leading uppercase letter "I" followed by four hexadecimal characters (for example, I0040). If the host is not online, the field contains a '-' (dash).

WWPN

The worldwide port name that is displayed as 16 hexadecimal characters.

ReserveType

The SCSI reservation type for all connections. Valid reservation types are "Traditional", "Persistent", or "PPRC".

Volume group specific commands

Volume groups require the use of specific commands that are used to create, modify, and delete volume groups and to display volume group information.

The following volume group specific commands are available:

chvolgrp

Modifies a volume group name and volume members.

lsvolgrp

Generates a report that displays a list of volume groups in a storage system and the status information for each volume group in the list.

mkvolgrp

Creates a volume group in a storage system.

rmvolgrp

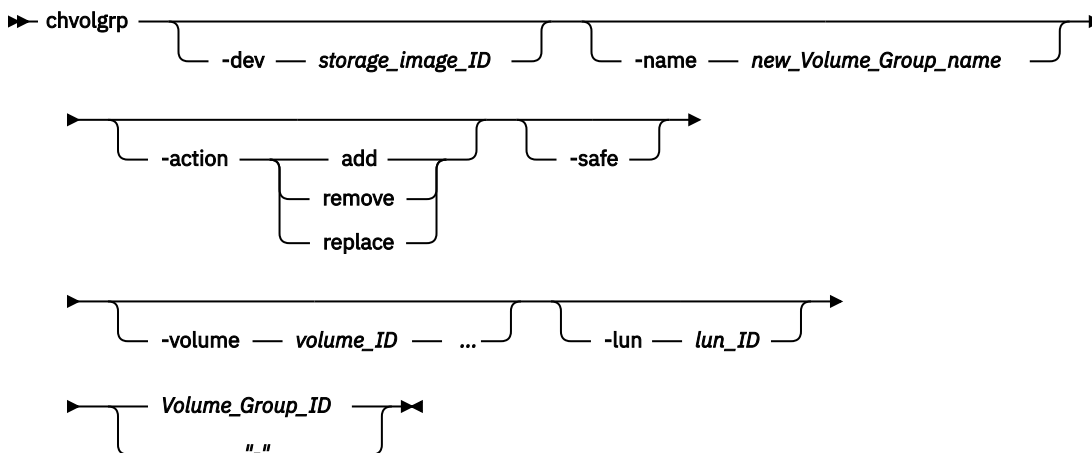
Deletes the specified volume group or volume groups from a storage system.

showvolgrp

Generates a report that displays the detailed properties of a volume group.

chvolgrp

The **chvolgrp** command modifies a volume group name and volume members.



Parameters

Note: If you are using an HP-UX operating system, the number of volumes in the volume group must not exceed seven volumes. This restriction applies only when the *hostconnect* attribute for the **-addrdiscovery** parameter is set to *reportlun* and the associated volume group is of type *mapscsi256*.

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify fully qualified IDs or do not set the *devid* variable in your profile or through the **setenv** command. The storage image ID is also required if the HMC is aware of more than one storage image. The **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-name new_Volume_Group_name

(Optional). A new name for the volume group. The name is limited to 16 characters. The name must be unique across volume groups that are contained by a storage unit.

-safe

(Optional). Enables checks for the safe removal of the volume from the volume group.

-action add | remove | replace

(Optional, unless the **-volume** parameter is specified). Specify one of the following values with this parameter:

add

The volumes be added to the volume group.

remove

The volumes be removed from the volume group.

replace

The existing volumes be replaced by the specified volumes.

Note: The **chvolgrp** command fails if you specify the **-volume** parameter and not included the **-action** parameter.

-safe

(Optional). Valid for the remove and replace actions, only. Enables checks for the safe removal or replacement of the volume from the volume group. The checked conditions that give a failed result include: an open host reservation, a Copy Services relationship, or an I/O received within the last 5 minutes.

-volume volume_ID ...

(Optional unless you are specifying the **-action** or the **-lun** parameter, then the **-volume** parameter is required.) An array of one or more volume IDs or volume ID ranges to be included in the volume group when the **-action** parameter is specified.

The volume ID is a 32-bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0–F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

To specify a range of volume IDs, separate the volume IDs with a dash (-).

You must separate multiple volume IDs or ranges of volume IDs with a comma between each ID or range of IDs.

Notes:

1. For SCSI MAP 256, the array or ranges cannot exceed 256 volume ID entries. Otherwise, up to 64 384 entries are allowed.
2. The **chvolgrp** command fails if you specify the **-volume** parameter and do not specify the **-action** parameter.

Example: 0100-010F,0180-018F,0120

-lun lun_ID

(Optional - SCSI MAP 256 only). The LUN ID in hexadecimal value (00 - FF), which is mapped to the specified volume ID when the **-action add** or **-action replace** parameter is specified. If multiple volume IDs are specified by the **-volume** parameter, the LUN ID is consecutively assigned in incremental order. If the specified LUN ID is not valid, the command is rejected.

Note: This parameter is only valid when the target volume group type is SCSI MAP 256. Otherwise, this command fails.

If the **-action add** parameter is specified and the specified LUN ID is already mapped to the other volume in the specified volume group, the command fails.

If the **-action add** parameter is specified without the **-lun** parameter, an unused LUN ID is assigned to the volume ID. In this case, the unused LUN ID is selected from a smaller number.

The following example shows how this process works:

```

A volume group of "SCSI Map 256" type has Volume 0000 and 0001.
Their LUNs are the members of the following volume group:
(showvolgrp displays the current mapping.)
0000 : 10
0001 : 11
Because the range of LUN IDs is 00-FF, the unused LUN IDs
are 00,01,...,0F,12,13,...,FF.

```

```

If you add volume 0002 and 0003 to this volume group without
the -lun parameter, the mapping results in the following
because 00 and 01 are "smaller" unused LUN IDs:
0002 : 00
0003 : 01
0000 : 10
0001 : 11

```

If the **-action** *replace* parameter is specified without specifying the **-lun** parameter, `lun_ID=00` is assumed.

Volume_Group_ID | -

(Required). The ID of the volume group that being changed. The volume group ID is made up of the storage image ID followed by the volume group ID. This parameter also accepts a fully qualified volume group ID including the storage image ID or a shortened version. The shortened version is a four-digit decimal number with no leading zeros, prefixed with the letter *V*.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Modifying a volume group name and volume members

```

dscli> chvolgrp -action add
-volume 0000-000F IBM.2107-75FA120/V2341

```

Output

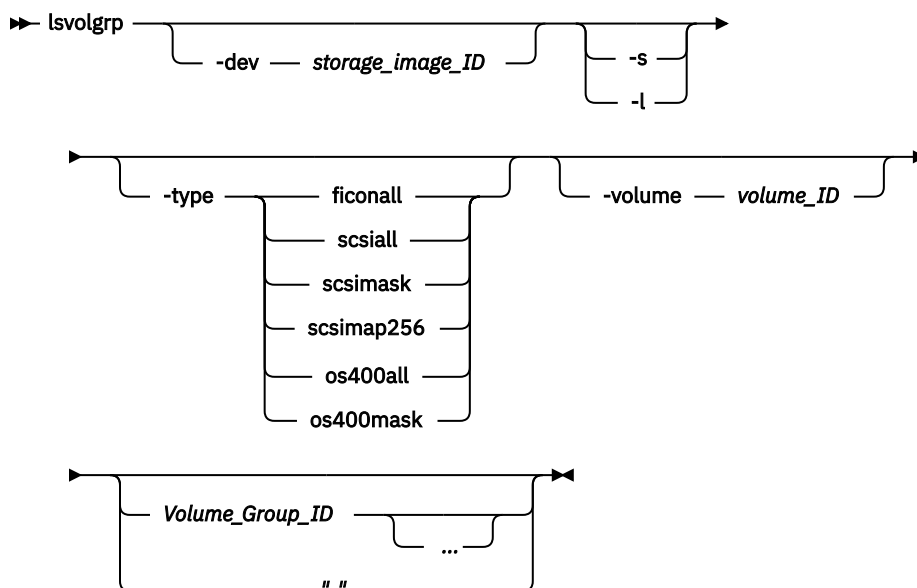
```

Volume group V2341 successfully modified.

```

lsvolgrp

The **lsvolgrp** command displays a list of volume groups in a storage image and status information for each volume group in the list.



Parameters

-dev *storage_image_ID*

(Optional). The storage image ID, which includes manufacturer, machine type, and serial number. Displays only the objects for the storage unit that is specified. The storage image ID is required if you do not specify fully qualified IDs, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-s

(Optional). Displays volume group IDs only. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional). Displays the default output. You cannot use the **-l** and the **-s** parameters together.

-type | ficonall | scsiall | scsimask | scsimap256 | os400all | os400mask

(Optional). Displays only volume groups that are configured as the specified volume group type.

-volume *volume_ID*

(Optional). Displays volume groups that contain the specified volume ID. The volume ID is a 32 bit number that can be represented as four hexadecimal digits in the form of XYZZ where:

X

The address group, 0-F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

Volume_Group_ID ... | -

(Optional). Displays volume groups with the specified IDs. A volume group ID is a four-digit decimal number with no leading zeroes, prefixed with the letter V.

This parameter accepts a fully qualified volume group ID or a shortened version, if the **-dev** parameter is specified.

To specify a range of volume group IDs, separate the volume group IDs with a hyphen. You must separate multiple volume group IDs or ranges of volume group IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of volume groups in a storage image and status information for each volume group in the list

The following table represents the headers that are displayed on the output report that is associated with the **lsvolgrp** command using the **-l** parameter.

```
dscli> lsvolgrp -dev IBM.2107-75FA120 -l
```

Output

Tues Aug 11 02:23:49 PST 2016 IBM DS CLI Device: IBM.2107-75FA120

| Name | ID | Type |
|----------------------|-----------|------------------|
| Host_xxx _volumes | 1011 | OS400 Mask |
| Host_yyy _volumes | 1111 | OS400 Map 256 |

| Name | ID | Type |
|----------------------|------|--------------|
| Host_zzz _volumes | 1211 | SCSI Mask |

Output definitions

Name

The name you assigned for this volume group ID.

ID*

The storage unit ID followed by the volume group ID. The volume group identifier is a four-digit decimal number, with no leading zeros, prefixed by the letter V.

Type

The type of the volume group.

Key:

*

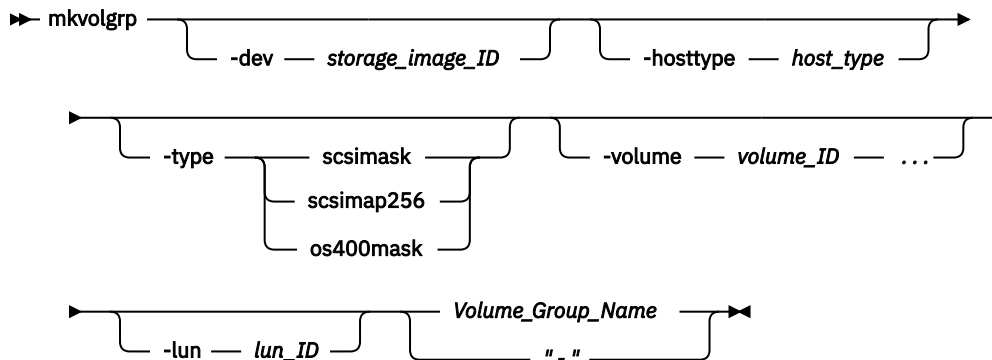
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

mkvolgrp

The **mkvolgrp** command creates a volume group in a storage image.



Parameters

Notes:

1. The ID is assigned during volume group creation based on the current configuration, past configuration changes, and other internal considerations. No algorithm is available to accurately predict the newly created volume group ID in every case.
2. Ensure that you use the **-hosttype** parameter when you issue this command.

If you are using an HP-UX operating system, the number of volumes in the volume group must not exceed 7 volumes. This restriction only applies when the **hostconnect** attribute for the **-addrdiscovery** parameter is set to **reportlun** and the associated volume group is of type *scsimap256*.

-dev *storage_image_ID*

(Optional). The storage image ID, which includes manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the *-dev* parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-hosttype *host_type*

(Optional) Use this parameter as an alternative method for specifying the type of Volume Group.

Note: You cannot use this parameter with the **-type** parameter.

-type | *scsimask* | *scsimap256* | *os400mask*

(Optional). The type of the volume group.

scsimask (default)

Creates a SCSI mask volume group. This option is available if the host adapter supports four-byte LUN addresses.

scsimap256

Creates a SCSI-MAP 256 volume group.

os400mask

Creates an OS/400 mask volume group. The IBM i host system typically uses fixed block volumes of 520-byte logical block size. This option is available only if the host adapter supports four-byte LUN addresses.

Note: This volume group is also referred to as SCSI520-MASK. When an error message is displayed for the *os400mask*, SCSI520-MASK is referenced instead.

Note: You cannot use this parameter with the **-type** parameter.

-volume *volume_ID* | ...

(Optional). The array of volume IDs to include in the volume group. For the **-type *scsimap256*** parameter, the array cannot exceed 256 volume ID entries. Otherwise, up to 64 384 entries are allowed.

The volume ID is a 32-bit number that can be represented as 4 hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0–F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

To specify a range of volume IDs, separate the volume IDs with a dash (-).

You must separate multiple volume IDs or ranges of volume IDs with a comma between each ID or range of IDs.

Example: 0100-010F,0180-018F,0120

-lun *lun_ID*

(Optional) The LUN ID in hexadecimal value (00 - FF) which is mapped to the specified volume ID for a SCSI-MAP256 type volume group. If multiple volume IDs are specified by the **-volume** parameter, LUN IDs are assigned consecutively in incremental order.

Note: This parameter is only valid for a SCSI-MAP 256 type volume group. If this parameter is specified for any other type of volume group, the command fails.

Volume_Group_Name | -

(Required). The volume group name, not to exceed 16 characters. Ensure that the name is unique within the scope of the storage image. Accepts a fully qualified volume group name or a shortened version, if the **-dev** parameter is specified.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Creating a volume group in a storage image

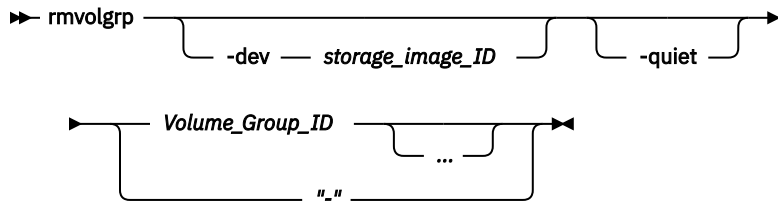
```
dscli> mkvolgrp -dev IBM.2107-75FA120 -volume 0000-000F host_xyz_volumes
```

Output

Volume group V0 successfully created.

rmvolgrp

The **rmvolgrp** command deletes existing volume groups from a storage image.



Parameters

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume group ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

Example: IBM.2107-75FA120

-quiet

(Optional) Turns off the volume group removal confirmation prompt for this command.

Volume_Group_ID ... | -

(Required). An array of one or more volume groups IDs to be deleted. All volume groups specified must belong to the same storage unit. This parameter also accepts a fully qualified volume group ID, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter V.

To specify a range of volume group IDs, separate the volume group IDs with a dash (-).

You must separate multiple volume group IDs or ranges of volume group IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example of -dev parameter use

If you specify the **-dev** parameter, you can use the shortened version of the *Volume_Group_ID* parameter as follows:

```
dscli> rmvolgrp -dev IBM.2107-75FA120 V11
```

If you do not specify the **-dev** parameter and you specify the *Volume_Group_ID* parameter, you must use the fully qualified version of the volume group ID as follows:

```
dscli> rmvolgrp IBM.2107-75FA120/V11
```

Example: Deleting existing volume groups from a storage image

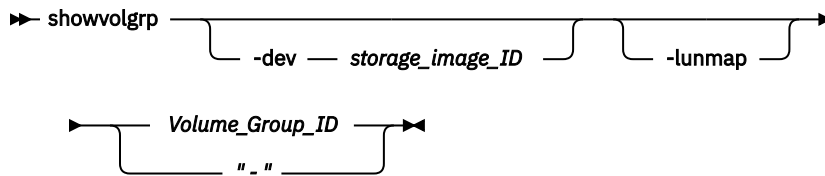
```
dscli> rmvolgrp IBM.2107-75FA1243/V123
```

Output

```
Are you sure you want to delete Volume Group IBM.2107-75FA1243/V123? y/n
Y
Volume group IBM.2107-75FA1243/V123 successfully deleted.
```

showvolgrp

The **showvolgrp** command displays detailed properties of a volume group.



Parameters

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume group ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

Example: IBM.2107-75FA120

-lunmap

(Optional). A LUN mapping table be displayed that shows the volume ID and LUN ID for all volumes in the specified volume group. This parameter is valid for all scsi and os400 type volume groups.

-etccmap

(Optional). A LUN mapping table be displayed that shows the volume ID, LUN ID, and the Easy Tier cooperative caching status for all volumes in the specified volume group. While always valid, this parameter is meaningful only when the volumes in the volume group are managed by a host that has the Easy Tier Server utility installed.

Note: Starting with DS8900F, Release 8, Easy Tier Server is no longer supported.

Volume_Group_ID | -

(Required). The properties be displayed for the specified volume group. This parameter accepts a fully qualified volume group ID, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-digit decimal number with no leading zeros, prefixed with the letter *V*.

Examples of -dev parameter use

If you specify the **-dev** parameter, you can use the shortened version of the *Volume_Group_ID* parameter as follows:

```
dsccli> showvolgrp -dev IBM.2107-75FA120 V11
```

where *V11* represents value for the volume group ID.

If you do not specify the **-dev** parameter, and you specify the *Volume_Group_ID* parameter, you must specify the fully qualified version of the *Volume_Group_ID* parameter as follows:

```
dsccli> showvolgrp IBM.2107-75FA120/V11
```

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Displaying detailed properties of a volume group where the volume group type is SCSI MAP 256

The following tables represent the headers that are displayed on the output reports that are associated with the **showvolgrp** command.

Note: The volume group type determines the format of the LUN ID that is reported. The following examples demonstrate these differences.

dscli> showvolgrp -lunmap IBM.2107-1300861/V2

Output

| Name | ID | Type | Vols |
|------------------------|----|-----------------|--|
| My_host_system_volumes | V2 | SCSI-MAP 256 | 1000 1001 1002 1003 1004 1005 1006 1007 |

=====LUN Mapping=====

| vol | lun |
|------|-----|
| 1000 | 00 |
| 1001 | 01 |
| 1002 | 02 |
| 1003 | 03 |
| 1004 | 04 |
| 1005 | 05 |
| 1006 | 06 |
| 1007 | 07 |

Example 2: Displaying detailed properties of a volume group where the volume group type is SCSI Mask

dscli> showvolgrp -etccmap IBM.2107-1300861/V18

Output

| Name | ID | Type | Vols |
|-------|-----|-----------|--|
| myVG1 | V18 | SCSI-Mask | 1000 1001 1002 1003 1004 1005 1006 1007 |

=====ETCC Mapping=====

| vol | lun | ETCCstatus |
|------|----------|------------|
| 1000 | 40104000 | Unmanaged |
| 1001 | 40104001 | Unmanaged |
| 1002 | 40104002 | Managed |
| 1003 | 40104003 | Managed |
| 1004 | 40104004 | Unmanaged |
| 1005 | 40104005 | Unmanaged |
| 1006 | 40104006 | Unmanaged |
| 1007 | 40104007 | Unmanaged |

Output definitions

Name

The name that you assigned for the designated volume group ID.

ID

The volume group ID. The volume group identifier is a four-digit decimal number having no leading zeros, and prefixed by a *V*.

Type

The configured volume group type. Any one of the following volume group types can be queried: FICON/ESCON All | SCSI all | SCSI Mask | SCSI MAP 256 | os400 all | os400 Mask | ESSNet Copy Services

Note: **os400 all** and **os400 Mask** are sometimes referred to as **SCSI520 all** and **SCSI520 Mask**.

Vols

The complement of accessible volume numbers within the designated volume group.

vol (part of LUN mapping table)

The volume ID.

lun (part of LUN mapping table)

The LUN ID that is mapped to the designated volume ID. As noted in the examples, the LUN IDs can be different based on volume group type.

ETCCstatus

The Easy Tier Cooperative Caching status.

Disabled

ETCC has been disabled for the storage system.

Managed

Currently, ETCC is managing the volume.

Unmanaged

Currently, ETCC is not managing the volume.

Unmonitored

Currently, ETCC is not monitoring the volume.

Unsupported

The storage system does not support ETCC.

Unknown

The ETCC status is unknown.

Advanced operation commands

Advanced operation commands are used to further administer and tune storage.

The following advanced operation commands are available:

clearvol

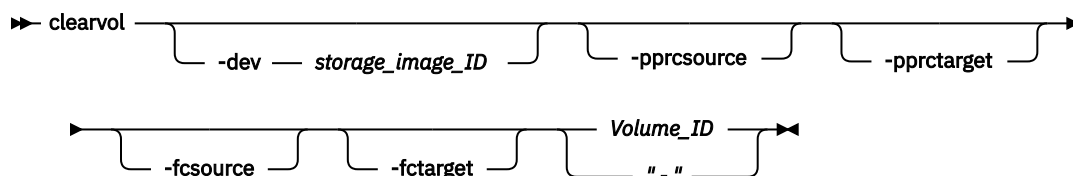
Clears Copy Services relationships for a base logical volume.

lsvolinit

Displays a list of fixed block volumes, either newly created or resized, that are still initializing in the ESS image. CKD volumes are not displayed.

clearvol

The **clearvol** command clears Copy Services relationships for a base logical volume.



Parameters

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-pprcsource

(Optional). Used with a base logical volume. It removes any remote mirror and copy relationships on the logical volume where the specified logical volume operates as a remote mirror and copy source.

-pprctarget

(Optional). Used with a base logical volume. It removes any remote mirror and copy relationships on the logical volume where the specified logical volume operates as a remote mirror and copy target.

-fcsource

(Optional). Used with a base logical volume. It removes any FlashCopy relationships on the logical volume where the specified logical volume operates as a FlashCopy source.

-fctarget

(Optional). Used with a base logical volume. It removes any FlashCopy relationships on the logical volume where the specified logical volume operates as a FlashCopy target.

Volume_ID | -

(Required). Where Copy Services relationships are to be cleared. This parameter accepts a fully qualified volume ID, which includes the storage image ID or a shortened version, if the **-dev** parameter is specified. The volume ID is a 32 bit number that can be represented as four hexadecimal digits in the form of *XYZZ* where:

X

The address group, 0-F.

XY

The logical subsystem number, 00 - FE.

ZZ

The volume number, 00 - FF.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: IBM.2107-75FA120/0001

Example: Clears Copy Services relationships for a base logical volume

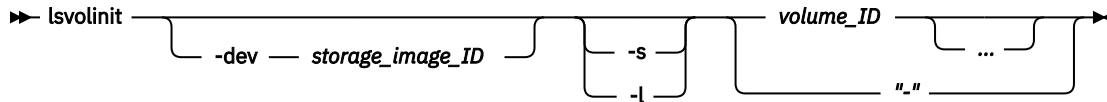
```
dscli> clearvol -dev IBM.2107-75FA120 0001
```

Output

```
Volume 0001 successfully cleared.
```

lsvolinit

The **lsvolinit** command displays volumes that are being initialized using flash init. CKD volumes are not displayed.



Parameters

Note: If trackstoinit reaches zero, the initialization is complete and the volume is no longer listed with this command

-dev storage_image_ID

(Optional). The storage image ID, which consists of manufacturer, machine type, and serial number. Displays only the objects for the storage unit that is specified. The storage image ID is required if you do not specify a fully qualified volume ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *devid* for the current command.

-s

(Optional). Displays only the volume ID. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional). Displays the default output. You cannot use the **-l** and the **-s** parameters together.

volume_ID ... | -

(Required). The IDs of the volumes that you want to query.

You must separate multiple volume IDs or ranges of volume IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying volumes that are being initialized using flash init

The following table represents the headers that are displayed on the output report that is associated with the **lsvolinit** command using the **-l** parameter.

```
dscli> lsvolinit -dev IBM.2107-75FA120 -l 0100-0101
```

Output

| ID | state | trackstoinit |
|-----|-------|--------------|
| 100 | Valid | 128 |
| 101 | Valid | 1 |

Output definitions

ID*

The volume ID.

State

The state of the initialization. One of the following values is displayed:

Valid

The volume with the initialization in process is in a normal state and was queried successfully.

Validation Required

The volume cannot be queried due to temporary microcode conditions. Issuing the query again, after a short interval, should solve the condition.

Volume Inaccessible

The volume cannot be accessed (usually because it is in a fenced state) and the query failed.

Invalid

A general internal error occurred during the processing of the query.

Note: If the state is anything other than Valid, then all other columns, except ID, are reported as " - ".

TracksToInit

The number of tracks that are not yet initialized. The maximum value that can be displayed is dependent on the volume size.

Key:

*

Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

Space-efficient storage commands

Space-efficient storage commands create, modify, delete, and display extent space-efficient (ESE) and track space-efficient (TSE) repositories. These two types of repositories differ in many ways, but the main idea of a repository is identical.

A repository of type T and of capacity N guarantees that at least N bytes are available in the extent pool to provision the defined virtual T volumes. This configuration means that other types of non-T allocations will not consume all of the available storage in the extent pool. It also guarantees that no more than N bytes from the extent pool will be used to provision the defined virtual T volumes. Therefore, T allocations will not consume all of the available storage in the extent pool.

A repository also provides a clear and intuitive definition for the over-provisioned ratio, also known as the over-allocation or over-commitment ratio. The over-provisioned ratio is the sum of all the virtual T volume capacities divided by the repository capacity N. In other words, for any fixed repository capacity, the over-provisioned ratio varies only with virtual T volume creations and deletions. The ratio does not vary with any virtual non-T volume creations and deletions.

Although ESE volumes previously existed, the DS8000 system did not allow the creation of an ESE repository until Release 7.2. Without an ESE repository, no method to reserve storage to provision ESE volumes was available. Also, no method to prevent the ESE volume allocations from consuming the entire extent pool was available. Both problems were solved with the creation of an ESE repository, which is similar in effect to a TSE repository. However, the underlying mechanism to provide an ESE repository and the mechanism to provide a TSE repository are completely different.

Note: Track space-efficient (TSE) repositories are required to create TSE volumes. However, starting with DS8000 Release 8, TSE repositories can no longer be created.

For TSE repositories:

- All storage used to provision TSE volumes is physically allocated at repository-creation time.
- A TSE repository is required to create TSE volumes.
- The minimum TSE repository capacity is 16 GiB/Mod1.
- Changing the capacity size of an existing TSE repository is not supported.
- Changing the extent pool capacity does not affect the TSE repository capacity (capacity is fixed).
- All TSE volumes must be removed before attempting to remove the TSE repository.

For ESE repositories:

- All storage used to provision ESE volumes is physically allocated at volume-creation time.

- An ESE repository is not required to create ESE volumes.
- The minimum ESE repository capacity is 0 GiB/Mod1.
- Changing the capacity size of an existing TSE repository is supported.
- Changing the extent pool capacity does affect the ESE repository capacity (percentage is fixed).
- Any existing ESE volumes need not be removed before attempting to remove the ESE repository. The existing volumes remain unchanged after the repository is removed.

The following space-efficient storage commands are available:

chsestg

Modifies the attributes of the specified repository in an extent pool.

lssestg

Generates a report that displays the repository values for the entire storage image.

mksestg

Creates the specified repository in an extent pool.

rmsestg

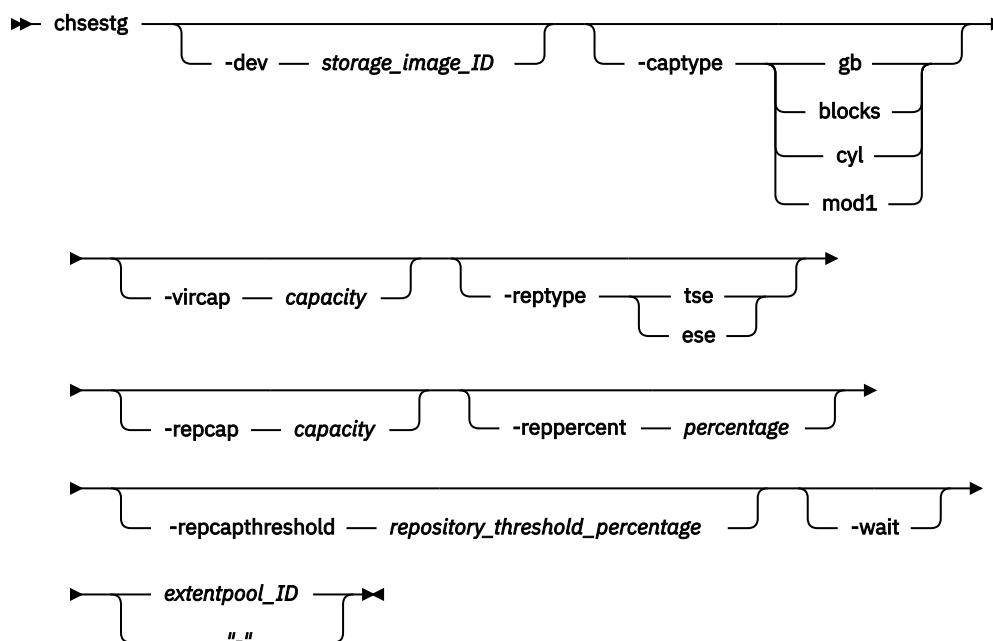
Deletes the specified repository from an extent pool.

showsestg

Generates a report that displays the detailed properties of the specified repository in an individual extent pool.

chsestg

The **chsestg** command changes the space-efficient storage attributes for an extent pool.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the extent pool ID. It is also required if you do not set the *dev*id variable in your profile or through the **setenv** command and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *dev*id for the current command.

-capytype *gb* | *blocks* | *cyl* | *mod1*

(Optional) The type of capacity unit that is specified by the **-vircap** and **-repcap** parameters. *gb* is the default for fixed block storage, and *mod1* is the default for count key data (CKD). You can also specify the **-capytype *gb*** parameter on CKD storage.

Select one of the following capacity unit types:

gb (Gibibyte)

The capacity unit type as gibibytes (GiB). 1 GiB = 2 097 152 blocks.

blocks

The capacity unit type as blocks. This capacity unit type can be selected only for fixed block storage. One block = 512 Bytes.

cyl

The capacity unit type as cylinders. This capacity unit type can be selected only for CKD storage. One cylinder = 15 tracks.

mod1

The capacity unit type in mod1 units. This capacity unit type can be selected only for CKD storage (mod1 = 1113 cylinders). This type is the default for CKD storage when the **-capytype** parameter is not specified.

-vircap *capacity*

(Optional) The amount of virtual capacity that can be allocated to all space-efficient logical volumes, including ESE volumes. All capacities must be designated as whole numbers. The capacity units are specified by the **-capytype** parameter.

If a **-vircap** parameter capacity is specified and it is larger than the existing vircap capacity, the specified capacity replaces the existing capacity. Otherwise, the specified capacity is ignored.

Notes:

1. Some releases of the storage system require that the ratio of virtual capacity to repository capacity to be at least 2:1.
2. Only one of the following parameters can be specified: **-repcapthreshold**, **-repcap**, **-reppercent**, and **-vircap**.

-reptype *ese*

(Optional) The type of repository that is affected by the **repcap**, **reppercent**, and **repcapthreshold** parameters..

Note: The default for the **reptype** parameter depends on the release level of your storage system. For example, starting with Release 8.0 storage systems, a TSE repository can no longer be created and is no longer supported. For Release 8.0 and later, if you do not specify the **reptype** parameter, the default is ESE.

For pre-Release 8.0 storage systems, if you do not specify the **reptype** parameter, the default is TSE.

tse

A track space-efficient physical repository.

ese

An extent space-efficient physical repository. This value is the default.

Note: An ESE repository is not required to create ESE volumes. By creating an ESE repository, you specify both a minimum capacity reserved for ESE volumes and a maximum capacity allowed for ESE volumes. By default, no ESE repository allows the entire pool to be used by any requestor of that capacity whether it is for standard volumes, a TSE repository, virtual capacity (overhead), or ESE volumes. That is, the ESE volumes have 0% of the pool that is guaranteed, and 100% the extent limit of the pool is allowed.

-repcap *capacity*

(Optional) The amount of physical capacity for the specified repository that you want to provision the virtual capacity of the space-efficient logical volumes. The repository type is specified with the **-reptype** parameter. All capacities must be designated as whole numbers. The capacity units are

specified by the **-capytype** parameter. Only one of the following parameters can be specified in a single command: **-repcap**, **-reppercent**, **-vircap**.

The following rules apply to ESE repositories:

- An ESE repository is not required to create ESE volumes.
- Changing the capacity size of an existing ESE repository is supported. The actual repository capacity is equal to the specified capacity, rounded up to the nearest whole percentage of the pool capacity.
- The **chsestg** command cannot be used to create an ESE repository. Use the **mksestg** command.
- The **chsestg** command cannot be used to remove an ESE repository. Use the **rmsestg** command.
- Existing ESE volumes do not need to be removed before you attempt to remove the ESE repository. The existing volumes remain unchanged after the repository is removed.
- The repository can be resized to any capacity from the size of the capacity that is used to provision any existing ESE volumes to smaller than the available capacity. The virtual storage overhead capacity is not a part of the repository. Therefore, the largest repository capacity is equal to the total available capacity, less the overhead capacity, rounded up to the nearest whole percentage of the pool capacity.

-reppercent *percentage*

(Optional) The amount of physical capacity for the specified repository that you want to provision the virtual capacity of the space-efficient logical volumes. The value is specified as a percentage of the total virtual capacity. The repository type is specified with the **-reptype** parameter. Only one of the following parameters can be specified in a single command: **-repcap**, **-reppercent**, **-vircap**.

This parameter is provided as a convenience. It is the equivalent to using the **-repcap** parameter with a value determined by multiplying the total virtual capacity by the specified percentage and rounding up to the nearest whole number. However, this parameter is seldom used because the total virtual capacity is automatically increased as space-efficient volumes are created. While the virtual capacity can be set manually to a higher value, the total virtual capacity is equal to the sum of all capacities of space-efficient volumes.

-repcapthreshold *repository_threshold_percentage*

(Optional) The minimum threshold percentage of the physical repository capacity available. When the percentage of the currently available repository capacity is less than this minimum percentage, notifications are sent and the repository capacity status is reported as exceeded.

Notes:

1. Three thresholds for the repository generate notifications when their thresholds amounts are attained. Two of the three thresholds are set by the system and cannot be changed. They are set to 0% (full) and 15% (85% full). The third threshold is the user-defined threshold that is set here, and the repository capacity status is based on this threshold. When any of the three thresholds attain a threshold amount, a notification is sent for that particular threshold. No further notifications are sent until the repository capacity changes. If the repository capacity changes and remains above the threshold, another notification might be sent, but no more than one notification every 5 minutes. You must free capacity in the repository to stop the notifications. If the user-defined threshold is equal to one of the other two fixed thresholds, only one notification is sent, at most once every 5 minutes, for the two equivalent thresholds.
2. To verify that your storage complex is set up to send notifications, use the **showsp** command. If it is not set up, use the **chsp** command to set up notifications.

-wait

(Optional) The command will be delayed until after the space efficient storage is created, configured, and in a Normal state. If an error condition is detected while waiting, the command returns and reports an error. The **-wait** parameter can be specified if either **-vircap**, **-repcap**, or **-reppercent** is also specified.

extentpool_ID | -

(Required) The ID of the space-efficient storage extent pool that you want to change. This parameter accepts either a fully qualified extent pool ID or a shortened version if the **-dev** parameter is used. The shortened version is a four-digit decimal number with no leading zeros, prefixed with the letter *P*.
If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Changing the space-efficient storage attributes for an extent pool

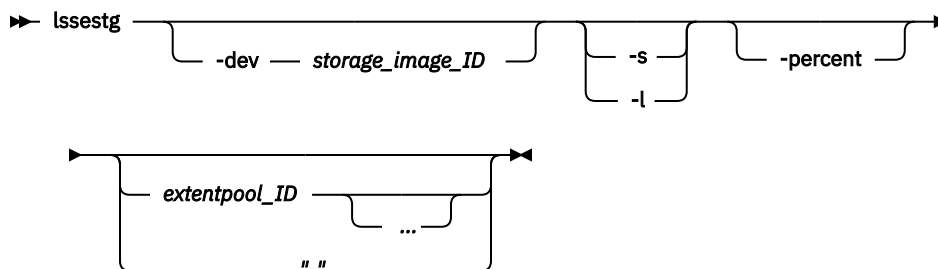
```
dscli> chsestg -dev IBM.2107-75FA120 -repcapthreshold 75 P2
```

Output

```
The space-efficient storage for the extent pool P2  
has been modified successfully.
```

lssestg

The **lssestg** command displays a list of the space-efficient repositories in the storage system.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified extent pool ID. It is also required if you do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-s

(Optional) Displays only the extent pool IDs of the extent pools that contain space-efficient storage. You cannot use the **-s** and the **-l** parameters together.

-l

(Optional) Displays the default output plus the virtual and physical repository capacity that is allocated for space-efficient repositories. You cannot use the **-s** and the **-l** parameters together.

-percent

(Optional) The *repcapalloc* and *virccapalloc* values be displayed in percentages rather than in gibibyte (GiB) or Mod1 units.

Note: In some versions of the DS CLI, the displayed percentages for the *repcapalloc* and *virccapalloc* values used one decimal place. However, because internal percentage calculations only use whole numbers, the decimal place was removed.

extentpool_ID ... | -

(Optional) The IDs of one or more extent pools that you want the system to display the space-efficient storage details for. A fully qualified extent pool ID is accepted, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-decimal digit number with no leading zeros, prefixed with the letter *P*.

To specify a range of extent pool IDs, separate the extent pool IDs with a hyphen.

You must separate multiple extent pool IDs or ranges of extent pool IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of the space-efficient repositories in the storage system

The following table represents the headers that are displayed on the output report that is associated with the **lssestg** command by using the **-l** parameter.

```
dscli> lssestg -dev IBM.2107-75FA120 -l
```

Output

```
dscli> lssestg -l
Date/Time: August 24, 2016 9:21:08 AM MST IBM
DS: IBM.2107-75YZ881
```

| extpool | stgtype | datastate | configstate | repcapstatus |
|---------|---------|-----------|-------------|--------------|
| P5 | ckd | Normal | Normal | below |
| P10 | fb | Normal | Normal | full |
| P13 | fb | Normal | Normal | - |
| P20 | fb | Normal | Normal | below |
| P20 | fb | Normal | Normal | below |

| repcap(GiB/Mod1) | vircap | reptype | repcapalloc | vircapalloc | opratio |
|------------------|--------|---------|-------------|-------------|---------|
| 100.0 | 200.0 | tse | 10.0 | 150.0 | 1.5 |
| 0.0 | 0.0 | ese | 0.0 | 0.0 | - |
| 0.0 | 100.0 | - | - | 0.0 | - |
| 160.0 | 1600.0 | tse | 0.0 | 0.0 | 0.0 |
| 1040.4 | 1600.0 | ese | 0.0 | 500.0 | 0.5 |

Notes:

1. Starting with DS8000 Release 8.0, a TSE repository can no longer be created and is no longer supported. For more information, see the **reptype** parameter included in the **mksestg** command.
2. The extent pool P5 has a TSE repository, but no ESE repository, and an over-provisioned ratio of 1.5 to 1.
3. The extent pool P10 has an ESE repository that is created with 0 (zero) capacity, which prevents ESE volume creation in the pool. The **repcapstatus** is **full** because the pool does not allow any further ESE volume creation.
4. The extent pool P13 has the virtual capacity that is specified but a TSE or an ESE repository. ESE volume creation is still allowed. However, because an ESE repository does not exist, **vircapalloc** is always zero. See the **virconfigured** field of the **showextpool** command to see total space-efficient storage of the extent pool.
5. The extent pool P20 has both a TSE and an ESE repository. The value for the **vircap** column is the same for both repositories because the virtual capacity is defined for all space-efficient storage.

Output definitions

Extpool*

The extent pool that you are querying.

Stgtype

The storage type. The value that is displayed is either fb (fixed block) or ckd (count key data).

Datstate

One of the following data states are displayed:

Normal

The space-efficient storage state is normal and that none of the other data states apply.

Pinned

None of the other data states apply and that logical tracks are present or at least identified in NVS or cache and cannot be de-staged for one reason or another.

Read only

The logical volume is read only because one or more extents on the logical volume are on a rank in the read only data state.

Inaccessible

One or more extents that are associated with the logical volume are on a rank that is in the inaccessible data state.

Indeterminate data loss

The following data states do not apply and that one of the following conditions occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions - one of the following items occurred:

- Committed write data was lost before it was de-staged, and the track identifiers that are associated with the data are unknown.
- Data was lost that indicates that extents on the logical volume were active FlashCopy targets.

Rank failed

One or more extents that are associated with the logical volume are on a rank that is in the Failed data state. This data state moves to the Rank repairing state if the rank moves to the Rank repairing state through use of the repair array function.

Rank Repairing

One or more extents that are associated with the logical volume are on ranks in the repairing data state.

Rank Repaired

One or more extents that are associated with the logical volume are on ranks that were in the repairing state, but are not in the repairing state now.

Global inaccessible

The global metadata that is associated with the logical volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate.

Global lost data

That global metadata that is associated with the logical volume configuration was lost. As a result, some of the data that is associated with the logical volume might be inaccurate.

NVS data inaccessible

Active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible.

Extent fault

None of the other states apply and a logical volume needs virtual space that is converted to real space, but the space was not available. So the subsequent writes fail until the space becomes available.

Configstate

One of the following configuration states is displayed:

Normal

No space-efficient storage configuration operations are in progress.

Configuration pending

An initial configuration for space-efficient storage is in the queue.

Configuration pending error

The request for initial configuration for space-efficient storage to be in the queue did not complete successfully.

Configuring

Space-efficient storage is being configured for the first time.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the space-efficient storage.

Corrective action: Use the **rmsestg** command to delete each track in the space-efficient storage that is listed with the configuration state of "configuration error".

Reconfiguration error

The reconfiguration request did not complete successfully.

Migration error

The dynamic volume relocation operation was ended during processing.

Configuration out-of-synch

Internal inconsistencies exist for the configuration state of the space-efficient storage.

Deconfiguring

The space-efficient storage is being deleted.

Deconfiguration error

A request to delete space-efficient storage did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmsestg** command for the space-efficient storage that is listed with the configuration state of "deconfiguration error".

Degraded - Configuration Error

Some of the storage configuration process failed to complete successfully. Some is normal and it can continue to be used.

Degraded - Configuration Out of Synch

Internal inconsistencies exist for the configuration state of some of the storage. Some is normal and it can continue to be used.

Degraded - Configuration Pending

The configuration operation for some of the storage is queued. Some is normal and it can continue to be used.

Degraded - Configuring

Some of the storage is in the process of configuring. Some is normal and it can continue to be used.

Degraded - Deconfiguration Error

Some of the deconfiguration process did not complete successfully. Some is normal and it can continue to be used.

Degraded Deconfiguring

Some of the storage is being deleted. Some is normal and it can continue to be used.

Degraded - Migration Error

Some of the space-efficient storage is being migrated and some is normal and it can continue to be used.

Degraded - Pending

Some of the configuration operation is queued. Some is normal and it can continue to be used.

Degraded - Reconfiguration Error

Some of the space-efficient storage is being reconfigured and some is normal and can continue to be used.

Unknown

The configuration state of the space-efficient storage cannot be determined due to an internal error.

Partial - No Physical Space

No physical space is defined. Defining physical space is not required and the state might be normal, with only virtual space defined.

Partial - No Virtual Space

The physical space is defined, but the virtual space is not.

Reconfiguring

The space-efficient storage is being reconfigured.

Degraded -Reconfiguring

Some of the space-efficient storage is being reconfigured and some is normal and that it can continue to be used.

Migrating

Space-efficient storage is being migrated.

Degraded - Migrating

Some of the space-efficient storage is being migrated and some is normal and that it can continue to be used.

Merging

The volume is in the process of merging. For example, merging from one extent pool to a different extent pool.

Degraded - Merging

Indicates that some of the space-efficient storage is being merged and some is normal and that it can continue to be used.

Transposition Error

An internal error condition occurred. This error can happen when a merge extent pool operation fails. To correct this state, use the **chextpool** command with the **-merge** parameter to redrive the original merge pool operation.

Degraded - Transposition Error

An internal error condition occurred on some of the space-efficient storage and some is normal and that it can continue to be used.

Repcapstatus

The status of the repository capacity. One of the following three values is displayed:

-

A dash (-) is displayed if the status is undefined or not applicable. For example, a dash is displayed if the repository does not exist.

below

The repository capacity available (repcap - repcapalloc), as a percentage of total repository capacity (repcap), is greater than the repository capacity threshold.

exceeded

The repository capacity available is less than the repository capacity threshold.

full

The repository capacity available is zero.

Repcap(GiB/Mod1)

The total physical repository capacity in the format of X.Y *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, the Mod1 capacity (1 Mod1 = 1113 cylinders) is displayed, *where* X is a whole Mod1, and Y represents tenths of a Mod1.

Viricap

The total virtual capacity for all space-efficient volumes, including ESE and TSE, in the format of X.Y *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, the Mod1 capacity (1 Mod1 = 1113 cylinders) is displayed, *where* X is a whole Mod1, and Y represents tenths of a Mod1.

Reptype

The type of repository, as follows:

tse

A track space-efficient (TSE) physical repository.

ese

An extent space-efficient physical repository.

-

A dash (-) indicates that this information is unknown, not available, or not applicable.

Repcapalloc+

The allocated physical repository capacity of the space-efficient storage that is used from the available repository capacity as a result of writes to the space-efficient volume. Displayed in the format of X.Y *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, the Mod1 capacity (1113 cylinders) is displayed, *where* X is a whole Mod1, and Y represents tenths of a Mod1.

If the **-percent** parameter is specified, the percent of total allocated physical repository is displayed in the format of a whole number with % (for example, 12%).

Vircapalloc+

The allocated virtual capacity of the specified space-efficient storage, that is to say, the amount of virtual capacity that is already allocated to logical capacity on the ESE or TSE volumes. If there is no specified repository, meaning the reptime value is a '-' (dash), this value is zero. This will be true, even if a particular pool contains ESE space-efficient volumes but does not contain an ESE repository.

Displayed in the format of X.Y *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, the Mod1 capacity (1113 cylinders) is displayed, *where* X is a whole Mod1, and Y represents tenths of a Mod1.

If the **-percent** parameter is specified, the percent of total virtual capacity that is defined as space-efficient volumes is displayed in the format of a whole number with % (for example, 12%).

Opratio+

Over-provisioned ratio is the allocated virtual capacity that is divided by the size of the repository (viricapalloc / repcap). Displayed in the format of X.Y *where* Y is limited to a single digit (0 - 9).

Key:

*

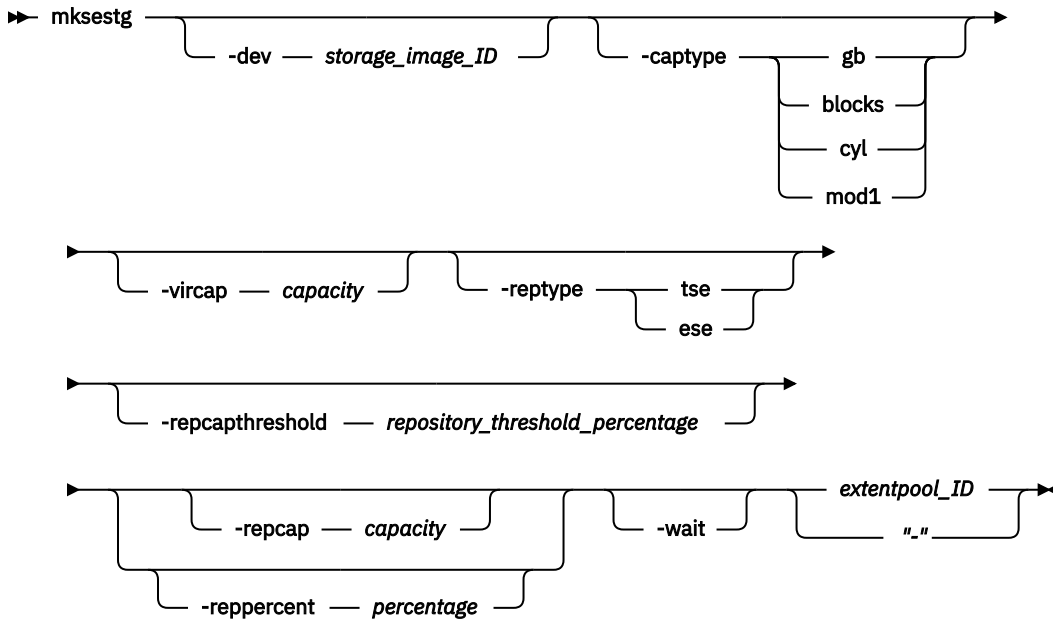
Displayed when the **-s** parameter is specified.

+

Displayed only when the **-l** parameter is specified.

mksestg

The **mksestg** command creates a space-efficient repository in an existing extent pool.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The **-dev** parameter temporarily overrides any defined value for *dev* for the current command. The storage image ID is required for the following situations:

- If you do not specify a fully qualified extent pool ID
- If you do not set the *dev* variable in your profile or through the **setenv** command
- If the HMC is aware of more than one storage image

-captype **gb** | **blocks** | **cyl** | **mod1**

(Optional) The unit type of capacity that is specified by the **-viricap** and the **-repcap** parameters. The following values are specified for each of these unit types:

gb

The capacity unit is gibibytes (GiB). This type is the default for fixed block storage when the **-captype** parameter is not specified. 1 GiB = 2 097 152 blocks.

This unit type can also be used with count key data (CKD) storage.

blocks

The capacity unit is blocks. This unit type is used only with fixed block storage. 1 block = 512 Bytes.

cyl

The capacity unit is cylinders. This unit type is used only with count key data (CKD) storage. 1 cylinder = 15 tracks.

mod1

The capacity unit is mod1. This unit type is used only with CKD storage (1 mod1 = 1113 cylinders). This type is the default for CKD storage when the **-captype** parameter is not specified.

-viricap *capacity*

(Optional) The amount of virtual capacity that can be allocated to all space-efficient logical volumes, including TSE and ESE volumes. All capacities must be designated as whole numbers. The capacity units are specified by the **-captype** parameter.

Note: Some storage system models require the ratio of virtual capacity to repository capacity to be at least 2:1.

-reptype tse | ese

(Optional) The type of repository that is affected by the **repcap**, **reppercent**, and **repcapthreshold** parameters.

Note: The default for the **reptype** parameter depends on the release level of your storage system. For example, starting with Release 8.0 storage systems, a TSE repository can no longer be created and is no longer supported. For Release 8.0 and later, if you do not specify the **reptype** parameter, the default is ESE.

For pre-Release 8.0 storage systems, if you do not specify the **reptype** parameter, the default is TSE.

tse

A track space-efficient physical repository.

ese

An extent space-efficient physical repository.

Note: An ESE repository is not required to create ESE volumes. By creating an ESE repository, you specify both a minimum capacity that is reserved for ESE volumes and a maximum capacity that is allowed for ESE volumes. By default, no ESE repository allows the entire pool to be used by any requester of that capacity whether it is for standard volumes, a TSE repository, virtual capacity (overhead), or ESE volumes. That is, the ESE volumes have 0% of the pool that is guaranteed, and the extent limit of the pool is allowed.

-repcapthreshold repository_threshold_percentage

(Optional) The minimum threshold percentage of the physical repository capacity that is available. When the percentage of the currently available repository capacity is less than this minimum percentage, notifications are sent and the repository capacity status is reported as exceeded. The default value is zero.

Notes:

1. Three thresholds for the repository generate notifications when their thresholds amounts are attained. Two of the three thresholds are set by the system and cannot be changed. They are set to 0% (full) and 15% (85% full). The third threshold is the user-defined threshold that is set here, and the repository capacity status is based on this threshold. When any of the three thresholds attain a threshold amount, a notification is sent for that particular threshold. No further notifications are sent until the repository capacity changes. If the repository capacity changes and remains above the threshold, another notification might be sent, but no more than one notification every 5 minutes. You must free capacity in the repository to stop the notifications. If the user-defined threshold is equal to one of the other two fixed thresholds, only one notification is sent, at most once every 5 minutes, for the two equivalent thresholds.
2. To verify that your storage complex is set up to send notifications, use the **showsp** command. If it is not set up, use the **chsp** command to set up notifications.

-repcap capacity

(Optional) The amount of physical capacity for the specified repository that you want to provision the virtual capacity of the space-efficient logical volumes. It is considered an error to create a repository that exists, but a single repository of each type is allowed in each extent pool. The repository type is specified with the **-reptype** parameter. All capacities must be designated as whole numbers. The capacity units are specified by the **-captive** parameter. You cannot specify the **-repcap** and **-reppercent** parameters at the same time.



Attention: TSE repositories can no longer be created starting with DS8900F Release 8.

An error occurs if you use this command to create a TSE/ESE repository when a TSE/ESE repository exists.

For TSE repositories:

- A TSE repository is required to create TSE volumes.

- All storage that is used to provision TSE volumes is physically allocated at the repository-creation time.
- The minimum repository capacity that can be created is as follows:
 - **gb** = 16 GiB
 - **blocks** = 33 554 432 blocks (equivalent to 16 GiB).
 - **cyl** = 17 808 cylinders.

For ESE repositories:

- An ESE repository is not required to create ESE volumes.
- All storage that is used to provision TSE volumes is physically allocated at the volume-creation time.
- The minimum repository capacity that can be created is 0 (zero) and prevents any ESE volume creation.
- Any existing ESE volumes become a part of the newly created ESE repository but remain otherwise unchanged. Any existing ESE volumes raise the minimum required repository capacity to be equal to capacity already allocated to provision those ESE volumes.

-reppercent *percentage*

(Optional) The amount of physical capacity for the specified repository that you want to provision the virtual capacity of the space efficient logical volumes. The physical capacity is specified as a percentage of the total virtual capacity. Creating a repository that exists is considered an error, but a single repository of each type is allowed in each extent pool. The repository type is specified with the **-reptype** parameter. You cannot specify the **-repcap** and **-reppercent** parameters at the same time. An error occurs if you use this command to create a TSE/ESE repository when a TSE/ESE repository exists.

This parameter is provided as a convenience. It is equivalent to using the **-repcap** parameter with a value determined by multiplying the total virtual capacity by the specified percentage and rounding up to the nearest whole number. However, this parameter is seldom used because the total virtual capacity is automatically increased as space-efficient volumes are created. Therefore, while the virtual capacity can be manually set to a higher value, the total virtual capacity is equal to the sum of all the capacities of the space-efficient volumes.

Note: Some storage system models require the ratio of virtual capacity to repository capacity to be at least 2:1. On systems with this requirement, the effective maximum percentage is 50%. In many cases, a value of 20% of the virtual capacity is a good value. However, less than 20% of virtual capacity might significantly degrade performance.

-wait

(Optional) The command will be delayed until after the space efficient storage is created, configured, and in a Normal state. If an error condition is detected while waiting, the command returns and reports an error.

extentpool_ID | -

(Required) The extent pool that is used to provision the extents that are used by this space efficient storage. For example, P111. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example 1: Creating a space-efficient repository in an existing extent pool

```
dscli> mksestg -dev IBM.2107-75FA120 -capytype gb -viricap 32 -repcap 16 P101
```

The space-efficient storage for the extent pool P101 has been created successfully.

Example 2: Creating a space-efficient repository in an existing extent pool

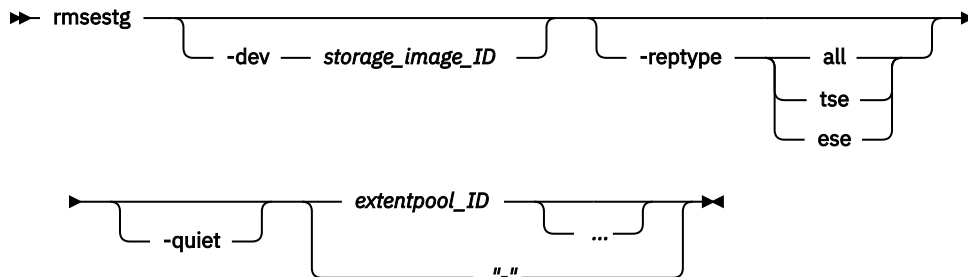
```
dscli> mksestg -viricap 1000 -repcap 500 -reptype tse P18
```


Output

Track Space Efficient repositories are not supported.

rmsestg

The **rmsestg** command deletes the specified repositories in an extent pool.



Parameters

-dev *storage_image_ID*

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified ID for the extent pool ID, do not set the *dev* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter will temporarily override any defined value for *dev* for the current command.

-reptype **all** | **tse** | **ese**

(Optional) The type of repository to remove. If the type is not specified, the default is **all**.

Valid repository types are as follows:

all

The removal of all physical repositories, plus any overhead that is used to manage the virtual capacity. However, if no ESE volumes exist after this action but are later created, the virtual capacity overhead is automatically re-created.

tse

The removal of the physical TSE repository in an extent pool. Any ESE repository and virtual capacity overhead remain unchanged.

Notes:

1. Using this option is equivalent to using the **chsestg** command and setting the TSE repository capacity to zero (0).
2. A TSE repository is required to create TSE volumes. Starting with DS8000, Release 8, TSE repositories can no longer be created.
3. All TSE volumes must be removed before attempting to remove the TSE repository.

ese

The removal of the physical ESE repository in an extent pool. Any TSE repository and virtual capacity overhead remain unchanged.

Notes:

1. An ESE repository is not required to create ESE volumes.
2. Removing the ESE repository allows the entire pool to be used by any requestor of that capacity whether it is for standard volumes, a TSE repository, virtual capacity (overhead), or ESE volumes. That is, the ESE volumes have 0% of the pool guaranteed, and the extent limit of the pool is allowed)

-quiet

(Optional) Turns off the space-efficient storage removal confirmation prompt for this command.

extentpool_ID ... | -

(Required) The IDs of one or more extent pools that you want to delete the space-efficient storage from. A fully qualified extent pool ID is accepted, which consists of the storage image ID or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-decimal digit number with no leading zeroes, prefixed with the letter P.

To specify a range of extent pool IDs, separate the extent pool IDs with a hyphen.

You must separate multiple extent pool IDs or ranges of extent pool IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input.

Note: You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Creating space-efficient storage in an extent pool

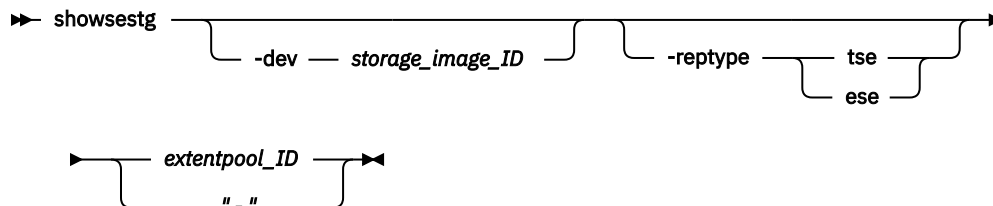
```
dscli> rmsestg -dev IBM.2107-75FA120 P2
```

Output

```
Are you sure that you want to delete the space-efficient storage for
the extent pool P2?[Y/N]:
The space-efficient storage for the extent pool P2 has been
deleted successfully.
```

showsestg

The **showsestg** command displays a detailed properties report of the specified repository of an individual extent pool. Because an extent pool can have more than one repository, the **-reptype** parameter is used to specify the single repository to display.



Parameters

-dev storage_image_ID

(Optional) The storage image ID, which consists of a value for manufacturer, machine type, and serial number. The storage image ID is required if you do not specify a fully qualified extent pool ID, do not set the *devid* variable in your profile or through the **setenv** command, and the HMC is aware of more than one storage image. Using the **-dev** parameter temporarily overrides any defined value for *devid* for the current command.

-reptype tse | ese

(Optional) The type of repository to display. All fields that begin with **rep** are associated with the specified repository type. These fields include **repcapstatus**, **%repcapthreshold**, **repcap**, **repcapalloc**, and **%repcapalloc**. If the type is not specified, the **-reptype** parameter defaults to tse.

Note: The default for the **reptype** parameter depends on the release level of your storage system. For example, starting with Release 8.0 storage systems, a TSE repository can no longer be created and is no longer supported. For Release 8.0 and later, if you do not specify the **reptype** parameter, the default is ESE.

For pre-Release 8.0 storage systems, if you do not specify the **reptype** parameter, the default is TSE.

tse

A track space-efficient physical repository.

ese

An extent space-efficient physical repository.

extentpool_ID | -

(Required) The ID of the extent pool that you want to query for the space-efficient storage values. A fully qualified extent pool ID is accepted, which consists of the storage image ID, or a shortened version without the storage image ID if the **-dev** parameter is specified. The shortened version is a four-decimal digit number with no leading zeros, prefixed with the letter P.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a detailed properties report of the specified repository of an individual extent pool

```
dscli> showsestg -reptype ese p3
```

Output

```
extpool          P3
stgtype          fb
datastate        Normal
configstate      Normal
repcapstatus     below
%repcapthreshold 0
repcap(GiB)      100.0
repcap(Mod1)     -
repcap(blocks)  209715200
repcap(cyl)      -
repcapalloc(GiB/Mod1) 24.0
%repcapalloc     24.0
vircap(GiB)      1000.0
vircap(Mod1)     -
vircap(blocks)  2097152000
vircap(cyl)      -
vircapalloc(GiB/Mod1) 48.0
%vircapalloc     4.8
overhead(GiB/Mod1) 2.0
reqrepcap(GiB/Mod1) 100.0
reqvircap(GiB/Mod1) 1000.0
reptype          ese
opratio          0.5
```

Output definitions**Extpool**

The extent pool that you are querying.

Stgtype

The storage type. The value that is displayed is either **fb** (fixed block) or **ckd** (count key data).

Datastate

One of the following data states is displayed:

Normal

The space-efficient storage state is normal and that none of the other data states apply.

Pinned

None of the other data states apply and that logical tracks are present or at least identified in NVS or cache that cannot be de-staged for one reason or another.

Read only

The logical volume is read only because one or more extents on the logical volume are on a rank in the read-only data state.

Inaccessible

One or more extents that are associated with the logical volume are on a rank that is in the inaccessible data state.

Indeterminate data loss

The following data states do not apply and that one of the following conditions has occurred:

Data states that do not apply:

- Rank failed
- Rank repairing
- Rank repaired
- Global inaccessible
- Global lost data

Conditions: one of the following has occurred:

- Committed write data was lost before it was de-staged, and the track identifiers that are associated with the data are unknown.
- Data has been lost that indicates that extents on the logical volume were active FlashCopy targets.

Rank failed

One or more extents that are associated with the logical volume are on a rank that is in the Failed data state. This data state transitions to the Rank repairing state if the rank transitions to the Rank repairing state through use of the repair array function.

Rank Repairing

One or more extents that are associated with the logical volume are on ranks in the repairing data state.

Rank Repaired

One or more extents that are associated with the logical volume are on ranks that were in the repairing state, but are not in the repairing state now.

Global inaccessible

Global metadata that is associated with the logical volume configuration is inaccessible. Some of the data that is associated with the logical volume might be inaccurate.

Global lost data

Global metadata that is associated with the logical volume configuration has been lost. As a result, some of the data that is associated with the logical volume might be inaccurate.

NVS data inaccessible

Active NVS data is inaccessible for one or more logical volumes of an LSS group. The logical volumes in the LSS group cannot be made accessible.

Extent fault

None of the other states apply and a logical volume needs virtual space converted to real space, but the space was not available. So the subsequent writes fail until the space becomes available.

Configstate

One of the following configuration states is displayed:

Normal

No space-efficient storage configuration operations is in progress.

Configuration pending

An initial configuration for space-efficient storage is in the queue.

Configuration pending error

The request for initial configuration for space-efficient storage to be in the queue did not complete successfully.

Configuring

Space-efficient storage is in the process of being configured for the first time.

Configuration error

The initial configuration did not complete successfully. This state reflects an internal error condition and not an error in the request to create the space-efficient storage.

Corrective action: Use the **rmsestg** command to delete each track in the space-efficient storage that is listed with the configuration state of "configuration error".

Reconfiguration error

The reconfiguration request did not complete successfully.

Migration error

The dynamic volume relocation operation was ended during processing.

Configuration out-of-synch

Internal inconsistencies for the configuration state of the space-efficient storage.

Deconfiguring

The space-efficient storage is in the process of being deleted.

Deconfiguration error

A request to delete space-efficient storage did not complete successfully. This state reflects an internal error condition and not an error in the request to remove the volume. To correct this state, you must reissue the **rmsestg** command for the space-efficient storage that is listed with the configuration state of "deconfiguration error".

Degraded - Configuration Error

Part of the storage configuration process failed to complete successfully.

Degraded - Configuration Out of Synch

Internal inconsistencies for the configuration state of some of the storage. Some is normal, and it can continue to be used.

Degraded - Configuration Pending

Part of the configuration operation is queued. Some is normal and it can continue to be used.

Degraded - Configuring

Some of the storage is in the process of configuring. Some is normal and it can continue to be used.

Degraded - Deconfiguration Error

Part of the deconfiguration process did not complete successfully. Some is normal and it can continue to be used.

Degraded Deconfiguring

Some of the storage is in the process of being deleted. Some is normal and it can continue to be used.

Degraded - Migration Error

Some of the space-efficient storage is in the process of being migrated and some is normal and it can continue to be used.

Degraded - Pending

The configuration operation is queued.

Degraded - Reconfiguration Error

Some of the space-efficient storage is in the process of being reconfigured and some is normal and can continue to be used.

Unknown

Configuration state of the space-efficient storage cannot be determined due to an internal error.

Partial - No Physical Space

There is no physical space defined. Defining physical space is not required and the state might be normal, with only virtual space defined.

Partial - No Virtual Space

The physical space is defined, but the virtual space is not.

Reconfiguring

The space-efficient storage is in the process of being reconfigured.

Degraded – Reconfiguring

Some of the space-efficient storage is in the process of being reconfigured and some is normal and that it can continue to be used.

Migrating

The space-efficient storage is in the process of being migrated.

Degraded - Migrating

Some of the space-efficient storage is in the process of being migrated and some is normal and that it can continue to be used.

Merging

The volume is in the process of merging. For example, merging from one extent pool to a different extent pool.

Degraded - Merging

Some of the space-efficient storage is in the process of being merged and some is normal and that it can continue to be used.

Transposition Error

An internal error condition has occurred. This error can happen when a merge extent pool operation fails. To correct this state, use the **chextpool** command with the **-merge** parameter to rerun the original merge pool operation.

Degraded - Transposition Error

An internal error condition has occurred on some of the space-efficient storage and some is normal and that it can continue to be used.

Repcapstatus

The status of the repository capacity. One of the following three values is displayed:

-

A dash (-) indicated that the status is undefined or not applicable. For example, a dash is displayed if the repository does not exist.

below

The repository capacity available (repcap - repcapalloc), as a percentage of total repository capacity (repcap) is greater than the repository capacity threshold.

exceeded

The repository capacity available is less than the repository capacity threshold.

full

The repository capacity available is zero.

%repcapthreshold

The minimum threshold percentage of the physical repository capacity available. When the percentage of the currently available repository capacity is less than this minimum percentage, notifications are sent and the repository capacity status is reported as exceeded. The default value is zero.

Notes:

1. Three thresholds for the repository generate notifications when their thresholds amounts are attained. Two of the three thresholds are set by the system and cannot be changed. They are set to 0% (full) and 15% (85% full). The third threshold is the user-defined threshold that is set here, and the repository capacity status is based on this threshold. When any of the three thresholds have attained a threshold amount, a notification will be sent for that particular threshold. No further notifications will be sent until the repository capacity changes. If the repository capacity changes and remains above the threshold, another notification might be sent, but no more than one notification every five minutes. You must free capacity in the repository to stop the notifications. If the user-defined threshold is equal to one of the other two fixed thresholds, only one notification is sent, at most once every five minutes, for the two equivalent thresholds.
2. To verify that your storage complex is set up to send notifications, use the **showsp** command. If it is not set up, use the **chsp** command to set up notifications.

Repcap (GiB)

The total physical repository capacity in the format of X.Y, *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9).

Repcap (Mod1)

The total physical repository capacity for CKD in the format of X.Y, *where* X is in whole Mod1 units (1113 cylinders) and Y represents tenths of a Mod1 unit, and is limited to a single digit (0 - 9). A value is displayed if the storage is for CKD, otherwise, a " - " value is displayed if the storage is for fixed block.

Repcap (blocks)

The total physical repository capacity in blocks. A value is displayed if the storage is for fixed block, otherwise, a " - " value is displayed if the storage is for CKD.

Repcap (cyl)

The total physical repository capacity in cylinders. A value is displayed if the storage is for CKD, otherwise, a " - " value is displayed if the storage is for fixed block.

Repcapalloc (GiB/Mod1)

The allocated physical repository capacity of the track space-efficient storage from the available repository capacity as a result of writes to the track space-efficient volumes. This value is displayed in the format of X.Y, *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, X is in whole Mod1 units (1113 cylinders) and Y represents tenths of a Mod1 unit, and is limited to a single digit (0 - 9).

%repcapalloc

The allocated virtual capacity of the track space-efficient storage; that is, the amount of virtual capacity that is already defined as a percentage.

Note: In some versions of the DS CLI, the displayed percentage for the repcapalloc value used one decimal place. However, because internal percentage calculations only use whole numbers, the decimal place has been removed.

Viricap (GiB)

The total virtual capacity for all space-efficient volumes, including ESE and TSE. The format is X.Y, *where* X is in whole gibibytes (1 GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9).

Viricap (Mod1)

The total virtual capacity in the format of X.Y, where X is in whole Mod1 units (1113 cylinders) and Y represents tenths of a Mod1 unit, and is limited to a single digit (0 - 9). A value is displayed if the storage is for CKD, otherwise, a " - " value is displayed if the storage is for fixed block.

Viricap (blocks)

The total virtual capacity in blocks. A value is displayed if the storage is for fixed block, otherwise, a " - " value is displayed if the storage is for CKD.

Viricap (cyl)

The total virtual capacity in cylinders. A value is displayed if the storage is for CKD, otherwise, a " - " value is displayed if the storage is for fixed block.

Viricapalloc (GiB/Mod1)

The allocated virtual capacity of the specified space-efficient storage, that is to say, the amount of virtual capacity that is allocated to logical capacity on the ESE or TSE volumes. If there is no specified repository, meaning the reptype value is a '-' (dash), this value is zero. This will be true, even if a particular pool contains ESE space-efficient volumes but does not contain an ESE repository.

Displayed in the format of X.Y, *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, X is in whole Mod1 units (1113 cylinders) and Y represents tenths of a Mod1 unit, and is limited to a single digit (0 - 9).

%viricapalloc

The space-efficient storage allocated virtual capacity (viricapalloc) as a percentage.

Note: In some versions of the DS CLI, the displayed percentage for the `virccapalloc` value used one decimal place. However, because internal percentage calculations only use whole numbers, the decimal place has been removed.

Overhead (GiB/Mod1)

The amount of physical space incurred to implement space-efficient storage.

reqrepcap(GiB/Mod1)

The total physical repository capacity that was requested in the format of X.Y, *where*, for fixed block volumes, X is in whole gibibytes (GiB) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9). For CKD volumes, X is in whole Mod1 units (1113 cylinders) and Y represents tenths of a Mod1 unit, and is limited to a single digit (0 - 9).

reqvircap (GiB/Mod1)

The total virtual repository capacity requested in the format of X.Y, where X is in whole gibibytes (GiBs) and Y represents tenths of a GiB, and is limited to a single digit (0 - 9).

Reptype

(Optional) The type of repository, as follows:

tse

A track space-efficient physical repository.

ese

An extent space-efficient physical repository. This is the default value.

-

A dash (-) indicates that this information is unknown, not available, or not applicable.

Opratio

Over-provisioned ratio is the allocated virtual capacity divided by the size of the repository (`virccapalloc / repcap`). Displayed in the format of X.Y *where* Y is limited to a single digit (0 - 9).

Storage image configuration commands

Commands are provided for information about configuring a storage image.

The following storage image configuration commands are available:

chsi

Primarily enables or disables the ESSNet user interface that issues Copy Services operations. These processes are for the storage image, changes the description and name that you assigned to the storage image, or changes a System i serial number.

diagsi

An administrative utility command that a user with administrator or service operator authority can use for non-routine diagnostic actions.

lssi

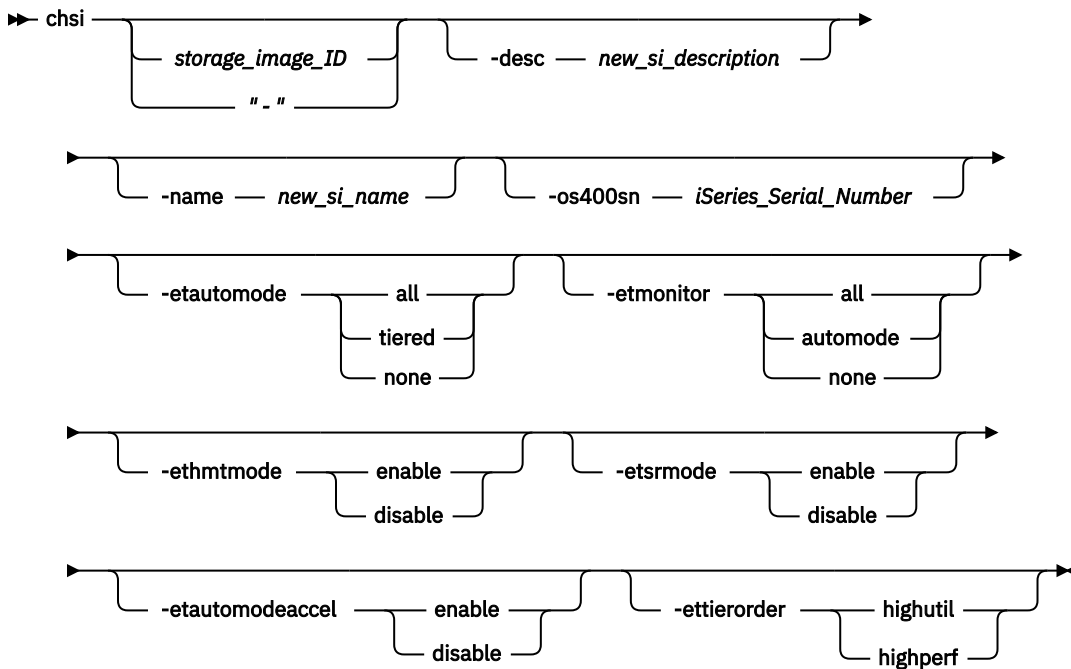
Displays a list of storage images in a storage complex. These commands require that you use the storage image WWNN, which is displayed for each storage image when you use the **lssi** command.

shows

Displays the detailed properties of a storage image. In addition, the storage image WWNN is displayed for the specified storage image. The storage image WWNN is needed when you use the **lsavailpprcport** and **mkpprcpath** commands.

chsi

The **chsi** command modifies a storage image. You can use it to set characteristics such as online or offline state, name, and description. You can also use this command to select the allocation order that Easy Tier uses to determine which storage tiers are chosen when capacity is allocated in pools.



Parameters

storage_image_ID | -

(Optional) The storage image ID, which consists of the values for manufacturer, machine type, and serial number.

-desc new_si_description

(Optional) The description that you assign to the storage image. The description is limited to 256 bytes or 128 double-byte characters.

-name new_si_name

(Optional) The name that you assign to the storage image. The storage image name is limited to 32 byte or 16 double-byte characters.

-os400sn iSeries_Serial_Number

The new iSeries serial number.

The serial number consists of three hexadecimal characters. It uniquely identifies LUNs within a customer storage complex. It is appended to the unit serial number that is returned by a SCSI inquiry command that is directed to each LUN.

Notes:

1. You must restart both storage images after you process this DS CLI command to assign a new serial number.
2. The iSeries serial number is only required when you have multiple DS**** storage systems with the last 3 digits of the machine serial number that overlap.

-etautomode all | tiered | none

(Optional) The automatic mode of the Easy Tier LIC feature. When the Easy Tier LIC feature is active, the manual mode is always active on all volumes, and the specified value controls only the automatic part of the feature.

all

The Easy Tier automatic mode is active on all pools.

tiered

The Easy Tier automatic mode is active only on pools with multiple tiers.

none

The Easy Tier automatic mode is not active on any pools.

-etmonitor all | automode | none

(Optional) If volumes are monitored by the Easy Tier LIC feature. When the Easy Tier LIC feature is active, the volumes are monitored for the Easy Tier automatic mode.

all

Easy Tier monitors all of the volumes on the system, regardless of the state of the Easy Tier LIC feature. This capability demonstrates the potential benefits of Easy Tier. When this value is selected, all values of the **-etautomode** parameter are accepted, if the **Easy Tier** LIC feature is active.

automode

Easy Tier monitors only those volumes that are managed by the Easy Tier automatic mode as specified by the **-etautomode** parameter.

none

Easy Tier monitors none of the volumes on the system. When this value is selected, all values of the **-etautomode** parameter are ignored, and the Easy Tier automatic mode is not active on any pools.

-etccmode enable | disable

(Optional) Easy Tier cooperative caching mode. The Easy Tier cooperative caching function is also known as Easy Tier Server. Only volumes that are monitored by Easy Tier can participate in Easy Tier cooperative caching.

Note: Starting with DS8000 Release 8, the **etccmode** parameter is no longer supported.

enable

All volumes are allowed to participate in Easy Tier cooperative caching.

disable

No volumes are allowed to participate in Easy Tier cooperative caching.

-ethmtmode enable | disable

(Optional) If the IBM Easy Tier Heat Map Transfer feature is enabled or disabled on this storage facility image.

-etsrmode enable | disable

(Optional) If space is reserved for Easy Tier data migration. The following values are included:

enable

Easy Tier space reservation control is enabled. Enable is the default, which specifies that the required space for Easy Tier to do storage optimization actions is pre-reserved in each pool. The reserved space is counted as the pool overhead, and usually it is only a small amount of the space.

disable

Easy Tier space reservation control is disabled. This value specifies that space is not pre-reserved for Easy Tier to do storage optimization actions. Ensure that you leave enough space in the storage pool for Easy Tier processing. If you select disable and the pool does not have enough free space, Easy Tier stops running storage optimization actions.

-

A dash (-) displays if the Easy Tier space reservation control is not supported on this storage system.

ETAutoModeAccel

The setting (enable or disable) of the Easy Tier Automatic Mode Acceleration control. When set to enable, the maximum amount of data that Easy Tier can automatically migrate in a given amount of

time is doubled. This occurrence might cause your existing workload to experience increased latency and decreased bandwidth while migration occurs.

Note: Set this value to disable after the data that Easy Tier migrates is redistributed.

ETTierOrder

(Optional) The order in which drive classes are chosen when capacity is allocated in pools.

A dash (-) displays if the storage system does not support the Easy Tier allocation method.

*Table 13. The table includes the tiers for the **highutil** and **highperf** options according to storage type .*

Note: The default for hybrid storage systems is **highutil** and the default for All Flash storage systems is **highperf**.

| highutil | | highperf | |
|---------------------------|---------------------------|---------------------------|------------|
| All Flash | Hybrid | All Flash | Hybrid |
| FlashTier1 ⁽¹⁾ | Enterprise ⁽²⁾ | FlashTier0 ⁽³⁾ | FlashTier0 |
| FlashTier2 ⁽⁴⁾ | FlashTier1 | FlashTier1 | FlashTier1 |
| FlashTier0 | FlashTier2 | FlashTier2 | FlashTier2 |
| | Nearline ⁽⁵⁾ | | Enterprise |
| | FlashTier0 | | Nearline |

Notes:

1. The first tier of high capacity flash drives.
2. The tier that consists of drives with speeds of 10K RPM, 15K RPM, or a mixtures of 10K RPM and 15K RPM speeds.
3. The tier of high performance flash drives.
4. The second tier of high capacity flash drives.
5. The tier that consists of high-volume disks that are either SATA or SAS nearline drives.

Example: Modifying a storage image

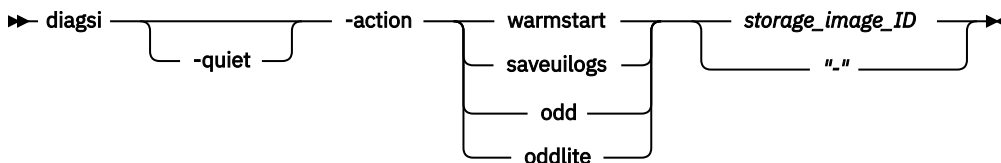
```
dscli> chsi -essnetcs n IBM.2107-75FA120
```

Output

Storage image IBM.2107-75FA120 successfully modified.

diagsi

The **diagsi** command is an administrative utility command that a user with administrator or service operator authority can use for nonroutine diagnostic actions.



Parameters

Note: Only users with administrator or service authority are authorized to use this command.

-action warmstart | saveuilogs | odd | oddlite

(Required) The administrative action to be completed.

warmstart

The **-action warmstart** parameter initiates a warmstart on the storage image, which causes the storage image to collect microcode data that is useful in diagnosing problems. This action is restricted to the following usage rules:

- This action must be used only under the direction of your technical support representative.
- You must be in interactive mode to enter this action. You cannot enter this action while in single shot mode or from a script.
- Five minutes must pass before you can reissue the **-action warmstart** parameter.
- If you enter the **-action warmstart** parameter more than 10 times during a 24-hour period, the warmstart does not collect the microcode diagnostic data.

saveuilogs

The **-action saveuilogs** parameter offloads DS CLI logs to the Hardware Management Console and saves DS Network Interface, DS CLI, and DS8000 Storage Management GUI logs. All of the user interface log files can then be retrieved with a PE package.

odd

The **-action odd** parameter initiates an “on-demand dump” request.

oddlite

The **-action oddlite** parameter initiates a lightweight “on-demand dump” request.

-quiet

(Optional) Turns off the diagnostic control confirmation prompt for this command.

storage_image_ID | -

(Required) The fully qualified storage image ID. The storage image ID consists of manufacturer, machine type, and serial number.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) if you are using the DS CLI interactive mode.

Example 1: Using the diagsi command

```
dscli> diagsi -action oddlite IBM.2107-1300861
```

Output

```
Are you sure you want to perform diagnostic control oddlite? [y/n]:y
CMUC00475I The diagnostic control action oddlite was submitted successfully.
```

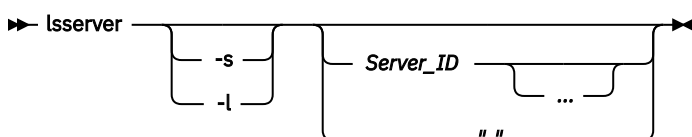
```
dscli> diagsi -action saveuilogs IBM.2107-68FA121
```

Output

```
Are you sure you want to perform diagnostic control saveuilogs? [y/n]:y
CMUC00443I The diagnostic control action saveuilogs was submitted successfully.
The action will complete within 5 minutes.
```

lsserver

The **lsserver** command displays all servers in a storage complex or a list of specified servers and it also displays the status information for each server in the list.



Parameters

-s

(Optional) Displays only the server ID. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output and the state of the servers. You cannot use the **-l** and the **-s** parameters together.

Server_ID ... | -

(Optional) Displays the server information for the specified server IDs. This parameter accepts a fully qualified server ID, which includes the storage image ID or a shortened version without the storage image ID. The shortened version is a two-digit decimal number with no leading zeros.

For example,

- IBM.2107-13AAV3A/0
- IBM.2107-13AAV3A/1

To specify a range of server IDs, separate the server IDs with a hyphen.

You must separate multiple server IDs or ranges of server IDs with a blank space between each ID or range of IDs.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying all servers in a storage complex or a list of specified servers, and status information for each server in the list

The following table represents the headers that are displayed on the output report that is associated with the **lsserver** command by using the **-l** parameter.

```
dscli> lsserver -l
```

The resulting output

| ID | Image ID | Image Name | Power Control SFI | State | LIC Version | OS Version | Bundle Version |
|-----------------------------|----------|----------------------------|-------------------|--------|---------------|------------|----------------|
| IBM.2107 -75FA120 /00 | 1 | SF1300 3 20ESS0 1 | 0 | Online | 5.3.0.83 2 | - | - |
| IBM.2107 -75FA120 /01 | 1 | SF1300 3 20ESS1 1 | 0 | Online | 5.3.0.83 2 | - | - |

Output definitions

ID*

The unique identifier of the server. This value includes the storage image ID and the server ID.

Image ID

The image ID for the designated storage server.

Image Name

The image name for the designated storage server.

Power Control SFI

The storage server power control SFI.

State⁺

The current state of the designated server.

LIC Version

The LIC version for the designated storage server.

OS Version

The operating system version for the designated server.

Bundle Version

The bundle version for the designated storage server.

Key:

*

Displayed when the **-s** parameter is specified.

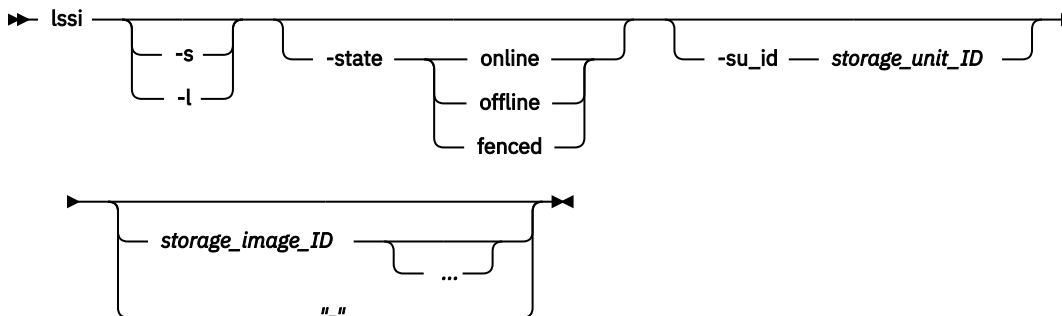
+

Displayed only when the **-l** parameter is specified.

lssi

The **lssi** command displays a list of storage images in a storage complex.

You can use this command to look at the status of each storage image in the list. The storage image worldwide node name (WWNN) is displayed when this command is used. You must use the storage image WWNN with the **lsavailpprcport** and **mkpprcpath** commands.

**Parameters**

-s

(Optional) Displays only the storage image IDs. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays the default output, ESSNet, volume group, and storage image description. You cannot use the **-l** and the **-s** parameters together.

-state online | offline | fenced

(Optional) Displays only the storage images in the specified state.

-su_id storage_unit_ID...

(Optional) Displays the storage images that are associated with the specified storage system. A storage system ID consists of manufacturer, machine type, and serial number.

storage_image_ID ... | -

(Optional) Accepts fully qualified storage image IDs. A storage image ID consists of manufacturer, machine type, and serial number. You must separate multiple IDs with a space between each ID.

Note: You cannot specify ID ranges.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying a list of storage images in a storage complex

The following tables represent the headers that are displayed on the output report that is associated with the **lssi** command by using the **-l** parameter. The input values differ when you use the **su_ID** and **storage_image_ID** parameters.

```
dscli> lssi -l
```

The resulting output

| Name | ID | Storage System | Model | WWNN |
|------|------------------|------------------|-------|----------------------|
| DS 1 | IBM.2107-75FA120 | IBM.2107-75FA120 | 921 | 3007ACF30 12399E0 |

| State | ESSNet | Volume Group | Desc |
|--------|---------|--------------|-----------------------------|
| Online | Enabled | - | This is my DS storage Image |

Output definitions

Name

The name that you assigned to the storage system.

ID*

The storage image ID that consists of the manufacture, machine type, and serial number.

Storage System

The storage system ID that consists of the manufacture, machine type, and serial number.

Model

The model number that is associated with the storage system.

WWNN

The worldwide node name that is assigned to the storage system.

State

The status of the storage system. One of the following values are displayed:

Online

The storage system is available to process all functions.

Offline

The storage system is offline and not capable of processing any functions.

Resuming

The storage system is preparing to come online.

Quiescing

The storage system is preparing to go offline.

Quiesce Exception

The storage system is in the quiesce exception state.

Forced Quiescing

The storage system is preparing for a force offline operation.

Fenced

The storage system failed and is offline.

ESSNet*

The storage-complex ESSNet user interface can start Copy Services operations to this storage image. Enabled and Disabled are the values that are displayed in this field.

Volume Group*

The ESSNet Copy Services Volume Group ID or displays a " - " in this field.

If ESSNet Copy Services operations are enabled, the value that is displayed in this field specifies the ESSNet Copy Services type volume group. This volume group contains the logical volumes that can be controlled by Copy Services operations that are initiated through the ESSNet.

If ESSNet Copy Services operations are enabled and the ESSNet Copy Services Volume Group ID is not specified (represented by the "-" value in this field), all logical volumes are eligible to be controlled by Copy Services operations that are initiated through the ESSNet.

Desc⁺

The value that is assigned as a description for the storage system.

Key:

Displayed when the **-s** parameter is specified.

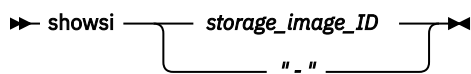
+

Displayed only when the **-l** parameter is specified.

showsi

The **showsi** command displays detailed properties of a storage image.

The storage image worldwide node name (WWNN) is displayed when this command is used. You must use the storage image WWNN with the **lsavailpprcport** and **mkpprcpath** commands.



Parameters

storage_image_ID | -

(Required) The storage image ID. A storage image ID consists of a manufacturer, machine type, and serial number.

If you use the dash (-), the specified value is read from standard input. However, you cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displaying detailed properties of a storage image

The following tables represent the headers that are displayed on the output report that is associated with the **showsi** command.

```
dsccli> showsi IBM.2107-75FA120
```

Output

| | |
|------------------|---------------------|
| Name | sherwood |
| Desc | - |
| ID | IBM.2107-75NA901 |
| Storage Unit | IBM.2107-75NA900 |
| Model | 996 |
| WWNN | 5005076408FEC795 |
| Signature | 9719-5d08-1865-1091 |
| State | Online |
| ESSNet | Enabled |
| Volume Group | V0 |
| os400Serial | 795 |
| NVS Memory | 127.5 GB |
| Cache Memory | 1867.3 GB |
| Processor Memory | 1912.9 GB |
| MTS | IBM.5631-75NA910 |
| numegsupported | 16 |
| ETAutoMode | all |
| ETMonitor | all |
| IOPMmode | Disabled |
| ETCCMode | - |
| ETHMTMode | Enabled |

| | |
|-----------------|------------------|
| ETSMode | Enabled |
| ETTierOrder | High utilization |
| ETAutoModeAccel | Enabled |

Output definitions

Name

The name that you assigned to the storage system.

Desc

The value that you assigned as a description for the storage system.

ID

The storage image ID that consists of the manufacture, machine type, and serial number.

Storage Unit

The storage system ID that consists of the manufacture, machine type, and serial number.

Model

The model number that is associated with the storage system.

WWNN

The worldwide node name that is assigned to the storage system.

Signature

The machine signature that is represented by 12 hexadecimal digits in the format xxxx-xxxx-xxxx.

State

The status of the storage system. One of the following values are displayed:

Online

The storage system is available to process all functions.

Offline

The storage system is not capable of processing any functions.

Resuming

The storage system is starting to come online.

Quiescing

The storage system is starting to go offline.

Quiesce Exception

The storage system is in the quiesce exception state.

Forced Quiescing

The storage system is starting a force offline operation.

Fenced

The storage system has failed and is offline.

Discovery

The storage system is determining which physical configurations are available and updates itself when it discovers new hardware.

ESSNet

The storage-complex ESSNet user interface can start Copy Services operations to this storage image. Enabled or Disabled are the values that are displayed in this field.

Volume Group

The ESSNet Copy Services Volume Group ID or displays a " - " in this field.

If ESSNet Copy Services operations are enabled, the value that is displayed in this field specifies the ESSNet Copy Services type volume group. This volume group contains the logical volumes that can be controlled by Copy Services operations that are initiated through the ESSNet.

If ESSNet Copy Services operations are enabled and the ESSNet Copy Services Volume Group ID is not specified (represented by the " - " value in this field), all logical volumes are eligible to be controlled by Copy Services operations that are initiated through the ESSNet.

NVS Memory

The amount in gigabytes (GB) of nonvolatile storage (NVS) memory that is configured on the storage system. Example 16.0 GB.

Cache Memory

The amount in gigabytes (GB) of cache memory that is configured on the storage system. This memory equals the processor memory less the memory that is required for the operating system (varies with Licensed Internal Code level), NVS, and the tables that are required to manage the cache memory.

Processor Memory

The amount in gigabytes (GB) of processor memory that is configured on the storage system. Processor memory equals the installed memory less the reserved memory requirements, including firmware memory, and varies with the model, the configuration, and the Licensed Internal Code level.

MTS

The order type of the storage system. The order type varies according to the warranty periods that are associated with the storage system.

numegsupported

The number of key groups that are supported.

ETAutoMode

The automatic mode of the Easy Tier LIC feature when the Easy Tier feature is active. The manual mode is always active if the Easy Tier LIC feature is active.

all

The Easy Tier automatic mode is active on all pools.

tiered

The Easy Tier automatic mode is active only on pools with multiple tiers.

none

The Easy Tier automatic mode is not active on any pools.

-

The Easy Tier feature, both automatic and manual modes, is not supported.

ETMonitor

If volumes are monitored by the Easy Tier LIC feature.

all

Easy Tier monitors all of the volumes on the system, regardless of the state of the Easy Tier LIC feature.

automode

Easy Tier monitors only those volumes that are managed by the Easy Tier automatic mode as specified by the **-etautomode** parameter.

none

Easy Tier monitors none of the volumes on the system.

-

The Easy Tier feature is not supported.

ETCCMode

Easy Tier cooperative caching. The Easy Tier cooperative caching function is also known as Easy Tier Server.

Note: Starting with Release 8, the **etccmode** parameter is no longer supported.

Enabled

All volumes are allowed to participate in Easy Tier cooperative caching. Only volumes that are monitored by Easy Tier can participate in Easy Tier cooperative caching.

Disabled

No volumes are allowed to participate in Easy Tier cooperative caching.

-

The system does not support Easy Tier cooperative caching.

ETHMTMode

If the Easy Tier heat map transfer feature is enabled on this storage facility image.

Enabled

The Easy Tier heat map transfer is enabled.

Disabled

The Easy Tier heat map transfer feature is not enabled.

-

The storage system does not support the Easy Tier heat map transfer feature.

ETSRMode

If space is reserved for Easy Tier data migration.

Enabled

Easy Tier space reservation control is enabled. Enable is the default, which specifies that the required space for Easy Tier to do storage optimization actions is pre-reserved in each pool. The reserved space is counted as the pool overhead, and usually it is only a small amount of the space.

Disabled

Easy Tier space reservation control is disabled. This value specifies that space is not pre-reserved for Easy Tier to do storage optimization actions. Ensure that you leave enough space in the storage pool for Easy Tier processing. If you select disable and the pool does not have enough free space, Easy Tier stops running storage optimization actions.

-

A dash (-) displays if the storage system does not support the Easy Tier space reservation function.

ETAutoModeAccel

The setting (enable or disable) of the Easy Tier Automatic Mode Acceleration control. When set to enabled, the maximum amount of data that Easy Tier can automatically migrate in a given amount of time is doubled. This occurrence might cause your existing workload to experience increased latency and decreased bandwidth while migration occurs.

Note: Set this value to disable after data that Easy Tier migrates is redistributed.

ETTierOrder

The order in which drive classes are chosen when capacity is allocated in pools.

A dash (-) displays if the storage system does not support the Easy Tier allocation method.

Table 14. The table includes the tiers for the **highutil** and **highperf** options according to storage type.

Note: The default for hybrid storage systems is **highutil** and the default for All Flash storage systems is **highperf**.

| highutil | | highperf | |
|---------------------------|---------------------------|---------------------------|------------|
| All Flash | Hybrid | All Flash | Hybrid |
| FlashTier1 ⁽¹⁾ | Enterprise ⁽²⁾ | FlashTier0 ⁽³⁾ | FlashTier0 |
| FlashTier2 ⁽⁴⁾ | FlashTier1 | FlashTier1 | FlashTier1 |
| FlashTier0 | FlashTier2 | FlashTier2 | FlashTier2 |
| | Nearline ⁽⁵⁾ | | Enterprise |
| | FlashTier0 | | Nearline |

Notes:

1. The first tier of high capacity flash drives.
2. The tier that consists of drives with speeds of 10K RPM, 15K RPM, or a mixtures of 10K RPM and 15K RPM speeds.

zseries

The power control mode is set to zSeries remote power control.

Note: Changing the power mode can take several minutes. Initiating a power-on or power-off request in manual mode can take up to 25 minutes. During a power-on or power-off request, access requests to the storage system might be queued. This queuing can result in a loss of response on other functions that access the storage system when accessed by the CLI.

-pwr_{on}

(Optional) Turns on power to the storage system. This parameter is valid if the control mode is set to manual and the switch is set to remote.

-pwr_{off}

(Optional) Turns off power to the storage system. This parameter is valid if the control mode is set to manual and the switch is set to remote.

-quiet

(Optional) Turns off the modification confirmation prompt for this command.

-desc *new_su_description*

(Optional) Allows you to specify a description for the storage system. The description is limited to 256 byte or 128 double-byte characters.

-name *new_su_name*

(Optional) Allows you to specify a user-defined name for the storage system. This name is limited to 32 bytes or 16 double-byte characters.

-ertestmode **enable** | **disable**

(Optional) Enables or disables the Energy Report test mode.

enable

Energy Report readings are averaged over a 30-second period.

disable

Energy Report readings are averaged over a 5-minute period.

Note: Disabling the Energy Report test mode at test completion is recommended.

storage_unit_ID | -

(Required) Accepts the fully qualified storage system ID. The storage system ID consists of manufacturer, machine type, and serial number. For example, IBM.2107-75FA120.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Modifying a storage system

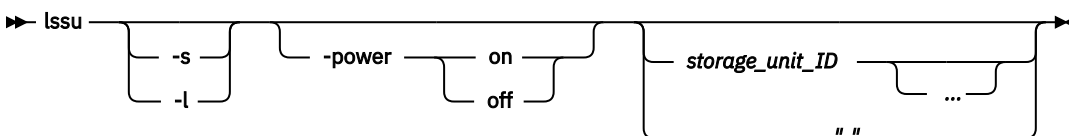
```
dsccli> chsu -pwrmode manual IBM.2107-75FA120
```

Output

```
Storage system IBM.2107-75FA120 successfully modified.
```

lssu

The **lssu** command displays a list of storage systems in a storage complex. You can use this command to review the status and other properties of each storage system in the list.



Parameters

-s

(Optional) Displays only the storage system ID. You cannot use the **-l** and the **-s** parameters together.

-l

(Optional) Displays default output plus the power mode and storage system description. You cannot use the **-l** and the **-s** parameters together.

-power on | off

(Optional) Displays only the storage systems in the specified power state.

storage_unit_ID ... | -

(Optional) Displays storage systems with the specified storage system IDs. A storage system ID includes manufacturer, machine type, and serial number. You must separate multiple IDs with a space between each ID.

Note: You cannot specify ID ranges.

The ellipsis (...) indicates that, optionally, you can specify multiple values. If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displays a list of storage systems in a storage complex

The following table represents the headers that are displayed on the output report that is associated with the **lssu** command when you use the **-l** parameter.

```
dsccli> lssu -l
```

Output

| Name | ID | Model | WWNN | Pw State | Pw Mode | Desc |
|------|------------------|-------|--------------------------|----------|---------|------------|
| SU 1 | IBM.2107-75FA110 | 961 | 3007ACF 3012399 E0 | On | Local | Test |
| SU 2 | IBM.2107-75FA120 | 961 | 3007ACF 3045699 E0 | On | Local | Production |
| SU 3 | IBM.2107-75FA130 | 961 | 3007ACF 3078999 E0 | On | Local | Backup |

Output definitions

Name

The user-defined name for each storage system that is found within the storage complex. This value is "-" if you did not assign a name to a storage system.

ID

The storage system ID that consists of the manufacture name, machine type, and serial number. When the **-s** parameter is used, this is the only information that is displayed for the **lssu** command.

Model

The model number of the storage system.

WWNN

The World Wide Node Name for the listed storage system. This value is "-" if the WWNN is not known.

Pw State

The power status of the listed storage system. One of the following values is displayed:

On

The storage system power is on.

Off

The storage system power is off.

Turning On

The storage system power is turning on.

Turning Off

The storage system power is turning off.

Power Exception

Storage system power is on, but online operation is not possible due to a power fault in one of the storage system frames.

Pw Mode

The power control mode in effect for the listed storage system. One of the following values is displayed:

Local

The SMC local/remote switch is set to the local power control mode.

Remote SMC Manual

The SMC local/remote switch is set to remote and that the power control mode is set to manual power control.

Remote SMC Auto

The SMC local/remote switch is set to remote and that the power control mode is set to auto-power control.

Remote zSeries Power Control

The SMC local/remote switch is set to remote and that the power control mode is set to zSeries remote power control.

Desc

The description that you assigned the storage system. This value is displayed as a "-" if no description is assigned.

showsu

The **showsu** command displays detailed properties of an individual storage system.

```
▶▶ showsu storage_unit_ID ▶▶  
      " - "
```

Parameters

storage_unit_ID

(Required) The storage system ID. A storage system ID consists of manufacturer, machine type, and serial number.

If you use the dash (-), the specified value is read from standard input. You cannot use the dash (-) while you are in the DS CLI interactive command mode.

Example: Displays detailed properties of an individual storage system

The following table represents the headers that are displayed on the output report that is associated with the **showsu** command.

```
dsccli> showsu IBM.2107-75FA120
```

Output

| Name | Desc | ID | Model | WWNN | Config |
|-------------------|------------------------------|------------------|-------|--------------------------|----------------------|
| My storage system | This is my DS storage system | IBM.2107-75FA120 | 921 | 3007ACF 3012399 E0 | 4-way, single SFI |

| Pw State | Pw Mode | Reqpm | System Memory | MTS |
|----------|---------|-------------------------|---------------|------------------|
| On | Local | Remote SMC manual | 1 GB | IBM.2424-75FA120 |

| ER Test Mode | ER Recorded | ER Power Usage | ER Inlet Temp | ER I/O Usage | ER Data Usage |
|--------------|------------------------------|----------------|---------------|--------------|---------------|
| Disabled | 2013-04-08T13: 19:10-0700 | 5161 | 19.23 | 26 | 42 |

Output definitions

Name

The name that you assigned for the designated storage system. This value is " - " if you did not assign a name to a storage system.

Desc

The description that you assigned for the designated storage system. This value is displayed as a " - " if no description is assigned.

ID

Indicates the storage system ID that consists of the manufacture name, machine type, and serial number.

Model

The model number of the designated storage system.

WWNN

The World Wide Node Name for the listed storage system. This value is " - " if the WWNN is not known.

Config

The internal I/O interface configuration for the storage system. One of the following values is displayed:

Undefined

The configuration is undefined. The value indicates that either this information is not supported for this storage system model, or a configuration upgrade is in progress that can cause the configuration option to change.

2-way, single SFI

There are two processors and a single storage facility image.

4-way, single SFI

There are four processors and a single storage facility image.

8-way, single SFI

There are eight processors and a single storage facility image.

Pw State

The power status of the listed storage system. One of the following values is displayed:

On

The storage system power is on.

Off

The storage system power is off.

Turning On

The storage system power is turning on.

Turning Off

The storage system power is turning off.

Power® Exception

Storage system power is on, but online operation is not possible due to a power fault in one of the storage system frames.

Pw Mode

The power control mode in effect for the listed storage system. One of the following values is displayed:

Local

The SMC local/remote switch is set to the local power control mode.

Remote SMC Manual

The SMC local/remote switch is set to remote and that the power control mode is set to manual power control.

Remote SMC Auto

The SMC local/remote switch is set to remote and that the power control mode is set to auto-power control.

Remote zSeries Power Control

The SMC local/remote switch is set to remote and that the power control mode is set to zSeries remote power control.

Reqpm

The power control mode to apply when the local/remote switch is set to remote power control mode. One of the following values is displayed:

- Remote SMC Manual
- Remote SMC Auto
- Remote zSeries Power Control

Note: The default value is remote SMC Manual mode.

System Memory

The amount in gigabytes (GB) of memory that is configured on the storage system.

MTS

The order type of the storage system. The order type varies according to the warranty periods associated with the storage system.

ER Test Mode

The state of the Energy Report test mode.

Disabled

The Energy Report test mode is disabled.

Enabled

The Energy Report test mode is enabled.

"_"

The dash (-) indicates that the Energy Report test mode is not supported on the system.

ER Recorded

The time stamp of the last successful Energy Report readings, in ISO8601 format. The format is *yyyy-MM-dd'T'HH:mm:ssZ*, where

- *yyyy* = the year

- *MM* = the month (01-12)
- *dd* = the day (01-31)
- *HH* = the hour (00-23)
- *mm* = the minutes (00-59)
- *ss* = the seconds (00-59)
- *Z* = the time zone offset from UTC [*-HHmm* | *+HHmm*]

Example: 2013-04-08T13:19:10-0700.

Unknown

The Energy Report recording is supported on the system, but the value is not readable.

"_"

The dash (-) indicates that the Energy Report recording is not supported on the system.

ER Power Usage

The average total power usage, which is measured over a 5-minute period, in watts.

Unknown

The Energy Report recording is supported on the system, but the value is not readable.

"_"

The dash (-) indicates that the Energy Report recording is not supported on the system.

ER Inlet Temp

The average inlet temperature, which is measured over a 5-minute period, in degrees Celsius.

Unknown

The Energy Report recording is supported on the system, but the value is not readable.

"_"

The dash (-) indicates that the Energy Report recording is not supported on the system.

ER I/O Usage

The average I/O usage, which is measured over a 5-minute period, in KIOPS (1000 I/Os/second).

Unknown

The Energy Report recording is supported on the system, but the value is not readable.

"_"

The dash (-) indicates that the Energy Report recording is not supported on the system.

ER Data Usage

The average data usage, which is measured over a 5-minute period, in MB/s (1,000,000 bytes/second).

Unknown

The Energy Report recording is supported on the system, but the value is not readable.

"_"

The dash (-) indicates that the Energy Report recording is not supported on the system.

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Printed in USA

SC27-9562-06

