IBM TotalStorage DS6000

IBM

Command-Line Interface
User's Guide

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Command-Line Interface
User's Guide

> **Note:**
> Before using this information and the product it supports, read the information in the **Safety and environmental notices** and **Notices** sections.

Fifth Edition (May 2005)

Contents

About this guide

This publication introduces the IBM TotalStorage DS Command-Line Interface application and provides instructions for installing it.

This publication provides descriptions of the following components:

- Each command-line interface command.
- Each system message that appears in the command-line interface application.
- Each system message that appears in the management console application.

This publication is for the storage system administrator or the person who is responsible for installing and using the DS Command-Line Interface in your enterprise. It is written for a user who understands the concepts of a command-line interface application and writing scripts and who has a knowledge of the operating systems and the storage systems in your enterprise.

Safety and environmental notices

This section contains information about safety notices that are used in this guide and environmental notices for this product.

Safety notices

Use this process to find information about safety notices.

To find the translated text for a danger or caution notice:

1. Look for the identification number at the end of each danger notice or each caution notice. In the following examples, the numbers **1000** and **1001** are the identification numbers.

   DANGER

   > **A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury.**
   >
   > **1000**

   CAUTION:
   A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.

   1001

2. Find the number that matches in the *IBM TotalStorage Solutions Safety Notices for IBM Versatile Storage Server and IBM TotalStorage Enterprise Storage Server*, GC26-7229.

Environmental notices

This section identifies the environmental guidelines that pertain to this product.

Product recycling

This unit contains recyclable materials.

Recycle these materials at your local recycling sites. Recycle the materials according to local regulations. In some areas, IBM provides a product take-back program that ensures proper handling of the product. Contact your IBM representative for more information.

Disposing of products

This topic contains information about how to dispose of products.

This unit might contain batteries. Remove and discard these batteries, or recycle them, according to local regulations.

Conventions used in this guide

The following typefaces are used to show emphasis:

boldface

Text in **boldface** represents menu items and lowercase or mixed-case command names.

italics Text in *italics* is used to emphasize a word. In command syntax, it is used for variables for which you supply actual values.

`monospace`

Text in `monospace` identifies the data or commands that you type, samples of command output, or examples of program code or messages from the system.

Related information

The tables in this section list and describe the following publications:

- The publications that make up the IBM® TotalStorage™ DS6000 series library
- Other IBM publications that relate to the DS6000 series
- Non-IBM publications that relate to the DS6000 series

See "Ordering IBM publications" on page xiv for information about how to order publications in the IBM TotalStorage DS6000 series publication library. See "How to send your comments" on page xv for information about how to send comments about the publications.

DS6000 series library

These customer publications make up the DS6000 series library.

Unless otherwise noted, these publications are available in Adobe portable document format (PDF) on a compact disc (CD) that comes with the storage unit. If you need additional copies of this CD, the order number is SK2T-8803. These publications are also available as PDF files by clicking on the **Documentation link** on the following Web site:

http://www-1.ibm.com/servers/storage/disk/ds6000

See "Ordering IBM publications" on page xiv for information about ordering these and other IBM publications.

Title	Description	Order Number
IBM® TotalStorage® DS: Command-Line Interface User's Guide	This guide describes the commands that you can use from the command-line interface (CLI) for managing your DS6000 configuration and Copy Services relationships. The CLI application provides a set of commands that you can use to write customized scripts for a host system. The scripts initiate predefined tasks in a Copy Services server application. You can use the CLI commands to indirectly control Remote Mirror and Copy and FlashCopy® configuration tasks within a Copy Services server group.	GC26-7681 (See Note.)
IBM TotalStorage DS6000: Host Systems Attachment Guide	This guide provides guidelines for attaching the DS6000 to your host system and for migrating to fibre-channel attachment from a small computer system interface.	GC26-7680 (See Note.)
IBM TotalStorage DS6000: Introduction and Planning Guide	This guide introduces the DS6000 product and lists the features you can order. It also provides guidelines for planning the installation and configuration of the storage unit.	GC26-7679

Title	Description	Order Number
IBM TotalStorage Multipath Subsystem Device Driver User's Guide	This publication describes how to use the IBM Subsystem Device Driver (SDD) on open-systems hosts to enhance performance and availability on the DS6000. SDD creates redundant paths for shared logical unit numbers. SDD permits applications to run without interruption when path errors occur. It balances the workload across paths, and it transparently integrates with applications.	SC30-4096
IBM TotalStorage DS Application Programming Interface Reference	This publication provides reference information for the IBM TotalStorage DS application programming interface (API) and provides instructions for installing the Common Information Model Agent, which implements the API.	GC35-0493
IBM TotalStorage DS6000 Messages Reference	This publication provides explanations of error, information, and warning messages that are issued from the DS6000 user interfaces.	GC26-7682
IBM TotalStorage DS6000 Installation, Troubleshooting, and Recovery Guide	This publication provides reference information for installing and troubleshooting the DS6000. It also discusses disaster recovery using Copy Services.	GC26-7678
IBM TotalStorage DS6000 Quick Start Card	This is a quick start guide for use in installing and configuring the DS6000 series.	GC26-7685
Note: No hardcopy book is produced for this publication. However, a PDF file is available from the following Web site: http://www-1.ibm.com/servers/storage/disk/ds6000		

Other IBM publications

Other IBM publications contain additional information that is related to the DS product library.

The following list is divided into categories to help you find publications that are related to specific topics. Some of the publications are listed under more than one category. See "Ordering IBM publications" on page xiv for information about ordering these and other IBM publications.

Title	Description	Order Number
Data-copy services		
z/OS DFSMS Advanced Copy Services	This publication helps you understand and use IBM Advanced Copy Services functions. It describes three dynamic copy functions and several point-in-time copy functions. These functions provide backup and recovery of data if a disaster occurs to your data center. The dynamic copy functions are peer-to-peer remote copy, extended remote copy, and coupled extended remote copy. Collectively, these functions are known as remote copy. FlashCopy, SnapShot, and concurrent copy are the point-in-time copy functions.	SC35-0428
IBM Enterprise Storage Server	This publication, from the IBM International Technical Support Organization, introduces the Enterprise Storage Server and provides an understanding of its benefits. It also describes in detail the architecture, hardware, and functions, including the advanced copy functions, of the Enterprise Storage Server.	SG24-5465

Title	Description	Order Number
Implementing Copy Services 0n S/390	This publication, from the IBM International Technical Support Organization, tells you how to install, customize, and configure Copy Services on an Enterprise Storage Server that is attached to an S/390 or zSeries host system. Copy Services functions include peer-to-peer remote copy, extended remote copy, FlashCopy®, and concurrent copy. This publication describes the functions, prerequisites, and corequisites and describes how to implement each function into your environment.	SG24-5680
IBM TotalStorage ESS Implementing Copy Services in an Open Environment	This publication, from the IBM International Technical Support Organization, tells you how to install, customize, and configure Copy Services on UNIX, Windows NT®, Windows 2000, Sun Solaris, HP-UX, Tru64, OpenVMS, and iSeries host systems. The Copy Services functions that are described include peer-to-peer remote copy and FlashCopy. This publication describes the functions and shows you how to implement them into your environment. It also shows you how to implement these functions in a high-availability cluster multiprocessing environment.	SG24-5757
Fibre channel		
Fibre Channel Connection (FICON) I/O Interface: Physical Layer	This publication provides information about the fibre-channel I/O interface. This book is also available as a PDF file from the following Web site: http://www.ibm.com/servers/resourcelink/	SA24-7172
Fibre Transport Services (FTS): Physical and Configuration Planning Guide	This publication provides information about fibre-optic and ESCON-trunking systems.	GA22-7234
IBM SAN Fibre Channel Switch: 2109 Model S08 Installation and Service Guide	This guide describes how to install and maintain the IBM SAN Fibre Channel Switch 2109 Model S08.	SC26-7350
IBM SAN Fibre Channel Switch: 2109 Model S08 User's Guide	This guide describes the IBM SAN Fibre Channel Switch and the IBM TotalStorage ESS Specialist. It provides information about the commands and how to manage the switch with Telnet and the Simple Network Management Protocol.	SC26-7349
IBM SAN Fibre Channel Switch: 2109 Model S16 Installation and Service Guide	This publication describes how to install and maintain the IBM SAN Fibre Channel Switch 2109 Model S16. It is intended for trained service representatives and service providers.	SC26-7352
IBM SAN Fibre Channel Switch: 2109 Model S16 User's Guide	This guide introduces the IBM SAN Fibre Channel Switch 2109 Model S16 and tells you how to manage and monitor the switch using zoning and how to manage the switch remotely.	SC26-7351
Implementing Fibre Channel Attachment on the ESS	This publication, from the IBM International Technical Support Organization, helps you install, tailor, and configure fibre-channel attachment of open-systems hosts to the Enterprise Storage Server. It provides you with a broad understanding of the procedures that are involved and describes the prerequisites and requirements. It also shows you how to implement fibre-channel attachment.	SG24-6113
Open-systems hosts		

Title	Description	Order Number
ESS Solutions for Open Systems Storage: Compaq AlphaServer, HP, and Sun	This publication, from the IBM International Technical Support Organization, helps you install, tailor, and configure the Enterprise Storage Server when you attach Compaq AlphaServer (running Tru64 UNIX), HP, and Sun hosts. This book does not cover Compaq AlphaServer that is running the OpenVMS operating system. This book also focuses on the settings that are required to give optimal performance and on the settings for device driver levels. This book is for the experienced UNIX professional who has a broad understanding of storage concepts.	SG24-6119
IBM TotalStorage ESS Implementing Copy Services in an Open Environment	This publication, from the IBM International Technical Support Organization, tells you how to install, customize, and configure Copy Services on UNIX or Windows 2000 host systems. The Copy Services functions that are described include peer-to-peer remote copy and FlashCopy. This publication describes the functions and shows you how to implement them into your environment. It also shows you how to implement these functions in a high-availability cluster multiprocessing environment.	SG24-5757
Implementing Fibre Channel Attachment on the ESS	This publication, from the IBM International Technical Support Organization, helps you install, tailor, and configure fibre-channel attachment of open-systems hosts to the Enterprise Storage Server. It gives you a broad understanding of the procedures that are involved and describes the prerequisites and requirements. It also shows you how to implement fibre-channel attachment.	SG24-6113
S/390 and zSeries hosts		
Device Support Facilities: User's Guide and Reference	This publication describes the IBM Device Support Facilities (ICKDSF) product that are used with IBM direct access storage device (DASD) subsystems. ICKDSF is a program that you can use to perform functions that are needed for the installation, the use, and the maintenance of IBM DASD. You can also use it to perform service functions, error detection, and media maintenance.	GC35-0033
z/OS Advanced Copy Services	This publication helps you understand and use IBM Advanced Copy Services functions. It describes three dynamic copy functions and several point-in-time copy functions. These functions provide backup and recovery of data if a disaster occurs to your data center. The dynamic copy functions are peer-to-peer remote copy, extended remote copy, and coupled extended remote copy. Collectively, these functions are known as remote copy. FlashCopy, SnapShot, and concurrent copy are the point-in-time copy functions.	SC35-0428
DFSMS/MVS V1: Remote Copy Guide and Reference	This publication provides guidelines for using remote copy functions with S/390 and zSeries hosts.	SC35-0169
Fibre Transport Services (FTS): Physical and Configuration Planning Guide	This publication provides information about fibre-optic and ESCON-trunking systems.	GA22-7234
Implementing ESS Copy Services on S/390	This publication, from the IBM International Technical Support Organization, tells you how to install, customize, and configure Copy Services on an Enterprise Storage Server that is attached to an S/390 or zSeries host system. Copy Services functions include peer-to-peer remote copy, extended remote copy, FlashCopy, and concurrent copy. This publication describes the functions, prerequisites, and corequisites and describes how to implement each function into your environment.	SG24-5680

Title	Description	Order Number
ES/9000, ES/3090: IOCP User Guide Volume A04	This publication describes the Input/Output Configuration Program that supports the Enterprise Systems Connection (ESCON) architecture. It describes how to define, install, and configure the channels or channel paths, control units, and I/O devices on the ES/9000 processors and the IBM ES/3090 Processor Complex.	GC38-0097
IOCP User's Guide, IBM e(logo)server zSeries 800 and 900	This publication describes the Input/Output Configuration Program that supports the zSeries 800 and 900 servers. This publication is available in PDF format by accessing ResourceLink at the following Web site: www.ibm.com/servers/resourcelink/	SB10-7029
IOCP User's Guide, IBM e(logo)server zSeries	This publication describes the Input/Output Configuration Program that supports the zSeries server. This publication is available in PDF format by accessing ResourceLink at the following Web site: www.ibm.com/servers/resourcelink/	SB10-7037
S/390: Input/Output Configuration Program User's Guide and ESCON Channel-to-Channel Reference	This publication describes the Input/Output Configuration Program that supports ESCON architecture and the ESCON multiple image facility.	GC38-0401
IBM z/OS Hardware Configuration Definition User's Guide	This guide provides conceptual and procedural information to help you use the z/OS Hardware Configuration Definition (HCD) application. It also explains: • How to migrate existing IOCP/MVSCP definitions • How to use HCD to dynamically activate a new configuration • How to resolve problems in conjunction with MVS/ESA HCD	SC33-7988
OS/390: Hardware Configuration Definition User's Guide	This guide provides detailed information about the input/output definition file and about how to configure parallel access volumes. This guide discusses how to use Hardware Configuration Definition for both OS/390® and z/OS V1R1.	SC28-1848
OS/390 V2R10.0: MVS System Messages Volume 1 (ABA - ASA)	This publication lists OS/390 MVS™ system messages ABA to ASA.	GC28-1784
Using IBM 3390 Direct Access Storage in a VM Environment	This publication provides device-specific information for the various models of the 3390 and describes methods you can use to manage storage efficiently using the VM operating system. It provides guidance on managing system performance, availability, and space through effective use of the direct access storage subsystem.	GG26-4575
Using IBM 3390 Direct Access Storage in a VSE Environment	This publication helps you use the 3390 in a VSE environment. It includes planning information for adding new 3390 units and instructions for installing devices, migrating data, and performing ongoing storage management activities.	GC26-4576
Using IBM 3390 Direct Access Storage in an MVS Environment	This publication helps you use the 3390 in an MVS environment. It includes device-specific information for the various models of the 3390 and illustrates techniques for more efficient storage management. It also offers guidance on managing system performance, availability, and space utilization through effective use of the direct access storage subsystem.	GC26-4574
z/Architecture Principles of Operation	This publication provides a detailed definition of the z/Architecture™. It is written as a reference for use primarily by assembler language programmers and describes each function at the level of detail needed to prepare an assembler language program that relies on a particular function. However, anyone concerned with the functional details of z/Architecture will find this publication useful.	SA22-7832

Title	Description	Order Number
	SAN	
IBM OS/390 Hardware Configuration Definition User's Guide	This guide explains how to use the Hardware Configuration Data application to perform the following tasks: • Define new hardware configurations • View and modify existing hardware configurations • Activate configurations • Query supported hardware • Maintain input/output definition files (IODFs) • Compare two IODFs or compare an IODF with an actual configuration • Print reports of configurations • Create graphical reports of a configuration • Migrate existing configuration data	SC28-1848
IBM SAN Fibre Channel Switch: 2109 Model S08 Installation and Service Guide	This guide describes how to install and maintain the IBM SAN Fibre Channel Switch 2109 Model S08.	SC26-7350
IBM SAN Fibre Channel Switch: 2109 Model S08 User's Guide	This guide describes the IBM SAN Fibre Channel Switch and the IBM TotalStorage ESS Specialist. It provides information about the commands and how to manage the switch with Telnet and the Simple Network Management Protocol (SNMP).	SC26-7349
IBM SAN Fibre Channel Switch: 2109 Model S16 Installation and Service Guide	This publication describes how to install and maintain the IBM SAN Fibre Channel Switch 2109 Model S16. It is intended for trained service representatives and service providers.	SC26-7352
IBM SAN Fibre Channel Switch: 2109 Model S16 User's Guide	This guide introduces the IBM SAN Fibre Channel Switch 2109 Model S16 and tells you how to manage and monitor the switch using zoning and how to manage the switch remotely.	SC26-7351
Implementing Fibre Channel Attachment on the ESS	This publication, from the IBM International Technical Support Organization, helps you install, tailor, and configure fibre-channel attachment of open-systems hosts to the Enterprise Storage Server. It provides you with a broad understanding of the procedures that are involved and describes the prerequisites and requirements. It also shows you how to implement fibre-channel attachment.	SG24-6113
	Storage management	
Device Support Facilities: User's Guide and Reference	This publication describes the IBM Device Support Facilities (ICKDSF) product used with IBM direct access storage device (DASD) subsystems. ICKDSF is a program that you can use to perform functions that are needed for the installation, the use, and the maintenance of IBM DASD. You can also use it to perform service functions, error detection, and media maintenance.	GC35-0033
IBM TotalStorage Solutions Handbook	This handbook, from the IBM International Technical Support Organization, helps you understand what makes up enterprise storage management. The concepts include the key technologies that you must know and the IBM subsystems, software, and solutions that are available today. It also provides guidelines for implementing various enterprise storage administration tasks so that you can establish your own enterprise storage management environment.	SG24-5250

Ordering IBM publications

This section tells you how to order copies of IBM publications and how to set up a profile to receive notifications about new or changed publications.

IBM publications center

The publications center is a worldwide central repository for IBM product publications and marketing material.

The IBM publications center offers customized search functions to help you find the publications that you need. Some publications are available for you to view or download free of charge. You can also order publications. The publications center displays prices in your local currency. You can access the IBM publications center through the following Web site:

http://www.ibm.com/shop/publications/order

Publications notification system

The IBM publications center Web site offers you a notification system for IBM publications.

If you register, you can create your own profile of publications that interest you. The publications notification system sends you a daily e-mail that contains information about new or revised publications that are based on your profile.

If you want to subscribe, you can access the publications notification system from the IBM publications center at the following Web site:

http://www.ibm.com/shop/publications/order

Web sites

The following Web sites provide information about the IBM TotalStorage DS6000 series and other IBM storage products.

Type of Storage Information	Web Site
Concurrent Copy for S/390 and zSeries host systems	http://www.storage.ibm.com/software/sms/sdm/
Copy Services command-line interface (CLI)	http://www-1.ibm.com/servers/storage/support/software/cscli.html
DS6000 series publications	http://www-1.ibm.com/servers/storage/disk/ds6000 Click **Documentation**.
FlashCopy for S/390 and zSeries host systems	http://www.storage.ibm.com/software/sms/sdm/
Host system models, operating systems, and adapters that the storage unit supports	http://www.ibm.com/servers/storage/disk/ds6000/interop.html Click **Interoperability matrix**.
IBM Disk Storage Feature Activation (DSFA)	http://www.ibm.com/storage/dsfa
IBM storage products	http://www.storage.ibm.com/
IBM TotalStorage DS6000 series	http://www-1.ibm.com/servers/storage/disk/ds6000
IBM version of the Java (JRE) that is often required for IBM products	http://www-106.ibm.com/developerworks/java/jdk/

Type of Storage Information	Web Site
Multiple Device Manager (MDM)	http://www.ibm.com/servers/storage/support/ Click **Storage Virtualization**.
Remote Mirror and Copy (formerly PPRC) for S/390 and zSeries host systems	http://www.storage.ibm.com/software/sms/sdm/
SAN fibre channel switches	http://www.ibm.com/storage/fcswitch/
Storage Area Network Gateway and Router	http://www-1.ibm.com/servers/storage/support/san/index.html
Subsystem Device Driver (SDD)	http://www-1.ibm.com/servers/storage/support/software/sdd.html
z/OS Global Mirror (formerly XRC) for S/390 and zSeries host systems	http://www.storage.ibm.com/software/sms/sdm/

How to send your comments

Your feedback is important to help us provide the highest quality information. If you have any comments about this information or any other DS6000 series documentation, you can submit them in the following ways:

- e-mail

  Submit your comments electronically to the following e-mail address:

  starpubs@us.ibm.com

  Be sure to include the name and order number of the book and, if applicable, the specific location of the text you are commenting on, such as a page number or table number.

- Mail

  Fill out the Readers' Comments form (RCF) at the back of this book. Return it by mail or give it to an IBM representative. If the RCF has been removed, you can address your comments to:

  International Business Machines Corporation
  RCF Processing Department
  Department 61C
  9032 South Rita Road
  TUCSON AZ   85775-4401

Summary of changes for GC26-7681-04 IBM TotalStorage DS6000 Command-Line Interface User's Guide

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

New Information

The following topics were added to this release:

- iSeries OS/400 v5.2 DS CLI installation instructions
- Added the mkaliasvol command which is used to create zSeries CKD alias volumes (also referred to as parallel access volumes) in a storage image.

Changed Information

Many commands were updated or changed. View the revision symbol in the left margin to view the changes that were made to those commands.

Chapter 1. Introduction

The IBM® TotalStorage® DS6000 series is a member of the family of DS products and is built upon 2 Gbps fibre channel technology that provides RAID-protected storage with advanced functionality, scalability, and increased addressing capabilities.

The DS6000 series offers a high reliability and performance midrange storage solution through the use of hot-swappable redundant RAID controllers in a space efficient modular design. The DS6000 series provides storage sharing and consolidation for a wide variety of operating systems and mixed server environments.

The DS6000 series offers high scalability while maintaining excellent performance. With the DS6800 (Model 1750-511), you can install up to 16 disk drive modules (DDMs). The minimum storage capability with 8 DDMs is 584 GB. The maximum storage capability with 16 DDMs for the DS6800 model is 4.8 TB.

If you want to connect more than 16 disks, you use the optional DS6000 expansion enclosures (Model 1750-EX1) that allow a maximum of 224 DDMs per storage system and provide a maximum storage capability of 67 TB.

The DS6800 measures 5.25-in. high and is available in a 19-in. rack mountable package with an optional modular expansion enclosure of the same size to add capacity to help meet your growing business needs.

The DS6000 series addresses business efficiency needs through its heterogeneous connectivity, high performance and manageability functions, thereby helping to reduce total cost of ownership.

The DS6000 series offers the following major features:
- PowerPC 750GX processors
- Dual active controllers provide continuous operations through the use of two processors that form a pair to back up the other
- A selection of 2 GB fibre channel (FC) disk drives, including 73 GB, 146 GB, and 300 GB sizes with speeds of 10 000 or 15 000 revolutions per minute (RPM)
- 2 GB fibre channel and FICON host attachments of up to 8 ports, which can be configured with an intermix of Fibre Channel Protocol (FCP) and FICON
- Fibre channel arbitrated loop (FC AL) switched device attachment of up to 2 dual loops
- Storage virtualization
- Battery backed mirrored cache
- Fully redundant power and cooling system
- Disaster Recovery and Copy Service solutions

Overview of the DS6000 series models

The DS6000 series offers a base enclosure model with storage and optional expansion enclosures.

DS6800 (Model 1750-511)

The DS6800 offers the following features:

- Two FC controller cards
- PowerPC 750GX 1 GHz processor
- 4 GB of cache
- Two battery backup units (one per each controller card)
- Two ac/dc power supplies with imbedded enclosure cooling units
- Eight 2 Gb/sec. device ports
- Connectivity with the availability of two to eight fibre channel/FICON host ports. The host ports auto-negotiate to either 2 Gbps or 1 Gbps link speeds.
- Attachment to 13 DS6000 expansion enclosures.

The DS6800 is a self-contained 3U enclosure that can be mounted in a standard 19-inch rack. The DS6800 comes with authorization for up to 16 internal FC DDMs, offering up to 4.8 TB of storage capability. The DS6800 allows up to 13 DS6000 expansion enclosures to be attached. A storage system supports up to 224 disk drives for a total of up to 67.2 TB of storage.

The DS6800 system offers connectivity with the availability of two to eight Fibre Channel/FICON host ports. The 2 GB fibre channel/FICON host ports, which are offered in long-wave and shortwave, auto-negotiate to either 2 Gbps or 1 Gbps link speeds. This flexibility supports the ability to exploit the potential benefits offered by higher performance, 2 Gbps SAN-based solutions, while also maintaining compatibility with existing 1 Gbps infrastructures. In addition, with the maximum of eight host ports enabled, the DS6800 system can be configured with an intermix of

Fibre Channel Protocol (FCP) and FICON. This can help protect your investment in fibre channel adapters, and increase your ability to migrate to new servers.

The DS6800 system offers connectivity support across a broad range of server environments, including IBM eServer™, zSeries®, iSeries™, and pSeries® servers as well as servers from Sun Microsystems, Hewlett-Packard, and other Intel-based providers. This rich support of heterogeneous environments and attachments, along with the flexibility to easily partition the DS6800 system storage capacity among the attached environments, helps support storage consolidation requirements and dynamic, changing environments.

DS6000 expansion enclosure (Model 1750-EX1)

The DS6000 series expansion enclosure contains the following features:
- Two expansion controller cards. Each controller card provides the following:
  - 2 inbound ports (2 Gb/sec.)
  - 2 outbound ports (2 Gb/sec.)
  - 1 FC switch per controller card
- Controller disk enclosure that holds up to 16 FC DDMs
- Two ac/dc power supplies with imbedded enclosure cooling units
- Supports attachment to DS6800

The 3U DS6000 expansion enclosure can be mounted in a standard 19-inch rack. The front of the enclosure contains the docking sites where you can install up to 16 DDMs.

The DDMs are installed in a horizontal position with a locking handle. The rear of the enclosure provides the docking sites for the power supplies and the controller cards.

You can attach the DS6800 and expansion enclosure by using the controller card interfaces at the rear of the enclosure. A system display panel is also located at the rear of the enclosure.

Performance features

The DS6000 series is built upon 2 Gbps fibre channel technology that can help bring high availability RAID-protected storage with scalable capacity, increased addressing capabilities, and connectivity to a wide range of storage area network (SAN) applications.

The DS6000 series provides the following technology and hardware to meet today's on demand business environments:

Integrated RAID controller technology
> The DS6000 series features IBM's 32-bit PowerPC microprocessor, a fourth generation processing technology.

High availability
> The DS6000 series is designed with component redundancy to eliminate single points of hardware failure, and no single point of repair other than the enclosure.

Industry standard fibre channel disk drives
> The DS6000 series offers a selection of 2 Gb fibre channel disk drives, including 300 GB drives, allowing the DS6000 series to scale up to 67 TB of capacity.

LUN and volume management
> LUN and volume creation and deletion is nondisruptive. When you delete a LUN or volume, the capacity can immediately be reused. You can configure LUN and volumes to span arrays, which allows larger LUNs and volumes.

Addressing capabilities
> The DS6000 series allows:
> - Up to 32 logical subsystems
> - Up to 8192 logical volumes
> - Up to 1040 volume groups

Simplified storage management for zSeries with z/OS
> The DS6000 series supports a new 65 520 cylinder 3390 volume. This volume option has a capacity of approximately 55.7 GB. It helps relieve addressing constraints, improve disk resource utilization, and improve storage administrator productivity by providing the ability to consolidate multiple disk volumes into a single address.

System management
> The DS6000 series provides online and offline configuration capability features and a graphical user interface (GUI) designed to offer increased ease of use.
>
> A single command line interface (CLI) supports both logical configuration and copy services.

Online Information Center
> The online Information Center is an information database that provides you

the opportunity to quickly familiarize yourself with the major aspects of the DS6000 series and to easily recognize the topics for which you might require more information. It provides information regarding user assistance for tasks, concepts, reference, user scenarios, tutorials, and other types of user information. Using the wonderful search tool and because the information is all in one place rather than across multiple publications, you can access the information that you need more efficiently and effectively.

Data availability features

This section provides information about data availability features that are supported by DS6000 series.

The DS6000 series provides the following features:
- RAID implementation
- Copy services
- Availability support for open systems, iSeries, zSeries, and pSeries hosts
- Component redundancy to eliminate single points of hardware failure, and no single point of repair other than the enclosure.

RAID implementation

RAID implementation improves data storage reliability and performance.

With RAID implementation, the DS6000 series offers fault-tolerant data storage by storing the same data in different places on multiple disk drive modules (DDMs). By placing data on multiple disks, input/output operations can overlap in a balanced way to improve the basic reliability and performance of the attached storage devices.

Physical capacity for the DS6000 series can be configured as RAID 5, RAID 10, or a combination of both. RAID 5 can offer excellent performance for most applications, while RAID 10 can offer better performance for selected applications, in particular, high random write content applications in the open systems environment. Each array in the DS6000 series is composed of four drives.

RAID 5 overview
RAID 5 is a method of spreading volume data across multiple disk drives. The DS6000 series supports RAID 5 arrays.

RAID 5 provides faster performance by striping data across a defined set of DDMs. Data protection is provided by parity, which redundantly saves the data to the same DDMs.

RAID 10 overview
RAID 10 provides high availability by combining features of RAID 0 and RAID 1. The DS6000 series supports RAID 10 arrays.

RAID 0 optimizes performance by striping volume data across multiple disk drives at a time. RAID 1 provides disk mirroring which duplicates data between two disk drives. By combining the features of RAID 0 and RAID 1, RAID 10 provides a second optimization for fault tolerance. Data is striped across half of the disk drives in the RAID 1 array, and the other half of the array mirrors the first set of disk drives. Access to data is preserved if one disk in each mirrored pair remains available.

RAID-10 offers faster data reads and writes than RAID 5 because it does not need to manage parity. However, with half of the DDMs in the group used for data and the other half to mirror that data, RAID 10 disk groups have less capacity than RAID 5 disk groups.

Overview of Copy Services

Copy Services is a collection of functions that provide disaster recovery, data migration, and data duplication functions. Copy Services runs on the DS6000 series and supports open systems and zSeries® environments.

Many design characteristics of the DS6000 series and data copying and mirroring capabilities of Copy Services features contribute to the protection of your data, 24 hours a day and seven days a week. A brief description of each of these licensed features is provided below.

You can manage Copy Services functions through a command-line interface called IBM TotalStorage DS CLI and a Web-based interface called IBM TotalStorage DS Storage Manager. The DS Storage Manager allows you to set up and manage the following types of data-copy features from any point from which network access is available:

Point-in-time copy
> The point-in-time copy feature, which includes FlashCopy, enables you to create full volume copies of data using source and target volumes that span logical subsystems within a single storage unit. After the FlashCopy function completes, you can immediately access both the source and target copies.

Remote Mirror and Copy
> The remote mirror and copy feature copies data between volumes on two or more storage units. When your host system performs I/O operations, the source volume is copied or mirrored to the target volume automatically. After you create a remote mirror and copy relationship between a source volume and a target volume, the target volume continues to be updated with changes from the source volume until you remove the relationship between the volumes.
>
> The following functions of remote mirror and copy are available:
> * Metro Mirror
> * Global Copy
> * Global Mirror

Consider the following Copy Services information:
* The feature activation codes for Copy Services features (remote mirror and copy and point-in-time copy) must be obtained and enabled on the DS Storage Manager before you can begin using the features.

FlashCopy

The IBM TotalStorage FlashCopy feature provides a point-in-time copy capability for logical volumes. FlashCopy creates a physical point-in-time copy of the data, with minimal interruption to applications, and makes it possible to access immediately both the source and target copies.

The primary objective of FlashCopy is to create a copy of a source volume on the target volume. This copy is called a point-in-time copy. When you initiate a FlashCopy operation, a FlashCopy relationship is created between the source

volume and target volume. A FlashCopy relationship is a ″mapping″ of a FlashCopy source volume and a FlashCopy target volume. This mapping allows a point-in-time copy of the source volume to be copied to the target volume. The FlashCopy relationship exists between the volume pair from the time that you initiate a FlashCopy operation until the DS6000 copies all data from the source volume to the target volume or until you delete the FlashCopy relationship, if it is a persistent FlashCopy.

The point-in-time copy that is created by FlashCopy is typically used when you need a copy of the production data to be produced with minimal application downtime. It can be used for online back up, testing of new applications, or for creating a database for data-mining purposes. The copy looks exactly like the original source volume and is an instantly available, binary copy.

FlashCopy supports the following copy options:

Data Set FlashCopy
> Data Set FlashCopy allows a FlashCopy of a data set in a zSeries environment.

Multiple relationship FlashCopy
> Multiple relationship FlashCopy allows a source to have FlashCopy relationships with multiple targets simultaneously. This flexibility allows you to establish up to 12 FlashCopy relationships on a given logical unit number (LUN), volume, or data set, without needing to first wait for or cause previous relationships to end.

Refresh target volume (also known as incremental FlashCopy)
> Refresh target volume provides the ability to ″refresh″ a LUN or volume involved in a FlashCopy relationship. When a subsequent FlashCopy operation is initiated, only data that updates the target and the source to the same point-in-time state is copied. The direction of the ″refresh″ can also be reversed. The LUN or volume that was defined as the target can now become the source for the LUN or the volume that was defined as the source (now the target).

Persistent FlashCopy
> Persistent FlashCopy allows the FlashCopy relationship to remain even after the FlashCopy operation completes. You must explicitly delete the relationship.

Establish FlashCopy on existing Remote Mirror and Copy source
> The establish FlashCopy on an existing Remote Mirror and Copy source volume option allows you to establish a FlashCopy relationship where the target volume is also the source of an existing remote mirror and copy source volume. This enables you to create full or incremental point-in-time copies at a local site and then use remote mirroring commands to copy the data to the remote site.
>
> This feature is represented by the **Establish target on existing Metro Mirror source** selection in the GUI.

Consistency group commands
> Consistency group commands allow the DS6000 to freeze I/O activity to a LUN or volume until you issue the FlashCopy consistency group command. Consistency groups help create a consistent point-in-time copy across multiple LUNs or volumes, and even across multiple DS6000 systems. This function is available through the use of command-line interface commands.

Inband commands over remote mirror link

In a remote mirror environment, inband commands are issued to a source volume of a remote mirror and copy volume pair on a local storage unit and sent across paths (acting as a conduit) to a remote storage unit to enable a FlashCopy pair to be established at the remote site. This eliminates the need for a network connection to the remote site solely for the management of FlashCopy. This function is available through the use of command-line interface commands.

Subsystem Device Driver for open-systems

The IBM TotalStorage Multi-path Subsystem Device Driver (SDD) supports open-systems hosts.

The Subsystem Device Driver (SDD) resides in the host server with the native disk device driver for the storage unit. It uses redundant connections between the host server and disk storage in the DS6000 series to provide enhanced performance and data availability.

Multiple allegiance for FICON hosts

The DS6000 series provides multiple allegiance facility support for FICON hosts.

The multiple allegiance facility enables the storage unit to accept concurrent I/O requests for a volume from multiple channel paths. This enables the storage unit to process requests from separate FICON hosts in parallel. Parallel processing of requests improves throughput and performance. The multiple allegiance facility does not require any user action.

DS6000 Interfaces

This section describes the following interfaces:

- IBM TotalStorage DS Storage Manager
- DS Open application programming interface
- DS Command-Line Interface (CLI)

IBM TotalStorage DS Storage Manager

The IBM TotalStorage DS Storage Manager is a program interface that is used to perform logical configurations and Copy Services management functions.

The DS Storage Manager program is installed as a GUI (graphical mode) or as an unattended (silent mode) installation for the supported operating systems. It can be accessed from any location that has network access using a Web browser. It offers you the following choices:

Simulated configuration

You install this component on your PC or the Master Console which provides the ability to create or modify logical configurations when your storage unit is disconnected from the network. After creating the configuration, you can save it and then apply it to a network attached storage unit at a later time.

Real-time configuration

This component is preinstalled on your HMC. It provides you the ability to create logical configurations and use Copy Services features when your storage unit is attached to the network. This component provides you with real-time (online) configuration support.

DS Open application programming interface

The DS Open application programming interface (API) is a nonproprietary storage management client application that supports routine LUN management activities, such as LUN creation, mapping and masking, and the creation or deletion of RAID5 and RAID10 volume spaces. The DS Open API also enables Copy Services functions such as FlashCopy and Remote Mirror and Copy (formally known as peer-to-peer remote copy).

The IBM TotalStorage DS Open API helps integrate DS configuration management support into storage resource management (SRM) applications, which allow customers to benefit from existing SRM applications and infrastructures. The DS Open API also enables the automation of configuration management through customer-written applications. Either way, the DS Open API presents another option for managing storage units by complementing the use of the IBM TotalStorage DS Storage Manager web-based interface and the DS command-line interface.

You must implement the DS Open API through the IBM TotalStorage Common Information Model (CIM) agent, a middleware application that provides a CIM-compliant interface. The DS Open API uses the CIM technology to manage proprietary devices as open system devices through storage management applications. The DS Open API allows these storage management applications to communicate with a storage unit.

DS command-line interface

The IBM TotalStorage DS Command-Line Interface (CLI) enables open systems hosts to invoke and manage FlashCopy and Metro and Global Mirror functions through batch processes and scripts.

The command-line interface provides a full-function command set that allows you to check your storage unit configuration and perform specific application functions when necessary.

Note: Before you can use the DS CLI commands, you must ensure the following:

- Your Storage Management Console must be equipped with the DS Storage Manager graphical user interface (GUI).
- The GUI must have been installed as a Full Management Console installation management type.
- Your storage unit must be configured (part of DS Storage Manager postinstallation instructions).
- You must activate your license activation codes (part of DS Storage Manager postinstallation instructions) before you can use the CLI commands associated with Copy Services functions.
- You cannot install the DS CLI on a Windows 64-bit operating system.

The following list highlights a few of the specific types of functions that you can perform with the DS command-line interface:

- Check and verify your storage unit configuration
- Check the current Copy Services configuration that is used by the storage unit
- Create new logical storage and Copy Services configuration settings
- Modify or delete logical storage and Copy Services configuration settings

Host systems that DS6000 series supports

The DS6000 series provides a variety of host attachments so that you can consolidate storage capacity and workloads for open-systems hosts and zSeries hosts. The storage unit can be configured for fibre-channel adapters, for support of fibre-channel protocol (FCP) and fibre connection (FICON) protocol.

For fibre channel attachments, you can establish zones. The zones must contain a single port that is attached to a system adapter with the desired number of ports that are attached to the storage unit. By establishing zones, you reduce the possibility of interactions between system adapters in switched configurations. You can establish the zones by using either of two zoning methods:

- Port number
- Worldwide port name (WWPN)

You can configure switch ports and hub ports that are attached to the storage unit in more than one zone. This enables multiple system adapters to share access to the storage unit fibre channel ports. Shared access to an storage unit fibre channel port might come from host platforms that support a combination of bus adapter types and the operating systems. For information about host systems, operating system levels, host bus adapters, cables, and fabric support that IBM supports, see the DS6000 series **Interoperability Matrix** at:

http://www.ibm.com/servers/storage/disk/ds6000/interop.html.

Fibre channel host attachments

Fibre channel technology supports increased performance, scalability, availability, and distance for attaching storage subsystems to network servers. Fibre channel technology supports applications that require large amounts of disk storage that is shared by two or more servers. You can use fibre channel to connect large amounts of disk storage to a server or cluster of servers.

The DS6000 series provides a fibre channel connection when you install a fibre-channel SFP (shortwave or longwave) in the DS6800 model.

Fibre channel architecture provides a variety of communication protocols on the storage server. The servers that are interconnected are referred to as *nodes*. Each node has one or more ports.

A storage unit is a node in a fibre channel network. Each port on a DS6800 fibre channel SFP is a fibre channel port. A host is also a node in a fibre channel network. Each port attaches to a serial-transmission medium that provides duplex communication with the node at the other end of the medium.

There are three basic topologies supported by fibre channel interconnection architecture:

Point-to-point
> You can use the point-to-point topology to interconnect ports directly.

Switched fabric
> The switched-fabric topology provides the necessary switching functions to support communication between multiple nodes. You can use a fabric to support communication between multiple nodes.

Arbitrated loop

A fibre channel arbitrated loop (FC-AL) is a ring topology where two or more ports can be interconnected. You can use the FC-AL to interconnect up to 127 hosts on a loop. An arbitrated loop may be connected to a fabric, known as a public loop. When the loop is not connected to a fabric, it is referred to as a private loop.

Attaching a DS6000 series to an open-systems host with fibre channel adapters

You can attach a DS6000 series to an open-systems host with fibre-channel adapters.

Fibre channel is a 1 Gbps or 2 Gbps, full-duplex, serial communications technology to interconnect I/O devices and host systems that are separated by tens of kilometers.

The IBM TotalStorage DS6000 series supports SAN connections at 1 Gbps to 4 Gbps with 2 Gbps host bus adapters. The DS6000 series negotiates automatically and determines whether it is best to run at 1 Gbps link or 2 Gbps link. The IBM TotalStorage DS6000 series detects and operates at the higher link speed.

Fibre channel transfers information between the sources and the users of the information. This information can include commands, controls, files, graphics, video, and sound. Fibre-channel connections are established between fibre-channel ports that reside in I/O devices, host systems, and the network that interconnects them. The network consists of elements like switches, bridges, and repeaters that are used to interconnect the fibre-channel ports.

FICON-attached S/390 and zSeries hosts that the storage unit supports

You can attach the DS6000 storage unit to FICON-attached S/390® and zSeries hosts.

Each storage unit fibre-channel adapter has four ports. Each port has a unique world wide port name (WWPN). You can configure the port to operate with the FICON® upper-layer protocol. When configured for FICON, the fibre-channel port supports connections to a maximum of 128 FICON hosts. On FICON, the fibre-channel adapter can operate with fabric or point-to-point topologies. With fibre-channel adapters that are configured for FICON, the storage unit provides the following configurations:

- Either fabric or point-to-point topologies
- A maximum of 509 channel connections per fibre-channel port
- A maximum of 2000 logical paths on each fibre-channel port
- A maximum of 2000 N-port logins per storage image
- Access to all 64 control-unit images (16 384 CKD devices) over each FICON port
- 1750 Model 511
- Logical Subsystems 32
- Logical Volumes 8192
- Volume Groups 1040

Note: FICON host channels support more devices than the 4096 possible devices on a storage unit. This enables you to attach other control units or other storage units to the same host channel up to the limit that the host supports.

The storage unit supports the following operating systems for S/390 and zSeries hosts:

- Transaction Processing Facility (TPF)
- Virtual Storage Extended/Enterprise Storage Architecture (VSE/ESA™)
- z/OS®
- z/VM®
- Linux™

For details about models, versions of operating systems, and releases that the storage unit supports for these host systems, see the *Interoperability Matrix* at http://www.ibm.com/servers/storage/disk/ds6000/interop.html.

Software Requirements

To see current information on servers, operating systems, I/O adapters, and connectivity products supported by the DS6000 series, click **Interoperability Matrix** at the following DS6000 series Web site:

http://www.ibm.com/servers/storage/disk/ds6000/interop.html

Chapter 2. Installing and removing the CLI

On most systems you can install and remove the DS command-line interface (CLI) using silent mode, console mode, or by using a GUI application.

Supported operating systems for the DS command-line interface

The DS command-line interface (CLI) can be installed on these operating systems.
- AIX 5.1, 5.2, 5.3
- HP-UX 11i v1, v2
- HP Tru64 version 5.1, 5.1A
- Novell Netware 6.5
- OpenVMS 7.3-1, 7.3-2
- Sun Solaris 7, 8, 9
- Windows 2000, Windows Datacenter, Windows 2003, and Windows XP

Note: The DS CLI cannot be installed on a Windows 64-bit operating system.

DS CLI operational limitations

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

These 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 must be either fixed block or count key data (CKD).

   Note: 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 logical control units (LCUs), which are the CKD volume equivalent of a fixed block LSS.
- A maximum of 256 volumes for each logical subsystem can be defined.

Preparing for the IBM TotalStorage DS CLI installation

The IBM TotalStorage DS CLI program enables open systems hosts to invoke and manage FlashCopy and Metro and Global Mirror functions through batch processes and scripts. You can choose to install the DS CLI interface using the silent mode, console mode, or graphic mode. The mode of installation that you choose is often dependent on system configuration.

Before you install the DS CLI, be aware of the following requirements:
- Before you use the DS CLI commands, be aware of the following requirements:
   - Your Storage Management Console must be equipped with the DS Storage Manager graphical user interface (GUI).

- – The GUI must have been installed as a Full Management Console installation.
- – Your storage unit must be configured. The DS Storage Manager is used for this initial configuration. The configuration process includes the following tasks:
  - Selecting your storage complex.
  - Assigning your storage unit to the storage complex.
  - Designating network information for the storage unit.

  For additional information, see "Creating a real-time storage configuration that includes open systems volumes" in the *IBM TotalStorage DS6000 Installation, Troubleshooting, and Recovery Guide* or this same topic in your online information center.
- – Before you can use the CLI commands that are associated with Copy Services functions, you must activate your license activation codes (part of DS Storage Manager postinstallation instructions).
- The DS CLI can be installed on only one of the following supported operating systems:

Supported Host Systems	Installation File Name
IBM AIX (5.1, 5.2, 5.3)	setupaix.bin
Hewlett-Packard-UX (11.0, 11i, v1, v2)	setuphp1020.bin or setuphp11x.bin
Sun Solaris (7, 8, 9)	setupsolarisSparc.bin
HP Tru64 (5.1, 5.1A)	setupgenericunix.sh
Novell Netware 6.5	setupwin32.exe
iSeries OS/400 5.2	Add -os400 at a command line after the name of the installation file. For example, `setupaix.bin -os400`
Windows 2000, Windows Datacenter, Windows 2003, and Windows XP	setupwin32.exe
UNIX users that do not have an X display **Note:** Use the same installation file name for your host operating system as shown in the rows above, but add the -console parameter after the installation file name. For example: setupaix.bin -console setuplinux.bin -console	setup*os*.bin -console **Note:** Where *os* represents the name of your operating system as shown in the rows above.

- The DS CLI cannot be installed on a Windows 64-bit system.
- You must have Java 1.4.1 or later installed on your machine. The installation program checks for this requirement during installation and does not install the DS CLI if you do not have Java 1.4.1 or later.

  Note: The DS CLI installation CD-ROM contains Java 1.4.1, which you can install if your system is not equipped with this version of Java.
- OS/400 installation tips:
  - – Ensure that the machine that you use to install DS CLI onto a machine that is running OS/400 is network-attached to the OS/400 machine and is a supported platform for DS CLI. It is not possible to install the DS CLI program directly onto a machine that is running OS/400.
  - – Provide the machine name, username, and password when prompted.

- You must use the ksh (Korn shell) or bash (Bourne again shell) shell if you are installing on a HP Tru64. Installshield does not support the sh shell. You must perform all HP Tru64 installations using the **setupgenericunix.sh** file that is located on the installation compact disc.
- The installation process installs the DS CLI in the following default directory:

AIX   /opt/ibm/dscli

HPUX   /opt/ibm/dscli

Sun Solaris
       /opt/ibm/dscli

Windows
       C:\Program Files\IBM\dscli

HP Tru64
       /opt/ibm/dscli

Novell Netware
       SYS:\dscli

Perform the following steps in preparation for the DS CLI installation:

1. Log on to your host system as a root user or administrator.
2. Insert the DS CLI product CD into the CD drive. If a window opens for the CD drive, close the window.
3. Mount the CD drive using the **mount** command according to your system. You can mount your CD drive using the following examples:

AIX   Create a directory for the CD-ROM by issuing the following command:
       `mkdir /cdrom -p`

       Create a file system for the CD-ROM by issuing the following command:
       `crfs -v cdrfs -p ro -d cd0 -m /cdrom`

       where *cd0* is represents the CD-ROM drive.

       Mount the CD-ROM file system by issuing the following command:
       `mount /cdrom`

HPUX   Mount the CD-ROM file system using the path name for your environment by issuing the following commands:
       `ioscan -funC disk | more`
       `mount /dev/dsk/c?t?d? /<cdrom>`

Sun Solaris
       Issue the following command:
       `mkdir /mnt`
       `mount -F hsfs -r /dev/dsk/c0t6d0s2 /mnt`

       Note: The device name /dev/dsk/c0t6d0s2 is the default name for Sun Solaris. The device name might be different on your system depending on your hardware configuration.

Windows
       You are not required to mount the CD if you are using this operating system.

HP Tru64
       Issue the following command:

```
mount -t cdfs -o noversion /dev/rznn /mnt
```

where *nn* represents the number of CD-ROM drives.

Novell Netware

You are not required to mount the CD if you are using this operating system.

4. Navigate to your CD drive and proceed with either the silent, console, or graphic installation.

Installing the IBM TotalStorage DS CLI using graphical mode

Users of Windows, Novell, or UNIX systems can use the DS CLI graphical mode to install the DS CLI.

You can install the IBM TotalStorage DS CLI using the graphical mode with the help of an installation wizard. Ensure that your system has the correct version of Java (Java 1.4.1) or higher and perform the following steps to install the DS CLI using the graphical mode.

Note:

- The installation process stops if the correct version of Java is not found. However, the DS CLI installation CD contains the Java 1.4.1 version. You can install this version on your system and continue with the installation of the DS CLI.
- If you are installing on a Novell system, you are directed to provide information about where your Windows drive is mapped and where the JAVA HOME location is located.
- You cannot install the DS CLI on a Windows 64-bit operating system.
- If you are installing onto an OS/400 system, ensure that the machine that you are installing from is network-attached to the OS/400 machine.
- Ensure that your Internet browser has animations turned on if you want to observe the installation progress bars that are associated with the installation of the DS CLI. Use the following instructions for your specific browser:
  - Internet Explorer
    1. From the **Tools** menu, select **Internet Options**.
    2. Select the **Advanced** tab and scroll down to the **Multimedia** section.
    3. Check **Play animation in web pages**.
  - Netscape
    1. From the **Edit** menu, select **Preferences**.
    2. Double-click on **Privacy and Security**.
    3. Select **Images** and select **as many times as the image specifies** in the **Animated image should loop** section.

1. Start the setup file that is appropriate for your operating system.

   If you are ultimately installing onto an OS/400 system, add -os400 to your command that includes the setup file. For example, `setupwin32.exe -os400`

2. The Welcome window is displayed. Click **Next** to continue or **Cancel** to exit the installation.
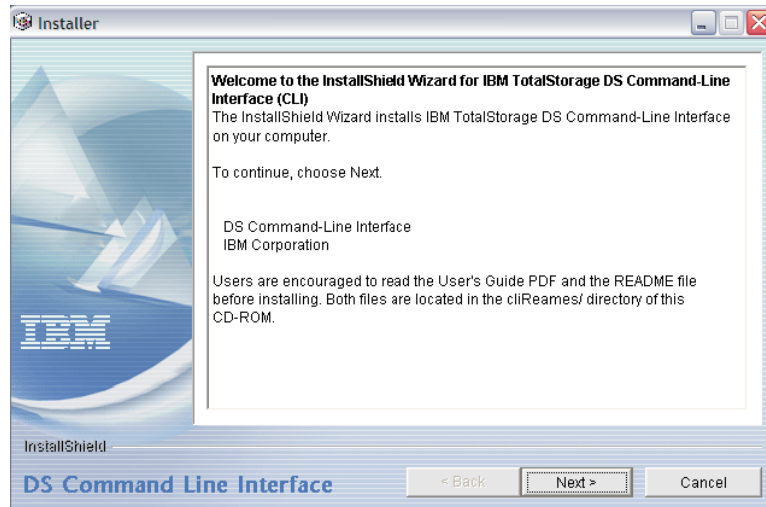
3. The License Agreement window is displayed. Select "**I accept the terms of this license agreement**" to continue. Click "**I do not accept the terms of this license agreement**" or **Cancel** to exit the installation.
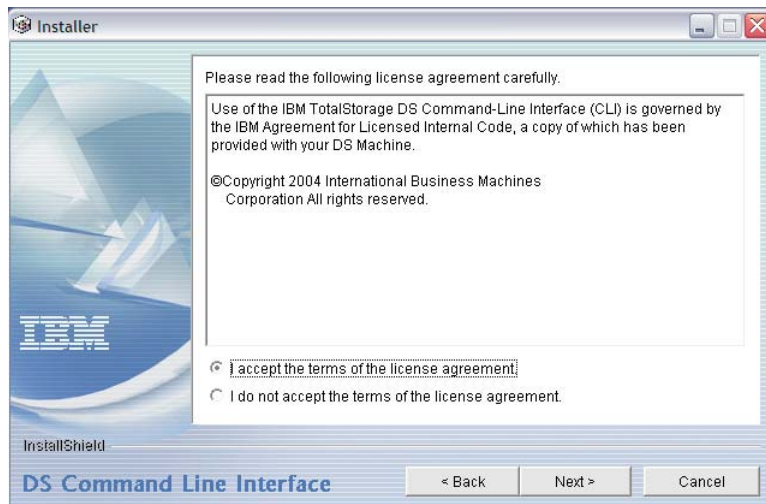
4. The User's window is displayed. Select the appropriate target system where you want the DS CLI installed, and then click **Next** to continue or **Cancel** to exit the installation.

Installer

Please select the appropriate target system:

○ Windows
○ Novell Netware

InstallShield

DS Command Line Interface   < Back   Next >   Cancel
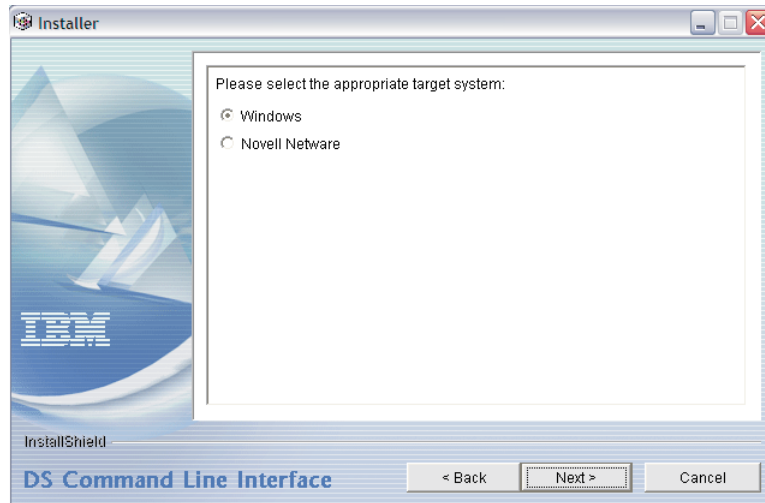
5. The Installation Location window (Windows has been selected as your system)
   is displayed. If you selected Novell, go to the next step. If you are satisfied
   with the default directory, click **Next**. If not, type the directory path where you
   want to install the DS CLI and click **Next**. Try to avoid using white spaces in
   the installation path. Click **Cancel** if you want to exit the installation.

Installer

Click Next to install "IBM TotalStorage DS Command-Line Interface" to this
directory, or click Browse to install to a different directory.

Directory Name:

C:\Program Files\ibm\dscli

Browse

InstallShield

DS Command Line Interface   < Back   Next >   Cancel
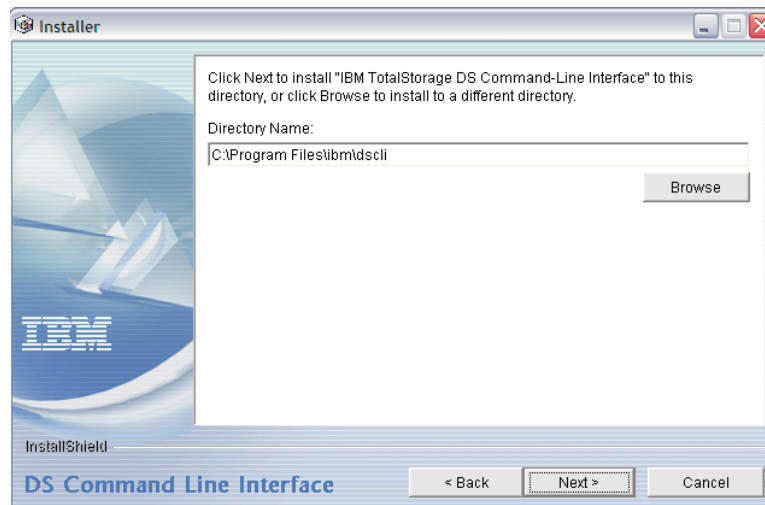
Note: If you are installing onto an OS/400 system, a window asking for the
directory where Java is installed on the OS/400 is displayed when you
click **Next**. Go to Step 7 on page 19.

6. The Novell Location window is displayed. Complete the information for where
   the Windows drive is installed and where JAVA HOME is located. Click **Cancel**
   if you want to exit the installation.
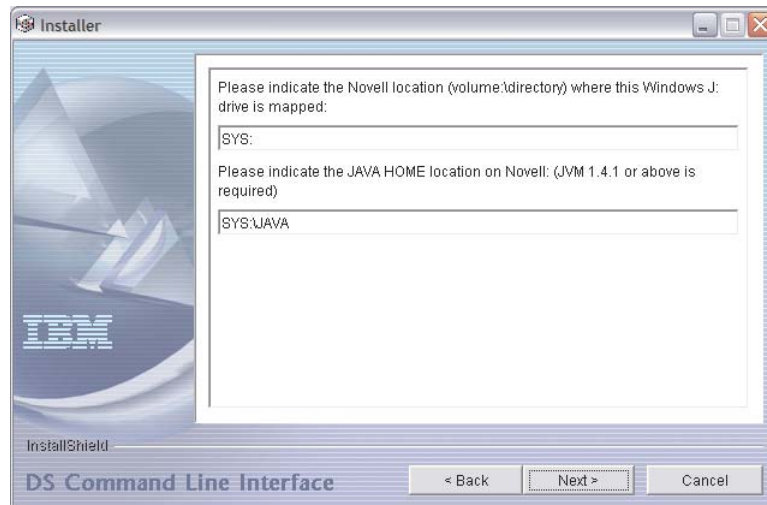
7. The Java directory window for OS/400 is displayed. Insert the directory information. Click **Next** to continue or **Cancel** to exit the installation.
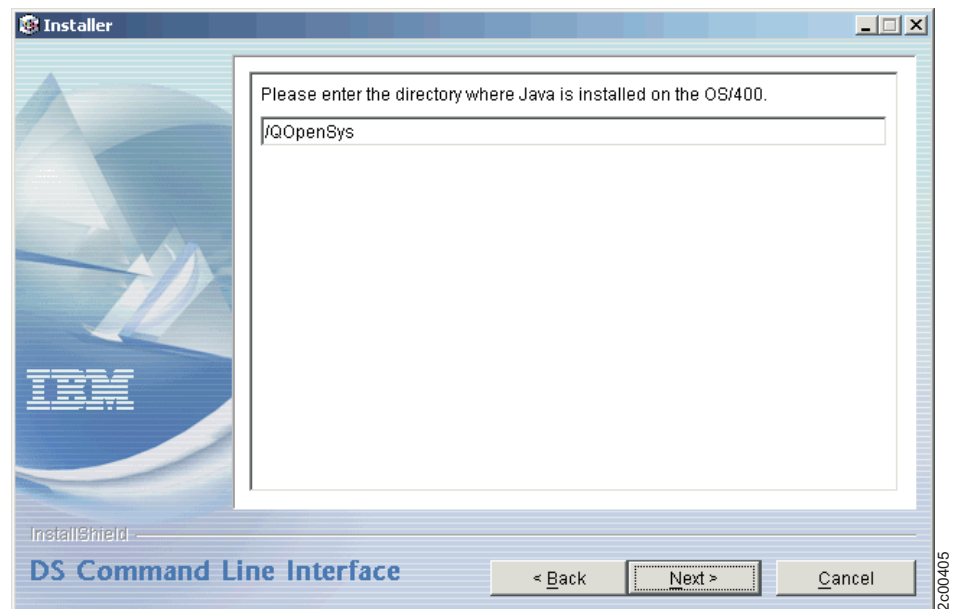
8. The Installation Preview window is displayed. This window displays where the command-line interface will be installed and how much space it will occupy on your drive. Click **Next** to continue or **Cancel** to exit the installation. You can change the installation directory by clicking **Back**.
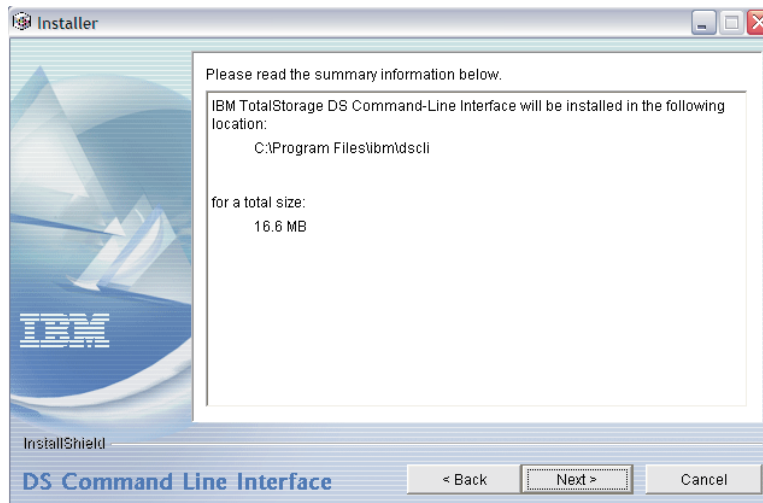
9. The Installation Progress window is displayed. This window displays the progress of the command line interface installation. Click **Next** to continue or **Cancel** to exit the installation.
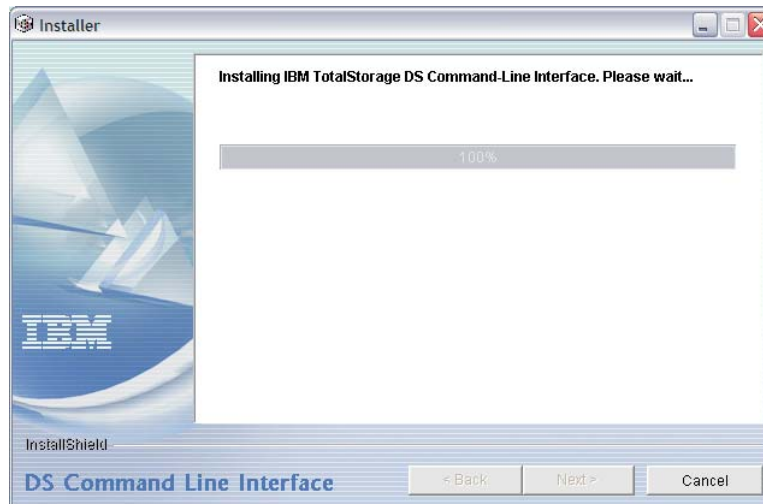
10. The Installation Summary window is displayed. This window displays the installation summary information. Click **Next** to continue or **Cancel** to exit the installation.
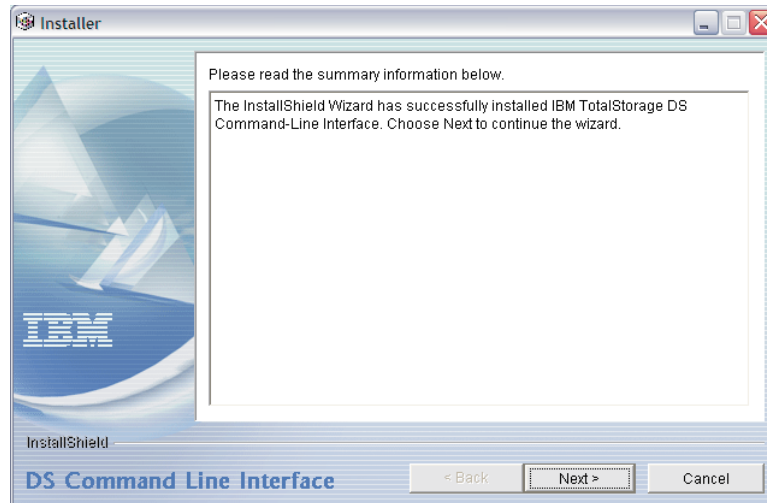
11. The Installation Complete window is displayed. A reminder is provided in text to read the Readme file. Click **Finish** to complete the installation.
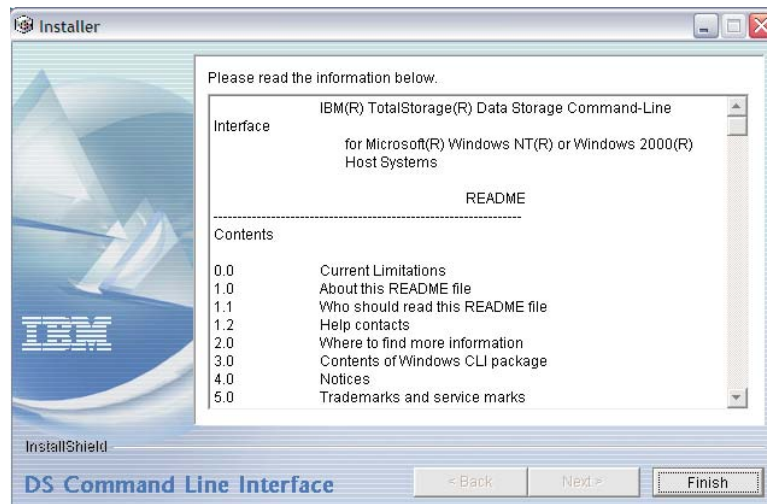
You can verify that the command line interface has installed correctly by reviewing the CLI.CFG file in the lib/ directory.

Installing the IBM TotalStorage DS CLI using silent mode

The DS CLI can be installed silently (without prompts or feedback) from the command line. You must create an options/response file and use a text editor to change the default selections to a selection of your choosing. Perform these steps to install the DS CLI in silent mode.

Note: When you are installing on a Novell system, run the windows installer on a Windows system, select the Novell install option, and then select the destination where the Novell drive is mapped.

1. Log on to your system as an administrator.

2. Insert the DS CLI installation CD into the CD-ROM drive. If the Installshield starts, click the **Exit** selection to exit.

3. Generate the template response file. A response file is provided in the cliReadmes directory of the CD. You can copy it to a directory of your choosing.

The following is an example of an response or options file.

Note:

- The response file that you want to edit is included on the DS CLI CD. Open the file with a text editor and modify the default options with the values that you want. If you are installing on a Novell system, you must indicate where the Java code is installed. The Java code must be JVM 1.4.1 or later.
- If your system does not have Java 1.4.1 or later, the installation fails. However, Java 1.4.1 is contained on the DS CLI CD and can be installed on your system. After installation of this Java version, you can continue with the installation of the DS CLI.
- If you are installing on an OS/400 system, the installer prompts you to provide the machine name, user name, and password for the OS/400 machine.

Example response file

```
InstallShield Options File Template
#
# Wizard name: Install
# Wizard source: setup.jar
# Created on: Mon May 09 16:35:04 MST 2005
# Created by: InstallShield Options File Generator
#
# This file can be used to create an options file (i.e., response file) for the
# wizard "Install". Options files are used with "-options" on the command-line
# to modify wizard settings.
#
# The settings that can be specified for the wizard are listed below. To use
# this template, follow these steps:
#
#    1. Enable a setting below by removing leading '###' characters from the
#    line (search for '###' to find settings you can change).
#
#    2. Specify a value for a setting by replacing the characters '<value>'.
#    Read each setting's documentation for information on how to specify its
#    value.
#
#    3. Save the changes to the file.
#
#    4. To use the options file with the wizard, specify -options <file name>
#    as a command-line argument to the wizard, where <file name> is the name
#    of this options file.
#
######################################################################

######################################################################
#
# License Agreement State
#
# The initial state of the License Agreement panel. Legal values are:
#
#    0 - Nothing will be selected
#    1 - "I accept the terms of the license agreement." will be selected
#    2 - "I do not accept the terms of the license agreement." will be
#        selected
#
# For example, to configure the panel to initially display "I accept the
# terms of the license agreement.", use
#
# -W license.selection=2

 -W license.selection=1

######################################################################
#
# User Input Field - Win_Novell_select
#
# This field only has meaning if you are running the installer on Windows.
# You must choose whether it should install the Windows CLI or the Novell
# CLI.
#
# If you choose Novell, then make sure that the installLocation (see below)
# is on a Novell drive.
#
#    1 - Novell Netware
#    2 - Windows
#
 -W win_user_input.Win_Novell_select="2"

######################################################################
```

The following is a continuation of the response file found on the installation CD.

```
 IBM TotalStorage DS command-line Interface Install Location
#
# The install location of the product. Specify a valid directory into which the
# product should be installed. If the directory contains spaces, enclose it in
# double-quotes. For example, to install the product to C:\Program Files\My
# Product, use
#
###    -P installLocation="C:\Program Files\My Product"
#
 -P installLocation="C:\Program Files\IBM\dscli"

#############################################################################
#
#  User Input Field - os400_java_location
#
#
# This is only used on OS/400 installations.
#
#
### -W os400_java_location_panel.os400_java_location="<value>"
#
#############################################################################
#
# User Input Field - novell_location_mapped
#
# This is only used on Novell installations.
#
### -W novell_user_input.novell_location_mapped="<value>"
#
#############################################################################
#
# User Input Field - novel_java_location
#
# This is only used on Novell installations.
#
### -W novell_user_input.novel_java_location="<value>"
#
#############################################################################
```

4. Save the modifications to the response file.
5. Type the following command for all systems but the OS/400 at the command prompt and press the **Enter** key on your keyboard to start the installation process in silent mode: *setup<platform>. <exe|bin|sh> -silent -options options.txt*
6. Type the following command if you are installing onto an OS/400 system and press the **Enter** key on your keyboard to start the installation process in silent mode: *setup<platform>. <exe|bin|sh> -os400 -silent -options options.txt*

You can verify that the command line interface has installed correctly by reviewing the CLI.CFG file in the lib/ subdirectory of the install directory.

Installing the IBM TotalStorage DS CLI using console mode

UNIX users who do not have an X display primarily use the console mode of installation to install the DS CLI. However, users can also run the installer from a command prompt on a Windows system.

The console mode installer displays its various screens as text. The screens have exactly the same options and information as the GUI installer. Perform the following steps to install the DS CLI using the console mode.

Note:

- The installation process checks for a version of Java 1.4.1 or higher. If this version of Java is not present the installation process stops.
- The DS CLI install CD-ROM contains the Java 1.4.1 version. You can install this version from the CD and continue with the installation of DS CLI.
- If you are ultimately installing onto an OS/400 system, ensure that the machine that you are installing from is network-attached to the OS/400 machine.
- Ensure that your Internet browser has animations turned on if you want to observe the installation progress bars that are associated with the installation of the DS CLI. Use the following instructions for your specific browser:
  - Internet Explorer
    1. From the **Tools** menu, select **Internet Options**.
    2. Select the **Advanced** tab and scroll down to the **Multimedia** section.
    3. Check **Play animation in web pages**.
  - Netscape
    1. From the **Edit** menu, select **Preferences**.
    2. Double-click on **Privacy and Security**.
    3. Select **Images** and select **as many times as the image specifies** in the **Animated image should loop** section.

Use the following steps to install the DS CLI using the console mode:

1. Open a command prompt and locate the setupwin32console.exe file on the DS CLI CD.
2. Type the following command on the command line (unless you are installing onto an OS/400 system): setup *platform*<.exe | .bin | .sh> -console

   For example, for Windows, type: `setupwin32console.exe`

   For an installation onto an OS/400 system from a Windows system, type: `setupwin32console.exe -os400`

   Note:
   - When you issue the setupwin32console.exe command on a Windows system, you do not need to include the -console argument as part of your command.
   - If you are installing onto an OS/400 system, you are prompted to provide the OS/400 machine name, user name, and password.
3. The Welcome screen is displayed. Press 1 for Next, 3 to Cancel, or 4 to Redisplay.

```
Initializing InstallShield Wizard...
Searching for Java(tm) Virtual Machine...
.
Searching for Java 1.4.1 by IBM Corporation
Verifying Java 1.4.1 by IBM Corporation
.......
-------------------------------------------------------------------------------
Welcome to the InstallShield Wizard for IBM TotalStorage DS Command-Line
Interface (CLI)
The InstallShield Wizard installs IBM TotalStorage DS Command-Line Interface
on your computer.

 To continue, choose Next.


    DS Command-Line Interface
    IBM Corporation

Users are encouraged to read the User's Guide PDF and the README file before
installing. Both files are located in the cliReames/ directory of this
CD-ROM.


Press 1 for Next, 3 to Cancel or 4 to Redisplay [1]
```

4. The License Agreement screen is displayed. Press 1 to accept the terms of the license agreement, and then press 0 to notify the installer that you are finished with this section. Press 1 to continue. The following screen is displayed.

```
Please read the following license agreement carefully.

Use of the IBM TotalStorage DS Command-Line Interface (CLI) is governed by the
IBM Agreement for Licensed Internal Code, a copy of which has been provided
with your DS Machine.

 (C) Copyright 2004, 2005 International Business Machines
     Corporation All rights reserved.


Please choose from the following options:

[ ] 1 - I accept the terms of the license agreement.
[ ] 2 - I do not accept the terms of the license agreement.

To select an item enter its number, or 0 when you are finished: [0] 1


[X] 1 - I accept the terms of the license agreement.
[ ] 2 - I do not accept the terms of the license agreement.

To select an item enter its number, or 0 when you are finished: [0]

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

5. The Windows User's screen is displayed if you are installing on a Windows system or are pointing to a Novell system. If you want Windows, press 1. If you want the Novell system, press 2. If you choose 1 or 2, the screen is updated with an X next to the system that you selected. Press 0 to notify the installer that you are finished with this section, and then press 1 to continue.

```
Please select the appropriate target system:

[X] 1 - Windows
[ ] 2 - Novell Netware

To select an item enter its number, or 0 when you are finished: [0]

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

6. The Installation Location screen (Windows was selected) is displayed. (If you selected Novell, go to the next step) . If you are satisfied with the directory shown in brackets, press 1 to continue. If you are not satisfied, enter the directory where you want to install the CLI, and press 1 to continue. Avoid using blank spaces in the path.

```
IBM TotalStorage DS Command-Line Interface Install Location

Please specify a directory or press Enter to accept the default directory.

Directory Name: [C:\Program Files\ibm\dscli]

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

7. If you selected Novell, the following screen is displayed.

   Note:
   - SYS represents where the Windows drive is mapped in a Novell system. However, this could also be SYS:\DS\CLI or a volume other than SYS:
   - J: (could be any drive letter)

```
IBM TotalStorage DS Command-Line Interface Install Location

Please indicate the Novell location (volume:\directory) where this window J:
drive is mapped:

Enter a value: [SYS:]

Please indicate the JAVA HOME location on Novell: (JVM 1.4.1 or above is
required)

Enter a value: [SYS:\JAVA]

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

8. If you selected Windows and are installing onto an OS/400, the following screen is displayed:

```
Please indicate the directory where Java is installed on the OS/400

Enter a value: [/QOpenSys]

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

9. The Installation Preview screen is displayed. Depending on your system's current configuration, the total size of the installation can vary. Press 1 to continue.

```
IBM TotalStorage DS Command-Line Interface will be installed in the following
location:

C:\Program Files\ibm\dscli




for a total size:

 16.6 MB
Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

10. The Installation Progress screen is displayed. Press 1 to continue after the installation completes.

```
Installing command-line Interface. Please wait...

Installing IBM TotalStorage DS Command-Line Interface. Please wait...


|-----------|-----------|-----------|------------|
0%         25%         50%         75%        100%
||||||||||||||||||||||||||||||||||||||||||||


|-----------|-----------|-----------|------------|
0%         25%         50%         75%        100%
|||||||||||||||||||||||||||||||||||||||||||||||||


Creating uninstaller...
```

11. The Installation Completed screen is displayed. If you are satisfied with the installation, press 1 to continue.

```
The InstallShield Wizard has successfully installed IBM TotalStorage DS
Command-Line Interface. Choose Next to continue the wizard.

Press 1 for Next, 3 to Cancel or 4 to Redisplay [1]
```

12. The Readme screen displays. It contains specific information about the DS CLI for your operating system. Press Enter to read the readme information or press 3 to finish the installation process. If you press Enter, you must press q to quit the readme and then press 3 to finish the installation process.

> **Note:** If you are installing on a Windows system, you might have to restart your system. If this is the case, the following window is displayed and you must complete the next step.

```
To complete the installation you must restart your computer.

     [X] 1 - Yes, restart my computer.

     [ ] 2 - No, I will restart my computer at a later time.


 To select an item enter its number, or 0 when you are finished:
```

13. Select the item you want and press 3 to finish the installation process. Use of the DS CLI application becomes effective with a reboot of your system.

You can verify that the command-line interface has installed correctly by reviewing the CLI.CFG file in the lib subdirectory of the install directory that you defined in Step 6.

Installing DS CLI on an OpenVMS system

The DS Command-Line Interface (CLI) provides a full function command set that allows you to check your storage unit configuration and perform specific application functions when necessary. It also enables open systems hosts to invoke and manage FlashCopy, Metro and Global Mirror functions through batch processes and scripts.

This topic describes how to install the DS CLI on an OpenVMS system. Additionally, it provides hints for integrating the DS CLI into the operating system environment.

Preparing to install the DS CLI on an OpenVMS System

The IBM TotalStorage DS CLI program enables open systems hosts to invoke and manage FlashCopy and Metro and Global Mirror functions through batch processes and scripts. The DS CLI is installed on an OpenVMS sytem by using the Polycenter Software Installation utility.

Be aware of the following requirements before you begin the installation of the DS CLI:

- The installation process places all command-line interface files in the [IBMDSCLI...] directory tree as a subdirectory of the Polycenter destination directory. You can specify this directory by using the **PRODUCT INSTALL** command with the /DESTINATION=devicename:[directoryname] qualifier. If you omit the device name, the Polycenter installation utility uses your current default device. If you omit the directory name, the Polycenter Software Installation utility uses the [VMS$COMMON] directory as the default destination directory.

  If you do not use the **/DESTINATION** qualifier at all, the utility installs the software in the location that is defined by logical name **PCSI$DESTINATION**. If this logical name is not defined, the utility installs the software in SYS$SYSDEVICE:[VMS$COMMON].

- Extract and check the Release Notes file from the DS CLI installation package in the root directory of the installation CD.

- Install the required prerequisite patches operating system patches (ECOs) on your OpenVMS host system.

  The command-line interface installation process automatically installs Java™ Runtime Environment (JRE) 1.4.2-4 on your host system. The JRE requires several ECOs. For detailed patch information, see the Java SDK v1.4.2 patch installation page at: http://h18012.www1.hp.com/java/download/ovms/1.4.2/sdk1.4.2_patches.html

  To download these ECOs, use the HP IT Resource Center (ITRC) database to perform a search for the patches from which you can select. These download steps are described at the Java SDK v1.4.2 patch installation page.

- Ensure that you have at least 140000 blocks (approximately 70 MB) of free space on the installation disk.

Installing the DS CLI on your OpenVMS system

Use the following steps to install the DS CLI application in your OpenVMS environment.

Before you install the DS CLI application, verify that the prerequisite software and hardware are installed on your system. The installation program checks for prerequisites and stops if any prerequisites are missing.

1. Log on to your host system as a user with SYSLCK, SYSNAM, SYSPRV, (or a system UIC), TMPMBX, and CMKRNL privileges.
2. Insert the DS CLI product CD-ROM into the CD drive.
3. Mount the CD drive. For example, for an IDE CD device DQA0, type the following command: **MOUNT /NOASSIST /OVERRIDE=IDENTIFICATION /MEDIA_FORMAT=CDROM DQA0:** A message similar to the following is displayed:

```
%MOUNT-I-WRITELOCK,volume is write locked
%MOUNT-I-CDROM_ISO, : (1 of 1) , mounted on VMS1$DQA0:
```

For a SCSI CD device DKA*nnn*, type the following command: **MOUNT /NOASSIST /OVERRIDE=IDENTIFICATION /MEDIA_FORMAT=CDROM DKAnnn:** where *nnn* represents the number that is assigned by the OpenVMS system to your CD device.

4. Type the following command and press `Enter` to access the command-line interface installation package in the root directory of the CD: **DIRECTORY /FULL DQA0:[000000]IBM-AXPVMS-DSCLI-*.PCSI**. Output similar to the following is displayed:

```
Directory DQA0:[000000]

IBM-AXPVMS-DSCLI-V0500-01F96-1.PCSI;1                  File ID:  (4,7,0)
Size:         55.79MB/55.80MB     Owner:     [0,0]
Created:      9-MAR-2005 04:07:22.25
Revised:      9-MAR-2005 04:09:43.98 (1)
Expires:      None specified
Backup:       No Backup record
Effective:    None specified
Recording:    None specified
Accessed:     None specified
Attributes:   None specified
Modified:     None specified
Linkcount:  1
File organization:  Sequential
Shelved state:      Online
Caching attribute:  Writethrough
File attributes:    Allocation: 114282, Extend: 0, Global buffer count: 0
                    Version limit: 0, Backups disabled
Record format:      Undefined, maximum 0 bytes, longest 0 bytes
Record attributes:  None
RMS attributes:     None
Journaling enabled: None
File protection:    System:RWED, Owner:RWED, Group:RWED, World:RWED
Access Cntrl List:  None
Client attributes:  None


Total of 1 file, 55.79MB/55.80MB
```

5. Type the following command and press Enter to extract the command-line interface for OpenVMS release notes: **PRODUCT EXTRACT RELEASE_NOTES DSCLI /SOURCE=DQA:[000000] /FILE=filespec**

   Note: If you do not use the **/FILE** qualifier, the release notes are written to the DEFAULT.PCSI$RELEASE_NOTES file in your current default directory. Read the release notes before continuing to ensure that you are equipped with the information that you need to complete your installation successfully.

6. Type the following command and press `Enter` to invoke the command-line interface installation process: **PRODUCT INSTALL DSCLI /SOURCE=DQA0:[000000] /DESTINATION=devicename:[directoryname] /RECOVERY_MODE**.

   After typing this command, a message similar to the following is displayed:

```
The following product has been selected:

  IBM AXPVMS DSCLI V5.0-1F96  Layered Product

 Do you want to continue? [YES]
```

   The **/DESTINATION** qualifier can be omitted from the command. However, IBM recommends that you use the optional **/RECOVERY_MODE** qualifier. For a detailed description of all **PRODUCT INSTALL** command qualifiers and parameters, see the HP OpenVMS System Management Utilities Reference Manual or the OpenVMS online help.

7. Press Enter to continue the installation process. The following configuration options message is displayed:

```
Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.

IBM AXPVMS DSCLI V5.0-1F96: IBM DS Command Line Interface (DS CLI)

    (C) Copyright IBM Corp. 1999, 2005. All Rights Reserved.

    International Business Machines Corporation (IBM)

    No PAK

Do you want the defaults for all options? []
```

8. Type No and press Enter to review the installation options.

   Note: You can type Yes if you have decided to install with the default options.
   The following CLI license message is displayed after typing Yes or No:

```
License Agreement IBM TotalStorage DS Command-line Interface

    Copyright 2005 International Business Machines Corporation
    All rights reserved.

    Use of the IBM TotalStorage DS Command-line Interface (DS CLI) is
    governed by the IBM Agreement for Licensed Internal Code, a copy
    of which has been provided with your DS Machine.

    Answer "Yes" to install the DS CLI code. By installing this code,
    you are certifying that you have read and accept the IBM DS CLI
    License agreement.

    Answer "No" to terminate and exit the IBM DS CLI installation.

    Do you want to continue? [YES]
```

   Note: You can answer Yes if you are using the default options for your installation process.

9. Press Enter to accept the DS CLI license agreement. The following Java license message is displayed:

```
License Agreement HP Java Run-Time Environment for OpenVMS

The IBM DS CLI requires the Java 1.4.2 Java Runtime Environment (JRE).
Installing the DS CLI program automatically installs the required JRE.
The installed JRE is the intellectual property of and licensed by
Hewlett-Packard Company.

You can view the license agreement on the World Wide Web at:

  http://h18012.www1.hp.com/java/download/ovms/1.4.2/
  rte1.4.2_license.html

Answer "Yes" to install the Java code. By installing this code,
you are certifying that you have read and accepted the HP Java
License agreement.

Answer "No" to terminate and exit the IBM DS CLI installation.


Do you want to continue? [YES]
```

10. Press Enter to accept the Java license agreement. The command-line interface requires Java 1.4.2 on an OpenVMS Alpha host system. If you answer No, the installation process automatically ends and exits. The following library update warning message is displayed:

```
WARNING: By default the system Help and Message libraries will be updated.

The IBM DS CLI program provides local Help and Help Message library files.
By default, the CLI instalation integrates these local libraries into the
OpenVMS system Help and Help Message libraries.

To prevent the system libraries from being modified chose to review the
installation options and answer "No" when prompted to update the libraries.


Do you want to continue? [YES]
```

11. Press Enter to continue the installation process. The following configuration question is displayed:

```
Would you like the local IBM DS CLI Help and Help Message libraries to be
integrated into the OpenVMS system libraries?

If you answer "Yes", the following OpenVMS libraries will be updated:

    SYS$COMMON:[SYSHLP]HELPLIB.HLB
    SYS$COMMON:[SYSHLP]MSGHLP$LIBRARY.MSGHLP$DATA

If you answer "No", OpenVMS system libraries will not be modified.

In every case, local libraries are available under:

     IBMDSCLI$HELP:IBMDSCLI_OVR.HLB
     IBMDSCLI$HELP:IBMDSCLI_MESSAGES.MSGHLP$DATA


Modify the system Help and Help Message libraries? [YES]
```

12. Press Enter to confirm the library update option (or type No and press Enter to deny the library update option). The following confirmation message is displayed:

```
Do you want to review the options? [NO]
```

13. Press Enter to confirm and accept all selections. The following installation message with completion status is displayed:

```
Execution phase starting ...

The following product will be installed to destination:
    IBM AXPVMS DSCLI V5.0-1F96
 DISK$V732_ALPHA:[VMS$COMMON.]

Portion done: 0%...10%...20%...30%...60%...70%...80%...90%...100%

The following product has been installed:
    IBM AXPVMS DSCLI V5.0-1F96             Layered Product
```

14. Review the Installation Verification Procedure (IVP) report, which is similar to the following output and check for possible errors:

```
%PCSI-I-IVPEXECUTE, executing test procedure for IBM AXPVMS DSCLI
V5.0-1F96 ...
dscli —ver
IBM DSCLI Version: 5.0.1.96
%PCSI-I-IVPSUCCESS, test procedure completed successfully
```

15. Ensure that the installation completes. When the Polycenter Software Installation utility finishes the command-line interface installation process, you will see a message similar to the following:

```
IBM AXPVMS DSCLI V5.0-1F96: IBM DS Command Line Interface (DS CLI)

    Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
        @PCSI$DESTINATION:[IBMDSCLI.MGR]IBMDSCLI$STARTUP.COM
    Insert the following lines in SYS$MANAGER:SYSHUTDWN.COM:
        @IBMDSCLI$MANAGER:IBMDSCLI$SHUTDOWN.COM

    Users of this product require the following lines in their login
    command procedure:
        @IBMDSCLI$MANAGER:IBMDSCLI$LOGIN.COM

    Release notes for IBM DS CLI available in IBMDSCLI$HELP
```

16. Unmount the CD drive and remove the CD-ROM.

The command-line interface provides program startup, login, and shutdown procedures in the [destinationdir.IBMDSCLI.MGR] directory. The installation process runs the startup and login procedures immediately before invoking the IVP procedure. But for persistent setup, you must integrate the startup, login, and shutdown procedures.

Using the DS CLI on an OpenVMS system

To use the DS CLI on an OpenVMS system, you must integrate the required IBMDSCLI$STARTUP.COM and IBMDSCLI$LOGIN.COM procedures.You can also integrate the optional IBMDSCLI$SHUTDOWN.COM procedure. This integration is accomplished when you use the OpenVMS persistent setup procedure.

You must add the required IBMDSCLI$STARTUP.COM procedure to your system startup processes. The IBMDSCLI$STARTUP.COM procedure defines the logical names that are required for the command-line interface in your system logical name table and installs some images with enhanced privileges. This procedure is intended to be invoked during the system startup.

You also must add the required IBMDSCLI$LOGIN.COM procedure to your system login processes. The IBMDSCLI$LOGIN.COM procedure sets up the JRE that is required by the command-line interface and defines the DSCLI command as a foreign DCL command symbol. It is intended to be invoked during the system-wide SYS$MANAGER:SYLOGIN.COM or user-specific SYS$LOGIN:LOGIN.COM procedure.

In order to use the DS CLI interface from start to finish in your OpenVMS system, you can add the optional IBMDSCLI$SHUTDOWN.COM procedure to your system shutdown processes. The IBMDSCLI$SHUTDOWN.COM procedure performs the removal operations for privileged images and undefines system-wide logical names that are associated with the DS CLI. It is intended to be invoked during the system shutdown process.

1. Integrate the IBMDSCLI$STARTUP.COM procedure into your system startup by adding the following line to the SYS$MANAGER:SYSTARTUP_VMS.COM script: $ @destinationdev:[destinationdir.IBMDSCLI.MGR]IBMDSCLI$STARTUP

   destinationdev
       Specifies the name of the device that contains the command-line interface installation directory

destinationdir
> Specifies the name of the directory where you just installed the command-line interface.

> **Note:** You can alternatively add the IBMDSCLI$STARTUP.COM procedure to the SYSMAN startup database.

2. Integrate the IBMDSCLI$LOGIN.COM procedure into the system-wide or user-specific login by adding the following line:
   `$@IBMDSCLI$MANAGER:IBMDSCLI$LOGIN.COM`

> **Note:** Run the IBMDSCLI$LOGIN.COM procedure only after you have successfully run the IBMDSCLI$STARTUP.COM procedure.

3. Integrate the IBMDSCLI$SHUTDOWN.COM procedure by adding the following line to the SYS$MANAGER:SYSHUTDOWN.COM script:
   `$@IBMDSCLI$MANAGER:IBMDSCLI$SHUTDOWN`

> **Note:** This step is optional. However, processing this step allows your system to make the full use of the DS CLI application.

Removing the DS CLI from an OpenVMS system

The removal of the DS CLI application from an OpenVMS system requires not only a removal from your main system but also a removal from your startup, login, and shutdown processes.

Perform the following steps to remove the CLI from your OpenVMS system:

1. Log on to your host system as a user with SYSLCK, SYSNAM, SYSPRV (or a system group UIC), TMPMBX, and CMKRNL privileges.
2. Type the following command at the command prompt to start the uninstallation process: `PRODUCT REMOVE IBMDSCLI`.

   A message similar to the following is displayed:

   ```
   The following product has been selected:
       IBM AXPVMS DSCLI V5.0-1F96              Layered Product

   Do you want to continue? [YES]
   ```

3. Press Enter to confirm the uninstallation. The following uninstallation confirmation message with completion status is displayed:

   ```
   The following product will be removed from destination:
       IBM AXPVMS DSCLI V5.0-1F96             DISK$V732_ALPHA:[VMS$COMMON.]

   Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...90%...100%
   ```

   4. When the uninstallation process ends, a message similar to the following is displayed:

   ```
   The following product has been removed:
       IBM AXPVMS DSCLI V5.0-1F96             Layered Product
   ```

4. 5. Remove the command-line interface startup, login, and shutdown functions from your system startup, login, and shutdown processes.

Completing DS CLI postinstallation

Perform these tasks to set up the DS CLI application so that you can use the DS CLI to configure your DS6000.

You must install the DS CLI before you complete these postinstallation tasks.

After you install the DS CLI application, how do you log into the application? After the initial login, what are some of the first tasks you must accomplish before you can get the full benefit of the DS CLI application? The instructions in this section answer these questions, as well as, describe how to configure your volumes and how to manage potential problems.

1. Initiate the DS CLI to begin using it in either single-shot, script, or interactive command mode.
2. Set up your required user accounts and passwords.
3. Set your DS CLI default configuration settings.
4. Activate your machine and feature license codes.
5. Enable the remote support and call home functions. You must provide customer contact and network information to enable these functions.
6. Register for the My Support service.
7. Configure new fixed block storage. Use the DS CLI to create and modify fixed block extent pools, arrays, volumes, and volume groups. You can also configure host ports and connections.

Using the DS CLI application

You must ensure that you have installed the DS Storage Manager using the Full-Management Console installation and that you have configured your domain. Without this domain configuration (which is a one-time process), you cannot use the DS CLI. After you install the DS CLI, there are three command modes that are available to you.

You must log into the DS CLI application to use the command modes. There are three command modes for the DS CLI:

- Single-shot
- Interactive
- Script

Logging into the DS CLI application

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

You must ensure that you are in the directory where you installed the DS CLI application. The following list provides a reminder of the supported operating systems default directories where the DS CLI is installed if the directory designation is not changed:

AIX   /opt/ibm/dscli

HPUX   /opt/ibm/dscli

Sun Solaris
        /opt/ibm/dscli

Windows
        C:\Program Files\IBM\dscli

HP Tru64
/opt/ibm/dscli

Novell Netware
SYS:\dscli

When you log into the DS CLI application (type `dscli` at the command prompt), you must provide the following information:

- HMC1 - Specify the primary management console.
- User Name - Specify the name of the user account. The default account for the first login is **admin**.
- Password - Specify the user password. The default password for the admin account is `admin`. However, this password is only good for your first login.

> **Note:** Because the password for the admin account is expired when 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.

The first time that you log in to the DS CLI, you can specify this information using either of the following two methods:

- Ensure you are in the directory where you installed the DS CLI application and type the `dscli` command at the command prompt. Supply all the log in information with the command. For example: `dscli -hmc1 mtc032h.storage.tucson.ibm.com -user admin -passwd topn0t`.

  Use this command when you use the single-shot mode for the first time and when the DS CLI application is not active on your system. In addition, when you use the single-shot mode, you must include the command that you want to process. For example, if you want to process the **lssi** command, if you have not activated the DS CLI application, and if you are using the single-shot mode type: `dscli -hmc1 mtc032h.storage.tucson.ibm.com -user admin -passwd topn0t lssi`.

- Supply the log in information in a profile configuration file (for additional information, see the topic "Default configuration setup with a profile file"). When you log into the DS CLI application (from the directory where you installed the DS CLI application) by typing `dscli`, you are prompted to supply the information for HMC1, user name, and password.

Using the DS CLI single-shot command mode

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

You must supply the login information and issue the command that you want to process at the same time. Use the following example to use the single-shot mode:

1. Enter `dscli -hmc1 mtc032h.storage.tucson.ibm.com -user admin -passwd topn0t lssi`
2. Wait for the command to process and display the end results.

Using the DS CLI script command mode

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

- 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.

Note: It is not the intent of this instruction to tell you how to write a script. An example script is displayed for your use as a guide.

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

1. Type the script name at the command prompt using the following format: `dscli -hmc1 mtc032h.storage.tucson.ibm.com -user admin -passwd tucs0n -script ~/bin/mkpprcpairs`

2. Wait for the script to process and provide a report regarding the success or failure of the process.

Here is an example script that could be used to establish remote mirror and copy relationships for volume pairs.

```
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type mmir 1000-103F:
2300-233F
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type gcp 1100-113F:
2340-237F
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type mmir 1800-187F:
2800-287F
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type gcp 1200-127F:
2500-257F
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type mmir 1040-1054:
2700-2714
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type gcp 1055-107F:
2400-242A
mkpprc -dev IBM.1750-1303561 -remotedev IBM.1750-7504491 -type mmir 1140-117F:
2600-263F
```

Using the DS CLI interactive command mode

Use the DS CLI interactive command mode when you have multiple transactions to process 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.

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 four DS CLI commands that you have used. It also allows you to repeat any of the last four 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.

1. Log on to the DS CLI application at the directory where it is installed.

   Note: If you should make a mistake and type the wrong user name or password, do not try to correct this within the current session. Exit the DS CLI session you are in and log in to a new DS CLI session.

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.

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

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

```
[4] lsarraysite -dev IBM.1750-1300771
[3] lsarray -dev IBM.1750-1300771
[2] lsextpool -dev IBM.1750-1300771
[1] lsextpool -dev IBM.1750-1300771
```

2. Issue dscli> !1 to retry the last command. Or, issue dscli>!3 to retry the third last command.

Setting up user accounts

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

The admin account is set up automatically at the time of installation. It is accessed using the user name **admin** and the default password **admin**. This password is temporary and expires after its initial use. You must change the password before you can use any of the other functions. There are 7 groups the administrator can assign to a user. The groups and the associated functions allowed by the assignment are as follows:

admin
> All users that you assign to the administrator user group allows access to all storage management console server service methods and all storage image resources.

op_volume
> The volume operator user group 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 group inherits all authority of the monitor user group.

op_storage
> The storage operator user group allows access to physical configuration service methods and resources, including storage complex, storage image, array, rank, and extent pool objects. This user group inherits all the authority of the op_copy_services and monitor user groups, excluding security methods.

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

service
> The service user group includes monitor authority, plus access to all management console server service methods and resources, such as performing code loads and retrieving problem logs.

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

no access
> The no access user group does not allow access to any service methods or

storage image resources. By default, this user group is assigned to any user account in the security repository that is not associated with any other user group.

Note: A user can be assigned to more than one user group.

In addition to assigning users to one or more user groups, you also must assign a default password to each user. When you notify users of their group assignment and default password, indicate that the default password is only good for the initial log on. Users must change the password at the time of their initial log on. 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 **admin** account, to be able to use any CLI command other than the one to change the password. See the chuser command for more information.

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

1. Log into the DS CLI application in interactive command mode.
2. Issue 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 testuser
3. Press Enter and observe the processing result. A successful process returns the following display:

```
Sun Aug 11 02:23:49 PST 2004 IBM DS  CLI
Version 5.0.0.0 DS: IBM.1750-75FA120
User Name testuser successfully created.
```

Default configuration setup with a profile file

You can create default settings for the command-line interface by defining one or more profiles on the system. For example, you can specify the Storage Management console (SMC) for the session, specify the output format for list commands, specify the number of rows per page in the command-line output, and specify that a banner is included with the command-line output.

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

You have several options for using 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\IBM\DSCLI\profile\dscli.profile for the Windows platform .
- You can make a personal default profile by making a copy of the system default profile as <user_home>/dscli/profile/dscli.profile. The home directory, *<user_home>* is designated as follows:
    - Windows system: C:\Documents and Settings\<user_name>
- You can create a profile for the storage unit operations. Save the profile in the user profile directory. For example:
    - c:\Program Files\IBM\DSCLI\profile\operation_name1

– c:\Program Files\IBM\DSCLI\profile\operation_name2

These profile files can be specified using the DS CLI command parameter **-cfg** **<*profile_name*>**. If the -cfg file is not specified, the user's default profile is used. If a user's profile does not exist, the system default profile is used.

Note: A password file, generated using the **managepwfile** command, is located at the following directory: <user_home>/dscli/security/security.dat.

When you install the command-line interface software, the default profile is installed in the profile directory with the software. The file name is dscli.profile. For example. c:\Program Files\IBM\DSCLI\profile\dscli.profile.

The profile is a text file. Table 1 provides the list of profile variables that can be used to create the profile.

Table 1. Profile variables

Variable	Description
banner: on|off	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.
delim	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	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.
format	Specifies the output format for list commands. Specify one of the following formats: • 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 horizontal table. This variable is equivalent to command option -fmt. The command option -fmt overrides this default value.
fullid	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	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	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 1. Profile variables (continued)

Variable	Description
locale	Specifies the language for the output on the local computer. • 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 1. Profile variables (continued)

Variable	Description
locale, *continued*	- 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
paging: on|off	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.
timeout	Set timeout value of client/server synchronous communication. The unit of the value is second. The default value is 420 seconds. You can set this timeout if the processing of a command ends by timeout due to network or client/server performance issue. **Note:** The command timeout value can be longer than this value because one command can consist of multiple client/server requests.
remotedevid	Specifies the remote storage image ID. This variable is equivalent to the command option -remotedev. The command option -remotedev overrides this default value.
rows	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

#
# Password filename
#   The password file can be generated using mkuser command.
#
#pwfile:  ibmadmin

#
# Default target Storage Image ID
#     "devid" and "remotedevid" are equivalent to
#     "-dev storage_image_ID" and "-remotedev storeage_image_ID" command options,
#      respectively.
#devid:   IBM.1750-AZ12341
#remotedevid: IBM.1750-AZ12341

#
# 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 420 seconds.
#timeout  420

#
# 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

# delimitter 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

# End of Profile
```

Activating your machine and feature licenses

Use this scenario to activate your license activation codes. These codes must be activated before any configuration can be applied to your DS6000 network.

The following licenses can be activated depending on your purchase:

- Operating environment license for each storage unit that you own. (This license must be activated.)
- Copy Services, which can consist of the following features:
  - Point-in-time
  - Remote mirror and copy

There are multiple codes associated with these features. To obtain the information that you need to activate these licenses and features in your storage unit, go to the IBM Disk Storage Feature Activation (DSFA) Web site at http://www.ibm.com/storage/dsfa. Download your codes onto a diskette in XML format. You can then import the codes from the XML file when you process the DS CLI applykey command.

Note: In most situations, the DSFA application can locate your order confirmation code (OCC) when you enter the DS6000 (1750) serial number and signature. However, if the OCC is not attached to the 1750 record, you must assign it to the 1750 record in the DSFA application. In this situation, you must have the OCC (which you can find on the License Function Authorization document).

Use the **applykey** DS CLI command to activate the licenses for your storage unit. Use the **lskey** DS CLI command to verify which type of licensed features are activated for your storage unit.

1. Log into the DS CLI application in interactive command mode (if you are not already logged in).
2. Issue the DS CLI applykey command at the dscli command prompt as follows (this example presumes that your XML file is named ″keys″ and it resides on a diskette in your A: drive): dscli> `applykey -file a:\keys.xml IBM.1750-75FA120`
3. Press Enter. When the process has completed, the following message is displayed:

   ```
   Sun Aug 11 02:23:49 PST 2004 IBM DS  CLI
   Version 5.0.0.0 DS: IBM.1750-75FA120
   Licensed Machine Code key xxxx, key xxxx successfully applied.
   ```
4. Verify that the keys have been activated for your storage unit by issuing the DS CLI **lskey** command as follows: `lskey IBM.1750-75FA120`
5. Press Enter and the following type of report is displayed:

   ```
   Sun Aug 11 02:23:49 PST 2004 IBM DS CLI
   ```

Activation Key	Capacity (TB)	Storage Type	Storage Facility Image
Operating Environment	45	All	IBM.1750-75FA120
FlashCopy	23	FB	IBM.1750-75FA120
...	...	...	...

Enabling remote support using the command-line interface

Remote support enables IBM support personnel to quickly assist you with problem determination and, with your consent, remotely perform certain maintenance procedures.

Enabling the DS6000 remote support function helps optimize availability of the DS6000. You can set up your site receive and send e-mail notifications as well as use the Call Home function. The Call Home function alerts IBM of a problem or a potential problem as soon as it occurs. This enables IBM Customer Service to be proactive in assisting you with maintaining your DS6000 in an optimal state. You or remote support can use the DS Storage Manager or the command-line interface to offload problem determination data to IBM.

To take advantage of remote support, you must allow an outside connection such as the following:
- A VPN connection
- An internet connection through your firewall that allows IBM to connect to your storage management system

Remote support can be set up through the DS Storage Manager or through the command-line interface. This section describes how to use the DS CLI commands to set up remote support.

Setting up contact information

When you use any of the remote support features, the contact information you supply is sent to IBM so that an IBM service representative can contact you. Much, if not all, of the information that is needed for the remote support function can be collected from the configuration worksheets that are completed before your DS6000 is set up for use.

You must supply the following types of information:
- Company name
- Company address
- Machine location (the physical location of the machine)
- Machine address (where the machine is physically located)
- Ship phone (the telephone number of the person to contact when parts are being shipped)
- Ship location (the building location where the parts are to be shipped)
- Ship city
- Ship state or province
- Ship postal code
- Ship country (recommended: This information is used for the Call Home e-mail records)

- Contact name (the name of the system administrator who can be contacted by IBM service personnel)
- Contact primary phone number
- Contact alternate phone number
- Contact e-mail address
- Machine identification (consists of the manufacture, machine type, and serial number)

Use the `setcontactinfo` command to provide the contact information needed for the remote support function.

1. Log into the DS CLI application for use in interactive command mode (if you are not already logged in).
2. Issue the `setcontactinfo` command from the dscli command prompt; for example, dscli> `setcontactinfo —companyname IBM —companyaddr "9000 S. Rita Rd Tucson Az 85744" —contactpriphone 1-520-7998001 IBM.1750-75FA120`
3. Press Enter to process the command. A successful process displays the following message:

   ```
   Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
   DS: IBM.1750-75FA120

   The contact information settings were successfully modified
   ```

4. Verify that the contact information is active in your system by issuing the `showcontactinfo` command as follows: dscli> `showcontactinfo IBM.1750-75FA120`

Setting up the Call Home function

The Call Home feature allows the transmission of operational and error-related data to IBM. It is the ability for the storage unit to alert IBM support to machine conditions. The information that is used for setting up the Call Home function can be collected from the worksheets that you complete before your DS6000 is set up for use.

Ensure that you have enabled the **setsmtp** command and activated the shipcountry information in the **setcontactinfo** command before you attempt to use this command.

The **setdialhome** command activates the Call Home function. You designate the machine and enable the function on the machine with this command.

1. Log in to the DS CLI application in interactive command mode, if you are not already logged in.
2. Issue the **setdialhome** command as follows: dscli> `setdialhome -action enabled IBM.1750-75FA120`
3. Press Enter and a successful process displays the following message:

   ```
   Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
   DS: IBM.1750-75FA120

   The dial home settings were successfully modified
   ```

4. Verify that the Call Home function is active by issuing the **tesstcallhome** command as follows: dscli> `testcallhome IBM.1750-75FA120`
5. Press Enter and a successful process displays the following message:

   ```
   Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
   DS: IBM.1750-75FA120

   A test problem record was successfully created.
   ```

Setting up e-mail (SMTP) notifications

One of the remote support features available to you is the sending of notifications using e-mail when a problem occurs on your storage unit. You can specify that you want to enable this feature by completing the e-mail notification worksheet and by using it during the set up process.

You must specify the SMTP port and IP address where a message is sent in the event of a problem.

Use the **setsmtp** command to activate the e-mail notification remote support feature.

1. Log in to the DS CLI application in interactive command mode, if you are not already logged in.
2. Issue the **setsmtp** command as follows to activate e-mail notifications: dscli>
   ```
   setsmtp –server 9.11.242.12:500 IBM.1750–75FA120
   ```
3. Press Enter and a successful process displays the following message:
   ```
   Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
   DS: IBM.1750–75FA120

   The SMTP settings were successfully modified
   ```

Registering for My Support

Use this process to register for My Support.

My Support provides pro-active notification of microcode updates though an email address that you specify. My Support will automatically notify you of the latest microcode fixes and how to obtain them. It is highly recommended that you register for My Support.

To access online technical support, visit: `http://www-1.ibm.com/servers/storage/support/disk/ds6800/`. My Support registration provides e-mail notifications when new firmware levels have been updated and are available for download and installation. To register for My Support:

1. Visit the following Web site: `http://www.ibm.com/support/mySupport`
2. Select `register now`.
3. Under `My IBM Registration Step 1 of 2`, fill in the required information. Items with an asterisk (*) are required fields. Select `Submit`.
4. Under `My IBM Registration Step 2 of 2`, fill in the required information. Items with an asterisk (*) are required fields. Select `Submit`. Select `Continue`.
5. Login. Enter your User ID and Password and select `Submit`.
6. Select the `Edit my profile` tab. Select the information required for your profile under the `Products` section.
   a. In the drop-down list, select `Storage`.
   b. In the drop-down list, select `Computer Storage`.
   c. In the drop-down list, select `Disk Storage Systems`.
   d. In the drop-down list, select `TotalStorage DS6000 series`.
   e. Check the check box next to `TotalStorage DS6800`.
   f. Select `Add products`.
   g. Review your profile for correctness.

7. Select the `Subscribe to email` tab. In the drop-down list, select `Storage`. Then check `Please send these documents by weekly email` and check `Downloads and drivers` and `Flashes`.
8. Under the Welcome box, select `Sign out` to end your session.

Configuring new fixed block storage using the command-line interface

This section describes how you can configure new fixed block storage within a storage unit by using the command-line interface.

Before you begin, you must be logged into the DS CLI application in interactive command mode. You must also be connected to a storage unit that is used for open systems host system storage.

This section describes the creation of the fixed block storage configuration and then describes the configuration of the storage unit SCSI host ports to enable access to fixed block storage. You can run these two basic steps in the reverse order, but it is better to create storage configurations first, thereby creating the media to back up configuration data that is not related to the storage configuration.

Configuring new fixed block storage involves the following processes:
- Creating fixed block extent pools
- Creating arrays
- Creating ranks
- Associating ranks with extent pools
- Creating fixed block volumes
- Configuring fibre-channel I/O ports
- Creating SCSI host port connections
- Creating fixed block volume groups

Creating fixed block extent pools

Creating the fixed block extent pools is the first step in configuring new fixed block storage.

Creating the extent pools before the arrays and ranks saves a processing step. When you create the new ranks, you can assign them to existing extent pools. Otherwise, you must modify each rank object to complete the extent pool ID assignment after the extent pools have been defined.

Each extent pool is defined with the rank group of 0 or 1 and storage type of **fb**. The minimum requirement if for you to define one extent pool for each rank group and storage type combination. This means that you must make a minimum of two extent pools for a storage unit that contains fixed block storage: one fixed block extent pool per rank group.

Extent pools that are defined for rank group 0 or 1 are assigned an even- or odd-numbered extent pool ID, respectively. Even-numbered extent pools are managed by storage server ID 0. Odd-numbered extent pools are managed by storage server ID 1. Each rank is assigned to one extent pool, therefore, storage server workload is affected by the rank assignments to even- and odd-numbered extent pool IDs. It is better to evenly distribute rank and extent pool allocations in order to keep the storage server workloads balanced.

You can create more than the minimum number of extent pools. For example, you can define unique extent pools for each RAID type (5 or 10) that is configured in a storage image. Or, you can define and name extent pools according to the host system attachments that access the volumes that are created from extent pool extents. You can have the same number of extent pools as ranks.

Use the **lsextpool** and **mkextpool** commands to create the fixed block extent pools. You must be logged into the DS CLI application and connected to the storage unit that will be used for open systems host system storage. See the command descriptions for **lsextpool** and **mkextpool** if you need additional information about the commands.

1. Issue the mkextpool the following command to create the fixed block extent pool for rank group 0:

   ```
   dscli> mkextpool -dev IBM.1750-75FA120 -rankgrp 0 -stgtype fb p000
   ```

   Note: You must change the -dev value to match your the serial number of your system.

2. Press Enter. A successful process displays the following message:

   ```
   Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

   Extent pool P1 successfully created.
   ```

3. Repeat step 1 for rank group 1, if needed.

4. Continue to repeat the mkextpool command in step 1 for each extent pool that you want to create. Try to evenly distribute rank and extent pool allocations in order to keep the storage server workloads balanced.

5. Verify the extent pool assignments by issuing the lsextpool command when you are done making the extent pools. Use the -l parameter to display a full report for the extent pools that are assigned to the storage unit.

   ```
   dscli>
   ```

Creating arrays

The creation of arrays is based on the array sites that are associated with the storage unit.

The machine type 1750 contains at least one storage enclosure, with a minimum of four DDMs.

The DDMs of a storage enclosure are partitioned into array sites. A machine type 1750 array site consists of four DDMs in one storage enclosure of a storage enclosure pair, with two to eight (four DDM) array sites per storage enclosure pair. All array sites of a storage enclosure pair have identical capacity, rpm, and interface characteristics, and interface to a common DA pair.

Use the **lsarraysite** and **mkarray** commands to create the arrays. You must be logged into the DS CLI application and connected to the storage unit that will be used for open systems host system storage. See the command descriptions in Chapter 3 of the *IBM TotalStorage DS: Command-Line Interface User's Guide* if you need additional information about the **lsarraysite** and **mkarray** commands.

1. Create a list of array site IDs for all installed array sites with the status "unassigned" by issuing the following lsarraysite command:

   ```
   dscli> lsarraysite -dev IBM.1750-75FA120 -state unassigned
   ```

2. Press Enter. A report of unassigned array sites is displayed. Use the list to identify unassigned array site capacity, rpm, and device adapter (DA) pair attributes. Record the RAID type for each array site.

3. Create an array from each site with the status ″unassigned″ by issuing the following mkarray command:

dscli> `mkarray -dev IBM.1750—75FA120 -raidtype 10 -arsite S10`

Repeat this command until all "unassigned" array sites have been assigned to an array.

Note:

- You can specify one or two array sites for Raid types 5 and 10. If there are two array sites, both must be associated with a common DA pair ID. Two array sites must be separated by commas with no blank space in between. Example: S10,S11.
- The new array site inherits the capacity, rpm, interface, and DA pair characteristics of its parent array site. The status of the array is "unassigned" until it is assigned to a rank.

Creating fixed block volumes

To create fixed block volume groups, you must have the command-line interface prompt, and you must be connected to a storage unit that will be used for open systems host system storage.

A storage unit contains 64,000 possible logical volumes. The quantity of logical volumes that you can create in a storage unit is dependent on the machine type and model, installed raw storage capacity, the configured storage RAID type, and the size or capacity of each volume that is created.

A logical volume consists of one or more data extents that are allocated from a single extent pool. The data type of a volume is inherited from the extent pool extent storage type (fixed block or CKD) characteristic. When a fixed block volume is created, volume attributes are further defined as a standard storage image, OS400-protected, or OS400-unprotected volume type and volume capacity in bytes (512-byte logical blocks). These volume attributes characterize the volume to the host system that will access the volume. Each volume is assigned a volume ID, which is the volume address within the storage image 64 KB address space. Host access to a volume is enabled when the volume ID is assigned to a volume group object.

Use these steps to create fixed block volumes:

1. Create a list of fixed block extent pool IDs using the following command.

   dscli> `lsextpool -dev ID -stgtype fb`

2. Determine which extent pool IDs will be used as the source for the fixed block logical volumes to be created. Extent pool attributes determine the size and quantity of volumes that can be created. The extent pool ID (even/odd) indicates the storage server (0|1) affinity, which dictates that the LSS ID component of the volume ID must be an even or an odd number.

3. Create a list of unassigned address groups using the following command.

   dscli> `lsaddressgrp -dev ID`

   Take the following notes into consideration:

   - Determine the defined address group objects (0 - F). If the returned list is empty, then all address group objects are available to be defined (0 - 3).

- Address groups with storage type CKD are not available for the definition of fixed block volumes. Address groups with storage type ″FB″ and number of defined LSSs less than 16 are available for new fixed block volume ID definition.
- If an undefined address group will be used when creating new fixed block volumes, select the lowest numbered address group that is not defined.
- If you are adding new fixed block volumes to an existing fixed block address group, use the lslss command to identify LSSs that are already defined in the target address group.

4. Create 256 fixed block volumes for the specified LSS using the following command. Specify a volume ID that has not been previously defined as a fixed block or CKD volume. Repeat this step for all of the required logical volumes for each LSS.

dscli> `mkfbvol -dev ID -extpool ID -cap 8.6 -name DS_1_vol#h -volgrp volume_group_ID 1000-10FF`

Take the following notes into consideration:

- All volumes will have the same type and capacity attributes.
- -extpool identifies a fixed block extent pool containing available data extents.
- -cap (capacity) is 8.6 GB.
- -name assigns a unique name to the volume. The volume name parameter can include a wild card (#d or #h) that inserts a decimal/hexadecimal volume ID value into a volume name, thereby making volume names unique when multiple volumes are created by one command execution.
- -volgrp (**Optional**) The use of this parameter is optional at this point in the configuration process. The use of this parameter requires that a volume group ID already exist. It is possible that you have not yet created your volume group IDs. However, if you have created the IDs, you can use the -volgrp parameter to assign the new fixed block volumes to the existing volume group IDs.
- Volume ID 1000-10FF 256 volumes, starting at a fixed address group (1), LSS ID (10), and volume number (00). A volume ID is four hexadecimal characters in the format ″llxx″, where *ll* specifies an LSS ID (00 - FE) and *xx* specifies an LSS volume number (00 - FF). A volume ID must be compatible with the extent pool ID that is the specified source for volume data extents. That is, if an extent pool ID is associated with rank group 0/1, then the volume LCU ID must be an even/odd numbered value, respectively.

Creating fixed block volume groups

To create fixed block volume groups, you must have the command-line interface prompt, and you must be connected to a storage image that will be used for open systems host system storage.

A volume group identifies the set of fixed block logical volumes that are accessible by one or more SCSI host system ports. If you make volume groups prior to making fixed block volumes, then the mkfbvol command -volgrp parameter can be used to assign new fixed block volumes to a target volume group ID. Otherwise, if you make fixed block volumes prior to making volume groups, then use the mkvolgrp command and the -volume parameter to assign volumes to a new volume group ID, or use the chvolgrp command and the -volume parameter to assign volumes to an existing volume group ID.

SCSI host system access is constrained to the "identified" access mode. For "identified" access mode, a volume group ID is assigned to a SCSI host port. Only those SCSI host ports that are "registered" to a volume group ID are allowed to access the set of logical volumes contained by the volume group.

Logical volumes can be assigned to a volume group when the volume group is created, or the logical volumes can be added (or removed) at a later time. The volume group type determines the maximum number of volumes that can be assigned to a volume group, either a maximum of 256 volumes or a maximum of 64 K volumes. The volume group type must be selected according to the addressing capability of the SCSI host system that will use the volume group.

Create and view fixed block volume groups using the following steps:

1. Create a fixed block volume group using the following command. Repeat this command for each volume group that you want to create..

   dscli> mkvolgrp -dev *ID* -volume *ID1,ID2,... volume_group_name*

   - Use the -type scsi256 flag if the volume group is constrained to 256 volume IDs. Otherwise, a volume group may contain up to 64 K volumes. Use the -type 0s400mask flag if the volume group is constrained to fixed block volume types OS400-protected or OS400-unprotected. Otherwise, the volume group is constrained to the fixed block volume type 2107.
   - The volume group name should describe the SCSI host system ports that will access volumes using this volume group ID. A SCSI host port can access one and only one volume group ID. Multiple SCSI host ports can register to access the same volume group ID. In this case, all host ports have shared access to the set of volumes contained by the volume group ID.

2. Create a list of the assigned volume group IDs using the following command.

   dscli> lsvolgrp -dev *ID*

   If the SCSI host ports have not yet been configured, save the volume group ID for use when you create the SCSI host port. If the fixed block volumes have not yet been defined, save the volume group ID for use when you create fixed block volumes. If the SCSI host ports were configured prior to the volume groups, use the chhostconnect command to modify each SCSI host port that is configured for SCSI host system access. Add the volume group ID to enable host system access to storage image fixed block volumes.

Configuring fibre-channel I/O ports

Before you begin, you must have the command-line interface prompt, and you must be connected to a storage unit that will be used for open systems host system storage.

The storage image supports the fibre-channel host bus adapter (HBA) card type. For machine type 2107, HBA cards are installed in I/O enclosures, each containing up to four HBA cards. For machine type 1750, one or two HBA cards are installed in each of the two CEC assemblies. Each fibre-channel HBA card contains four I/O ports. The storage image microcode automatically creates one I/O port object to represent each HBA card I/O port. The default fibre-channel I/O port object settings enable SCSI-FCP "identified" access to fixed block volumes. You might have to modify the I/O port object settings to enable SCSI FC-AL access to FB volumes.

Use these steps to configure fibre-channel I/O ports:

1. Create a list of fibre-channel port IDs using the following command:

   dscli> lsioport -dev *ID* -type fc

2. Identify which I/O port IDs you want to access the fixed block volumes. Configure a minimum of four storage image I/O ports for SCSI host I/O operations. Select ports with physical locations on different host bus adapter (HBA) cards. If possible, locate the HBA cards in different I/O enclosures. Identify the port IDs that you want to configure for SCSI host access.

3. Set the specified I/O ports to enable the FCAL topology using the following command. I/O ports are automatically set offline and returned to the online state after configuration changes are applied

   dscli> `setioport -dev ID -topology fc-al port_ID1 ID2...IDn`

Creating SCSI host port connections

Before you begin, you must have the command-line interface prompt, and you must be connected to a storage unit that will be used for open systems host system storage.

The 1750 supports the "identified" access mode for SCSI host attachments, which requires that all SCSI host ports be identified to a storage unit. This is accomplished by creating a SCSI host port object for each SCSI host port that will access storage unit fixed block volumes. A SCSI host port object contains attributes that identify the SCSI host system type, the port profile, the port WWPN, the volume group ID that the port will access, and an array of storage unit I/O port IDs that the host port will log into for volume access, or an attribute to indicate that all I/O ports can be used for volume access. Object attributes also include a host port description and port nickname. Create one SCSI host port for each port that will access storage unit volumes.

Create SCSI host ports using the following command:

dscli> `mkhostconnect -dev ID -wwname wwpn -profile # -volgrp ID -ioport ID,ID,ID,ID host_name`

The command specifies the worldwide port name, the fibre-channel communication profile, the volume group ID that this host port is allowed to access, the storage image I/O ports that this port can log in to, and your name for the SCSI host system.

Note:
- You can obtain a profile value from the lsportprof command for the host type.
- You do not need to list the volume group.
- Use the chhostconnect command to map volumes to volume groups

Modifying fixed block volume groups
This scenario describes how to modify fixed block storage within a storage unit.

To modify fixed block volume groups, you must have the command-line interface prompt, and you must be connected to a storage unit that will be used for open systems host system storage.

Adding volumes to a volume group and removing volumes from a volume group are typical storage management tasks. The volumes that are added to a volume group can be "unassigned" to a volume group, or they can be volumes that are assigned to a volume group but you want to move them to a different volume group. In either case, you are responsible for managing how the volumes are allocated to volume

groups and how the volumes are reserved for future allocation. It is better that you maintain "unassigned" volumes in a volume group that is not accessible by any host system, thereby controlling the accessibility of volumes that are reserved for future allocation.

You can assign a fixed block volume to multiple volume groups. This might be necessary for some host system applications. However, damage to volume data can occur if a volume is accessed by different host systems using different file management systems. To assign a fixed block volume to multiple volume groups, perform the following steps:

1. Find the fixed block volumes that are to be assigned to a volume group using the following command.

   dscli> `lsfbvol -dev` *ID* `-type` *2107* | *os400-protected* | *os400-unprotected* `-extpool` *ID*

   The command creates a list of all volumes of the specified volume type within the specified extent pool. It includes only the volumes that are contained by the specified storage image.

2. Retrieve the current volume group volume map using the following command.

   dscli> `showvolgrp -dev` *ID volume_group_ID*

   The command creates a list of volumes that are assigned to the target volume group.

3. Modify the volume group using the following command.

   dscli> `chvolgrp -dev` *ID* `-action add` | `remove` | `replace -volume` *ID,ID,...,ID volume_group_ID*

   You can add or remove volume IDs to the list in order to add or remove volumes. This command applies the updated volume ID list.

DS Command Line Interface

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

The following topics describe the steps required to successfully remove this interface.

Removing IBM TotalStorage DS CLI from your system using graphical mode

Use the graphical mode to remove the DS CLI from your system when DS CLI is installed on a Windows, Novell, or UNIX system.

Note: The following procedure applies only to the removal of the DS CLI application. This procedure cannot be used to remove other versions of CLI.

You use the Add/Remove Programs facility of the Windows operating system to remove the DS CLI from your system. When you have processed the uninstall steps, you need to restart your system to complete the uninstall. Perform the following steps to remove the DS CLI using the graphical mode.

1. Navigate to your Control Panel and open the Add/Remove program facility.
2. Scroll the list of currently installed programs and click the listing for DS CLI.

3. Click the **Change/Remove** button and the Welcome window for the Uninstaller is displayed.
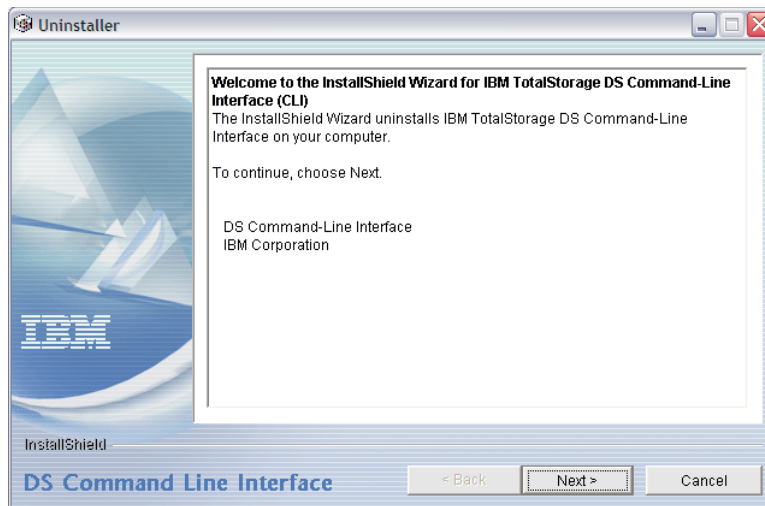
4. Click **Next** to continue or click **Cancel** to exit the removal process. When you click **Next**, the Confirmation window is displayed showing the directory from which the DS CLI program is removed.
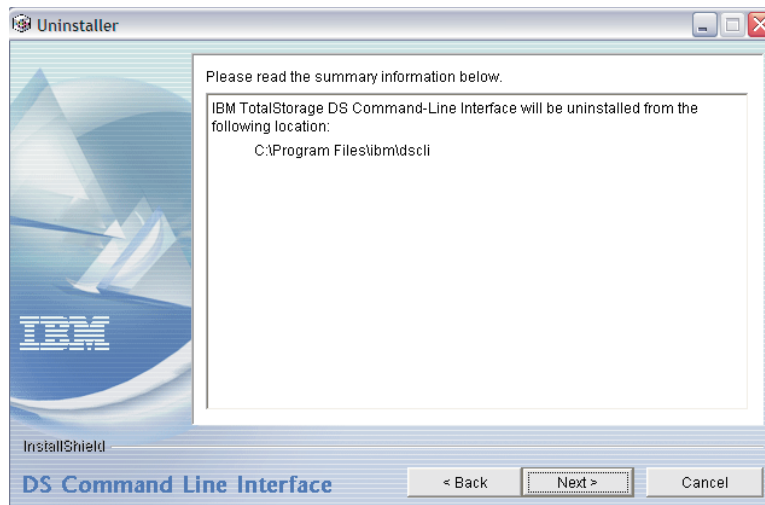
5. Click **Remove** to continue or **Cancel** to stop the removal and exit the uninstall process. Click **Back** to return to the previous window. When you click **Remove**, the Uninstallation Progress window is displayed. When the uninstall process is finished, the Finish window is displayed, which contains a statement about the success or failure of the uninstall process.
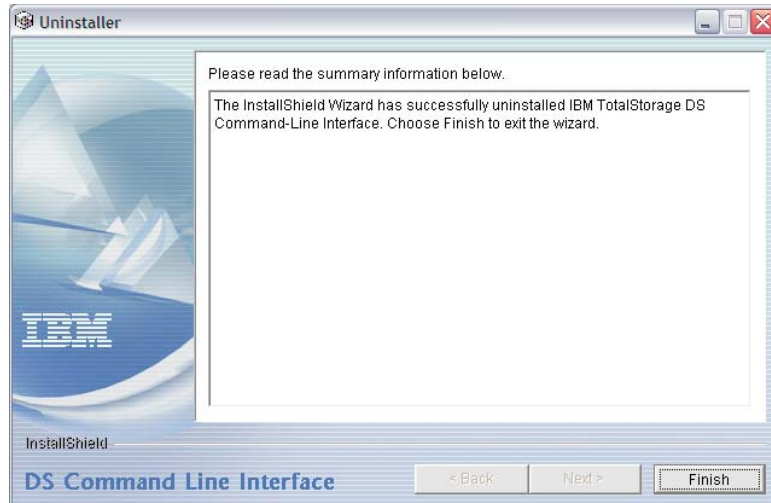
> If the uninstall program does not remove some information from your system, the Restart window is displayed. You must restart so that previously locked files are released and automatically deleted.

6. Close the Add/Remove Programs window.

7. Restart your system (now or later) to complete the removal process.

Removing the IBM TotalStorage DS CLI using silent mode

Use the silent mode to remove the DS CLI through the command-line if the DS CLI is installed on a UNIX system or a variant of UNIX (for example, HPUX, Sun, or AIX).

Perform the following steps to successfully uninstall the DS CLI.

Note:

- If you are using Windows or Novell you will use the Add/Remove Programs feature to uninstall the DS CLI.
- This uninstall process only works with DS CLI. No other versions of CLI can be removed with this process.

1. Locate the uninstaller file in the /_uninst folder. If you selected the default directory, you can find the _uninst folder using the /opt/ibm/dscli path. The uninstaller file name is uninstaller.*xxx*, with *xxx* depending on the operating system. . If you have a Hewlett Packard, Sun, or AIX system, then the file name is uninstaller.bin. For all other operating systems the file name is uninstaller.sh.

2. Type the following command at the command prompt: <install directory>/_uninst/uninstaller.<exe|sh|bin> -silent

3. Press the **Enter** key. All the associated CLI files are uninstalled.

Removing the IBM TotalStorage DS CLI using the console mode

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

Perform the following steps to remove the DS CLI using the console mode:

Note: Do not use the console method to uninstall DS CLI on a Windows system. Instead, follow the steps in this guide for removing the DS CLI using graphical mode.

1. Type the following command at a command prompt: <install directory>/_uninst/uninstaller.<sh | bin> -console
2. The Welcome screen displays. Press 1 and `Enter` to continue, or 3 to `Cancel` the removal process.

```
Welcome to the InstallShield Wizard for IBM TotalStorage DS Command-Line
Interface (CLI)
The InstallShield Wizard uninstalls IBM TotalStorage DS Command-Line Interface
on your computer.

 To continue, choose Next.


    DS Command-Line Interface
    IBM Corporation

Press 1 for Next, 3 to Cancel or 4 to Redisplay [1]
```

3. The Uninstallation Location screen is displayed. Press 1 and `Enter` to continue, or 3 and `Cancel` to exit the removal process.

```
IBM TotalStorage DS Command-Line Interface will be uninstalled from the
following location:

C:\Program Files\ibm\dscli

Press 1 for Next, 2 for Previous, 3 to Cancel or 4 to Redisplay [1]
```

4. The Uninstallation progress screen is displayed while the command-line interface is being removed.

```
Uninstalling IBM TotalStorage DS Command-Line Interface...
```

5. The Uninstallation Finish screen is displayed. Press 3 to finish the removal.

```
The InstallShield Wizard has successfully uninstalled IBM TotalStorage DS
Command-Line Interface. Choose Finish to exit the wizard.

Press 3 to Finish or 4 to Redisplay [3]
```

Upgrading your system to use DS CLI

You can upgrade your system to use DS CLI by following the remove and install procedures put in place for DS CLI. However, there are some things that you need to consider before making this upgrade.

The DS CLI is designed to support the following features that exist on the IBM TotalStorage Enterprise Storage Server® (ESS) Models 750 and 800:

• A Copy Services domain, configured as part of the IBM TotalStorage Enterprise Storage Server (ESS) Models 750 and 800.

• FlashCopy Version 2 and PPRC Version 2 licenses that are available on the ESS.

However, the DS CLI is not designed to support the CLI scripts that you have written for these features without modification.

As part of your upgrade preparation, ask yourself the following questions:

• Do you plan to add the DS6000 to your network?

If you do, you must install the DS CLI application. This application is used for the configuration, performance, and Copy Services functions. Also, only the DS CLI can be used to perform Copy Services functions between the ESS and the DS models.

- Do you plan to keep the DS6000 separate from your network?

If you do, you can not communicate with the ESSs in your network, even for Copy Services functions. You can install the DS CLI on your server and it supports the DS6000, but new scripts must be written that support the DS6000.

OpenVMS system integration

You can adjust your OpenVMS system to obtain greater benefits from the use of the DS CLI application. The hints and tips that are provided in this section show how to obtain these benefits through the optimal integration of the DS CLI into your OpenVMS system.

The following list provides the areas that you might consider for optimizing the use of the DS CLI in your OpenVMS system:

- Command Console LUN (CCL)
- OpenVMS system messages
- Message help
- Java Run Time Environment (JRE)
- Quota recommendations

Enhancing the command console LUN for DS CLI use

The OpenVMS operating system considers a fibre-channel device with LUN ID 0 as Command Console LUN (CCL). These devices do not normally display when you issue the DS CLI **lshostvol** command. However, with adjustments, these devices can be displayed when you issue the **lshostvol** command. The following description provides the information that you need to make this enhancement work on your OpenVMS system.

Fibre-channel CCL devices have the OpenVMS device type GG, which result in OpenVMS device names in the form 1GGA*n*. In contrast, fibre-channel disk devices have the OpenVMS device type DG, which result in device names in the form 1DGA*n*. Therefore, LUN 0 devices on OpenVMS are a special device type, different from disk devices.

The DS CLI **lshostvol** command displays the mapping of host device names or volume names to machine type 2105, 2107, and 1750 volume IDs. That implies that all host devices belonging to 2105/2107/1750 volumes are displayed. Therefore, CCL devices 1GGA*n* are included in the lshostvol output for multiplatform consistency and to match the output of other DS CLI commands.

However, the inclusion of CCL devices can be confusing for users who expect that the **lshostvol** command displays only the disk devices. You can use the OpenVMS logical name **IBMDSCLI$SHOW_GG_DEVICES** to modify the DS CLI behavior: If this logical name translates to an expression which evaluates as True in OpenVMS conventions (1, Y, YES, T, or TRUE), then the 1GGA*n* CCL devices are shown in the command output. Otherwise, the 1GGA*n* CCL devices are not shown.

The startup procedure **IBMDSCLI$STARTUP.COM** defines the logical name **IBMDSCLI$SHOW_GG_DEVICES** as Y. If you want to suppress 1GGA*n* CCL

devices in the lshostvol command output, you can redefine the logical name after the startup procedure has been processed.

Enhancing the OpenVMS system messages

When you use the DS CLI, the application provides messages regarding the application processes, status, and errors. You also receive the OpenVMS system messages but they are displayed in a different format. You can make this situation less confusing by making the following adjustments.

The DS CLI messages are presented in an operating-system independent format. In contrast, native OpenVMS programs provide messages using the system message facility as displayed in the following format: **%facility-level-identification, text**.

To ensure that the OpenVMS command **SET MESSAGE** and customer-written tools that scan for such messages work correctly, the DS CLI provides each message using OpenVMS system services in addition to the operating system independent output. After displaying the OpenVMS message, the normal DS CLI message is provided unchanged. This ensures that the DS CLI messages are identical across platforms and that you can work with the DS CLI documentation.

However, these redundant messages can be confusing for users who are not familiar with OpenVMS. You can use the OpenVMS logical name **IBMDSCLI$OPENVMS_MESSAGES** to modify the DS CLI behavior: If this logical name translates to an expression which evaluates as True in OpenVMS conventions (1, Y, YES, T, or TRUE), then the additional OpenVMS-formatted messages are presented. Otherwise, only the operating system independent DS CLI messages are shown.

The startup procedure **IBMDSCLI$STARTUP.COM** defines the logical name **IBMDSCLI$OPENVMS_MESSAGES** as Y. If you want to suppress the OpenVMS-formatted messages, you can redefine the logical name after the startup procedure has been processed.

Enabling OpenVMS to use the DS CLI help

The DS CLI installation process offers the option to add modules to the system help library. If you enable OpenVMS with this option, you can use the DS CLI help.

The DS CLI installation process offers the option to add modules to the system help library **SYS$COMMON:[SYSHLP]HELPLIB.HLB** and the system messages database **SYS$COMMON:[SYSHLP]MSGHLP$LIBRARY.MSGHLP$DATA**. If you choose this option, the module IBMDSCLI is added as the top-level key to the help library, and the DS CLI status messages can be accessed using the **HELP/MESSAGE/FACILITY=IBMDSCLI** command. Additionally, the login procedure **IBMDSCLI$MANAGER:IBMDSCLI$LOGIN.COM** activates the message section file **IBMDSCLI$SYSTEM:IBMDSCLI_Messages_Shr.exe** for the current process.

In every case, the installation process provides the following files in the directory which is referred by the logical name IBMDSCLI$HELP:

IBMDSCLI_Ovr.hlp
>A help library containing one module with the top-level key IBMDSCLI. You can add this library to the search list for help libraries in your OpenVMS system by defining appropriate logical names **HLP$LIBRARY**, **HLP$LIBRARY_1**, **HLP$LIBRARY_2**, and so forth.

IBMDSCLI_Messages.msghlp$data

A message help data file with messages for facility IBMDSCLI. You can add this data file to the searchlist for message help files in your OpenVMS system by defining the logical name MSGHLP$LIBRARY accordingly.

If you do not want the installation process to modify the OpenVMS system libraries, you can use these OpenVMS default logical names to integrate the DS CLI help information manually.

Java Runtime Environment considerations

The DS CLI login procedure **IBMDSCLI$MANAGER:IBMDSCLI$LOGIN.COM** defines **JAVA$CLASSPATH** in the OpenVMS process logical name table and it overrides any existing Java classpath definition. If you want to use other Java-based software in the same process, you must redefine **JAVA$CLASSPATH** so that it provides the classpath as a JAVA command parameter.

The following information provides an overview of how the installation of the DS CLI affects the Java environment of your OpenVMS system.

Because the DS CLI relies on Java Run Time Environment (JRE) V1.4.2, mandatory JRE files are installed in the directory tree that is referenced by the logical name **IBMDSCLI$JRE**. This setup is according to HP guidelines. The login procedure **IBMDSCLI$MANAGER:IBMDSCLI$LOGIN.COM** calls the JRE setup procedure which defines several logical names and DCL symbols for usage by the Fast Virtual Machine.

If your OpenVMS host system uses other software that requires JRE but cannot run with the same JRE version as the DS CLI, users of that software can switch between different Java versions. To use different JRE versions, you must run a command procedure to set up the Java environment definitions for the version that you want to use in the given process (see the OpenVMS Java documentation at http://h18012.www1.hp.com/java/documentation/index.html).

The DS CLI application-specific Java classes are bundled in Java Archive (.JAR) files in the directory referenced by logical name **IBMDSCLI$LIBRARY**. These files must be included in the Java classpath. On OpenVMS, two logical names define the classpath:

CLASSPATH

For UNIX-style names. You can use a string inside single quotation marks that consists of colon-separated path names.

JAVA$CLASSPATH

For OpenVMS specification syntax. You can specify multiple paths with a comma-separated expression (not enclosed in single quotation marks) as OpenVMS logical name search list. **JAVA$CLASSPATH** overrides **CLASSPATH**, if **JAVA$CLASSPATH** is defined.

Because of this override process, you might have to redefine the **JAVA$CLASSPATH** to provide the class path as a JAVA command parameter. However, this JAVA command parameter is only required if you want to use other Java-based software in the same process.

Quota considerations

The JRE was designed to perform optimally on UNIX systems, where each process is given large quotas by default. On OpenVMS, the default behavior gives each process lower quotas so that many processes can co-exist on a system.

To get the best Java performance on OpenVMS, HP recommends that you set process quotas to match a typical UNIX system. HP also recommends these as minimum quota settings (except where noted). See these recommendations at

http://h18012.www1.hp.com/java/documentation/1.4.2/ovms/docs/
user_guide.html#processquotas.

To check if your current process quotas fulfill the recommendations, you can run the following process: `IBMDSCLI$JRE:[LIB]Java$Check_Environment.com`.

Chapter 3. Using remote support

Remote support enables IBM support personnel to quickly assist you with problem determination and, with your consent, remotely perform certain maintenance procedures.

When you are directed by IBM Customer Service personnel, you can use the DS CLI mkpe and offloadss commands to pass detailed information to IBM for use in analyzing your problem. This allows IBM to assist you directly with maintaining your DS6000 in an optimal state.

You can pass the problem determination information to IBM using ftp, e-mail, or by copying the information to a CD and sending the CD to IBM support.

Providing problem determination information using ftp

The problem determination information that you collect when you process the mkpe and offloadss commands is forwarded automatically to IBM support personnel using ftp if your storage management console (SMC) is attached to the Internet.

To use the ftp parameter of the mkpe and offloadss commands, you must ensure the following:
* The Internet Raid controllers (IRCs) must be powered on and functioning.
* There must be an active IP connection between your storage management console and both IRCs.
* Adequate disk space must exist on your storage management console (SMC).
* You must be logged into the DS CLI application in interactive mode.

Note: The ftp function works only from your storage management console.

The mkpe command collects the PE package data and presents the information in a summary format. The offloadss command collects the statesave data, which contains additional detailed information. Generally, when IBM support personnel request the statesave data, they also request that you provide the PE package information, as well. There are occasions, however, when only the PE package information is needed for analysis.

Use the following process to provide the requested information to IBM support:
1. Ensure that your SMC meets the prerequisites before issuing the mkpe and offloadss commands.
2. Determine the directory where you want to collect the PE package information. For example, /etc/prepackage
3. Issue the mkpe command from the dscli prompt as follows: dscli>`mkpe -destdir /etc/prepackage IBM.1750-75FA120`. The PE package information is collected in the destination directory and using ftp, is automatically sent to the applicable IBM support URL. When the information has been successfully received by the IBM support site (for example, testcase.boulder.ibm.com), the information files are automatically erased from the collection directory.

    A successful process of this command displays a message like the following:

    ```
    Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
    DS: IBM.1750-75FA120

    The PE package was successfully offloaded to the management node
    ```

4. Determine the directory where you want to collect the statesave information. For example, /etc/statesave

5. Issue the offloadss command as follows (if you have been asked to supply the statesave information): dscli>`offloadss -destdir /etc/statesave IBM.1750-75FA120`. The statesave information is collected in the destination directory and automatically sent to the applicable IBM support URL. When the information has been successfully received by the IBM support site, the information files are automatically erased from the collection directory.

   A successful process of this command displays a message like the following:

   ```
   Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
   DS: IBM.1750-75FA120

   The State Save was successfully offloaded to the management node
   ```

Providing problem determination information when ftp is not available

There might be times when you must provide problem determination information to IBM support personnel but your ftp connection is not available. You still make use of the mkpe and offloadss commands to collect the information, but you include the -noftp parameter. You can send the collected information to IBM support using e-mail or sending a CD that contains the information.

You must ensure that you are logged into the DS CLI application in interactive mode.

The mkpe command collects the PE package data and presents the information in a summary format. The offloadss command collects the state save data, which contains additional detailed information. Generally, when IBM support personnel request the state save data, they also request that you provide the PE package information, as well. There are occasions however, when only the PE package information is needed for analysis.

Use the following process to provide the requested information to IBM support:

1. Obtain the address information from IBM Support where you will send your e-mail or CD.

2. Determine the directory where you want to collect the PE package information. For example, /etc/prepackage

3. Issue the mkpe command from the dscli prompt as follows: dscli>`mkpe -destdir /etc/prepackage -noftp IBM.1750-75FA120`. The PE package information is collected in the destination directory.

4. Create a zip file of the information if there are many files or copy the files to a CD.

5. Create and send an e-mail with your attached PE package file, to the address IBM Support has directed that your file be sent. Or, send your CD by mail to the address that IBM Support has given you.

6. Determine the directory where you want to collect the state save information. For example, /etc/statesave

7. Issue the offloadss command from the dscli prompt as follows: dscli>`offloadss -destdir /etc/statesave -noftp IBM.1750-75FA120`. The state save information is collected in the destination directory.

8. Create a zip file of the information or copy the files to a CD.

9. Create and send an e-mail with your attached state save file, to the address that IBM Support has directed your file be sent. Or, send your CD by mail to the address that IBM Support has given you.
10. Wait for confirmation of receipt from IBM Support and copy your state save files and PE package files to a backup directory.

    Note: When your problem has been resolved, you can delete the backup copy of your files.
11. Delete the PE package files from your collection directory.
12. Delete the state save files from your collection directory.

Chapter 4. CLI commands

This section describes the command-line interface (CLI) commands that you can use to perform configuration and storage management tasks.

About CLI commands

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

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

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

The **command name** specifies the task that the command-line interface is to perform. For example, *lsarraysite* tells the command-line interface to list array sites, and *mklcu* 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 perform the command task in a specific way. For example, the *-v* flag tells the command-line interface to display the command results in verbose mode. Some flags may 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 may be followed immediately by 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. This means that their value changes to meet your needs. Every user will have 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 if you specify *-v* only, then the flag parameter is assumed to be on.

The **command parameter** provides basic information that is necessary to perform 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 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 provided in the command parameter string.

In the following example, *lsrank* is the command name. *-fullid -dev* and *-l* are flags. *IBM.2107–75FA120* is the flag parameter for the *-dev* flag, and *R1*, *R2*, and *R3* are a list of command parameters.

Understanding the syntax diagrams

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

Syntax diagrams

Main path line

►►——►◄

Begins on the left with double arrowheads (>>) and ends on the right with two arrowheads facing each other (><). If a diagram is longer than one line, each line to be continued ends with a single arrowhead (>) and the next line begins with a single arrowhead. Read the diagrams from left-to-right, top-to-bottom, following the main path line.

Keyword

►►—dscli——►◄

Represents the name of a command, flag, parameter, or argument. A keyword is not in italics. Spell a keyword exactly as it is shown in the syntax diagram.

Required keywords

►►—mkuser— -pw— *password*— -group—*group_name* [. . .]————————————————————┬—*User Name*—┬——►◄
                   └— -pwfile— *file_name*—┘   └— *" - "*——┘
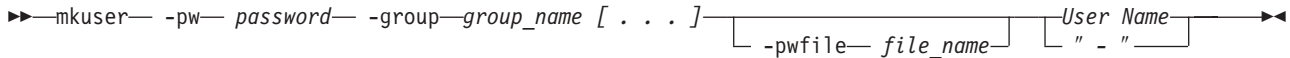
Indicate the parameters or arguments you must specify for the command. Required keywords appear on the main path line. Mutually exclusive required keywords are stacked vertically.

Optional keywords

►►——►◄
        └— -h— -help— -?—┘
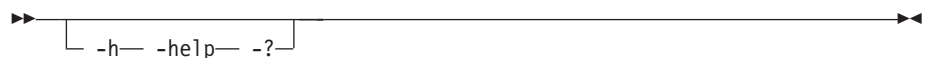
Indicate the parameters or arguments you can choose to specify for the command. Optional keywords appear below the main path line. Mutually exclusive optional keywords are stacked vertically.

Variable

►►—*variable*——————————————————————————————————————►◄

Represents the value you need to supply for a parameter or argument, such as a file name, user name, or password. Variables are in italics.

Special characters

- (minus) or / (slash) sign

Flags are prefixed with a - (minus) sign. Flags define the action of a

command or modify the operation of a command. You can use multiple flags, followed by parameters, when you issue a command.

[ ] square brackets
Optional values are enclosed in square brackets.

{ } braces
Required or expected values are enclosed in braces.

| vertical bar
A vertical bar indicates that you have a choice between two or more options or arguments.

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.

List of commands

This is a complete list of the command-line interface commands, alphabetized by command name.

Command	Type	Description
applykey	application key and version	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. The file that contains the LMC keys must be downloaded from an IBM Web site.
chckdvol	storage configuration	The chckdvol command changes the name of a count key data (CKD) base volume.
chextpool	storage configuration	The chextpool command modifies an extent pool name.
chfbvol	storage configuration	The chfbvol command changes the name or data type of a fixed block volume.
chhostconnect	I/O port and host connect configuration	The chhostconnect command modifies a SCSI host port configuration.
chlcu	storage configuration	The chlcu command modifies a logical control unit.
chlss	storage configuration	The chlss command modifies a logical subsystem.

Command	Type	Description
chpass	user account and security	The chpass command changes the password expiration time and the number of login attempts for a storage complex.
chrank	storage configuration	The chrank command assigns an unassigned rank to a extent pool, or removes an assigned rank from a extent pool. This action can change an assigned rank to an unassigned rank.
chsession	Copy Services	The chsession command allows you to modify a Global Mirror session.
chsi	storage image configuration	The chsi command modifies a storage image. You can use it to set characteristics such as online or offline state, name, and description.
chsu	storage unit configuration	The chsu command modifies a storage unit. You can use this command to power-on and power-off a storage unit.
chuser	user account and security	The chuser command is used to modify and lock or unlock a DS CLI or a DS Storage Manager user account. A CLI user with administrative authority uses this command to update a user account password, modify user group authority, or to lock or unlock a user account. Users that do not have administrator authority, use this command to change an expired password and create a password that is not known to the administrator who created their account.
chvolgrp	storage configuration	The chvolgrp command modifies a volume group name and volume members.
clearvol	storage configuration	The clearvol command clears Copy Services relationships for a base logical volume.
closeproblem	DS6000 close problem	The closeproblem command modifies the status of a problem in the problem log file to closed.

Command	Type	Description
commitflash	Copy Services	The commitflash command commits data to a target volume to form a consistency between the source and target. Before you use this command, you must first issue the mkflash command with the -record and -persist flags. After the pair is established, you must then issue the setflashrevertible command against the pair.
commitremoteflash	Copy Services	The commitremoteflash command commits data to a target volume to form a consistency between the remote source and target FlashCopy pair. Before you use this command, you must first issue either the command mkflash or mkremoteflash with the -record and -persist flags. After the pair is established, you must then issue either the setflashrevertible or setremoteflashrevertible command against the pair.
dscli	framework	The dscli command starts the command-line interface (CLI) program. Use this command to run CLI commands in interactive mode, to run a single command, or to run a set of commands from a script. For more information about how to use this command, see "Completing DS CLI postinstallation."
failbackpprc	Copy Services	the failbackpprc command against any remote mirror and copy volume that is in a primary suspended state. The command copies the required data from the source volume to the target volume in order to resume mirroring. The command is usually used after a failoverpprc command has been issued to restart mirroring either in the reverse direction (recovery site to production site) or original direction (production site to recovery site). However, this command also works if the target volume has been made simplex or is a secondary volume. The command performs a full or partial copy, as required.

Command	Type	Description
failoverpprc	Copy Services	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. See "Using the failoverpprc and failbackpprc commands" scenario for further information.
freezepprc	Copy Services	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.
lsaddressgrp	storage configuration	The lsaddressgrp command displays a list of address groups for a storage image and status information for each address group in the list.
lsarray	storage configuration	The lsarray command displays a list of arrays in a storage image and status information for each array in the list.
lsarraysite	storage configuration	The lsarraysite command displays a list of array sites and status information for each array site in the list.
lsavailpprcport	Copy Services	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 DS6000 supports only fibre channel ports. The Enterprise Storage Server (2105 machine type) supports ESCON ports.
lsckdvol	storage configuration	The lsckdvol command displays a list of count key data (CKD) base and alias volumes in a storage image and status information for each volume in the list.

Command	Type	Description
lsddm	field-replaceable unit information	The lsddm command displays a list of device drive modules (DDMs) and status information for each DDM in the list.
lsextpool	storage configuration	The lsextpool command displays a list of extent pools in a storage image and status information on each extent pool in the list.
lsfbvol	storage configuration	The lsfbvol command displays a list of fixed block volumes in a storage image and status information for each volume in the list.
lsflash	Copy Services	The lsflash command displays a list of FlashCopy relationships and status information for each FlashCopy relationship in the list.
lshostconnect	I/O port and host connect configuration	The lshostconnect command displays a list of host connections for a storage image and the status information for each host connection in the list.
lshosttype	I/O port and host connect configuration	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.
lshostvol	I/O port and host connect configuration	The lshostvol command displays the mapping of host device names or volume names to machine type 2105, 2107, and 1750 volume IDs.
lsioport	I/O port and host connect configuration	The lsioport command displays a list of I/O ports (both ESCON and fibre channel) on a specified storage image and optionally provides performance metrics for each I/O port listed.
lskey	application key and version	The lskey command displays the type of licensed machine code (LMC) activation keys that are installed and available for use by the storage image. For instance, the following list represents the type of LMC activation keys: Operating Environment, FlashCopy, Remote Mirror and Copy, Parallel Access Volumes, Remote Mirror for z/OS.
lslcu	storage configuration	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.

Command	Type	Description
lslss	storage configuration	The lslss command displays a list of logical subsystems (LSSs) for a storage image and status information for each logical subsystem in the list.
lsportprof	I/O port and host connect configuration	The lsportprof command displays a list of port profiles that are supported on a storage image and their recommended address discovery and logical block size values.
lspprc	Copy Services	The lspprc command displays a list of remote mirror and copy (formerly PPRC) volume relationships for a storage image, and status information for each remote mirror and copy volume relationship in the list.
lspprcpath	Copy Services	The lspprcpath command displays a list of existing remote mirror and copy (formerly PPRC) path definitions.
lsproblem	DS6000 problem log	The lsproblem command lists problem logs.
lsrank	storage configuration	The lsrank command displays a list of defined ranks in a storage image and status information for each rank.
lsremoteflash	Copy Services	The lsremoteflash command displays a list of FlashCopy relationships and status information for each FlashCopy relationship in the list.
lsserver	storage image configuration	The lsserver command displays all servers in a storage complex or a list of specified servers, and displays status information for each server in the list.
lssession	Copy Services	The lssession command displays a list of Global Mirror sessions for a logical subsystem (LSS) and information regarding the volumes of each session in the list.
lssi	storage image configuration	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 when using the lsavailpprcport and mkpprcpath commands.

Command	Type	Description
lsstgencl	physical enclosure information	The lsstgencl command displays a list of storage enclosures and status information for each enclosure in the list.
lssu	storage unit configuration	The lssu command displays a list of storage units in a storage complex. You can use this command to look at the status and other properties of each storage unit in the list.
lsuser	user account and security	The lsuser command returns a list of storage image user account names and access authority levels.
lsvolgrp	storage configuration	The lsvolgrp command displays a list of volume groups in a storage image and status information for each volume group in the list.
managehostconnect	I/O port and host connect configuration	The managehostconnect command modifies the volume group assignment for a SCSI host port.
mkaliasvol	storage configuration	The mkaliasvol command creates zSeries CKD alias volumes (generally referred to as parallel access volumes or PAVs) in a storage image.
mkarray	storage configuration	The mkarray command creates arrays.
mkckdvol	storage configuration	The mkckdvol command creates zSeries count key data (CKD) base or CKD alias volumes in a storage image.
mkesconpprcpath	Copy Services	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 TotalStorage Enterprise Storage Servers (2105, Model 800 and Model 750).
mkextpool	storage configuration	The mkextpool command creates a fixed block or count key data (CKD) storage type extent pool.
mkfbvol	storage configuration	The mkfbvol command creates open systems fixed block (FB) volumes in a storage image.
mkflash	Copy Services	The mkflash command initiates a point-in-time copy from source volumes to target volumes.

Command	Type	Description
mkgmir	Copy Services	The mkgmir command starts Global Mirror for a session.
mkhostconnect	I/O port and host connect configuration	The mkhostconnect command configures open systems hosts port attachments to fibre channel ports that are configured for FC-AL or SCSI-FCP topology. Open systems hosts port attachments to fibre channel ports are configured for identified access mode and SCSI protocol.
mklcu	storage configuration	The mklcu command creates a logical control unit (LCU) in a storage image.
mkpe	DS6000 PE package	The mkpe command creates and copies PE packages from DS6000 nodes to the destination directory on a management node.
mkpprc	Copy Services	The mkpprc command establishes a remote mirror and copy (formerly PPRC) relationship for a volume pair.
mkpprcpath	Copy Services	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. This is the only supported connectivity for machine types 2107 and 1750. Paths can be established between the following machine types: 2105:2105, 2107:2107, 2107:1750, 2107:2105, 1750:1750, 1750:2105.
managepwfile	user account and security	The managepwfile command creates a password file for an existing ESS user account. This command processes the password requirements for 2105, 2107, and 1750 systems.
mkrank	storage configuration	The mkrank command creates one fixed block or count key data (CKD) rank from one array.
mkremoteflash	Copy Services	The mkremoteflash command initiates a remote copy from source volumes to target volumes through a remote mirror and copy (formerly PPRC) relationship.
mksession	Copy Services	The mksession command opens a Global Mirror session.

Command	Type	Description
mkuser	user account and security	The mkuser command creates a DS CLI or a DS Storage Manager user account. A CLI user with administrative authority uses this command to create a user account with a password and user group authority.
mkvolgrp	storage configuration	The mkvolgrp command creates a volume group in a storage image.
offloadss	DS6000 PE package	The offloadss command copies state information from nodes to the destination directory on a management node.
pausegmir	Copy Services	The pausegmir command pauses Global Mirror for a session.
pausepprc	Copy Services	The pausepprc command pauses an existing remote mirror and copy volume pair relationship. Or, this command can be used to pause a single volume ID. To use 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.
restorevolaccess	storage configuration	The restorevolaccess command resets the fenced access state for a volume when the volume is in a fenced access state.
resumegmir	Copy Services	The resumegmir command resumes Global Mirror processing for a session.
resumepprc	Copy Services	The resumepprc command resumes a remote mirror and copy (formerly PPRC) relationship for a volume pair.

Command	Type	Description
resyncflash	Copy Services	The resyncflash command (formerly called incflash for an incremental FlashCopy process) increments an existing FlashCopy pair that has been established with the -record and -persist flags. When a pair is established with the -record and -persist flags, the pair initially synchronizes and then a record of all host writes to the source is maintained in the source volumes. When the resyncflash command is issued on the pair, the new writes to the source are copied to the target. The flags specified in this command will replace the flags in the existing relationship. In order to keep the initial -record and -persist flags, they must be specified in the resyncflash command.
resyncremoteflash	Copy Services	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 flags. When a pair is established with the -record and -persist flags, the pair initially synchronizes and then a record of all host writes to the source is maintained in the source volumes. When the resyncremoteflash command is issued on that pair, the new writes to the source are copied to the target. The specified flags in this command replace the flags in the existing relationship. In order to keep the initial -record and -persist flags, they must be specified using the resyncremoteflash command.

Command	Type	Description
reverseflash	Copy Services	The direction of a FlashCopy relationship can be reversed, where the volume that was previously defined as the target becomes the source for the volume that was previously defined as the source (and is now the target). The data that has changed is copied to the volume that was previously defined as the source. For example, suppose 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.
reverseremoteflash	Copy Services	The reverseremoteflash command restores an existing remote FlashCopy pair that was previously established with the -record and -persist flags. When a pair is established with the -record and -persist flags, the pair will initially synchronize and then a record will be kept of all host writes to the source. When this command is issued on that pair, the new data on the source will be overwritten with the previously saved data on the target. The pair will be permanently reversed, meaning the source is now the target and the target now the source. The flags specified in this command will replace the flags in the existing relationship. In order to keep the pair with the -record and -persist flags, they must be specified.
revertflash	Copy Services	The revertflash command overwrites new data with data saved at the last consistency formation. To use this command, you must first issue the mkflash command with the -record and -persist flags. You must then issue the setflashrevertible command against the pair.

Command	Type	Description
revertremoteflash	Copy Services	The revertremoteflash command overwrites new data with data saved at the last consistency formation. To use this command, you must first issue the mkremoteflash command with the -record and -persist flags. You must then issue the setremoteflashrevertible command against the pair.
rmarray	storage configuration	The rmarray command deletes arrays.
rmckdvol	storage configuration	The rmckdvol command deletes count key data (CKD) base or alias volumes from a storage image.
rmextpool	storage configuration	The rmextpool command deletes extent pools from a storage image.
rmfbvol	storage configuration	The rmfbvol command deletes fixed block volumes from a storage image.
rmflash	Copy Services	The rmflash command removes a relationship between FlashCopy volume pairs.
rmgmir	Copy Services	The rmgmir command removes Global Mirror for the specified session. All of the volumes are removed from the session and the instance of the session no longer exists.
rmhostconnect	I/O port and host connect configuration	The rmhostconnect command removes a SCSI host port connection from a storage image.
rmlcu	storage configuration	The rmlcu command deletes existing logical control units.
rmpprc	Copy Services	The rmpprc command removes a remote mirror and copy (formerly PPRC) volume pair relationship. Or, this command can be used to remove 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). To use 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. The -uncondtional parameter must be specified when designating a single volume otherwise an error occurs and the command process fails.

Command	Type	Description
rmpprcpath	Copy Services	The rmpprcpath deletes a remote mirror and copy (formerly PPRC) path.
rmrank	storage configuration	The rmrank command deletes ranks from a storage image.
rmremoteflash	Copy Services	The rmremoteflash command removes a relationship between remote FlashCopy volume pairs. **Note**:
rmsession	Copy Services	The rmsession command closes an existing Global Mirror session.
rmuser	user account and security	The rmuser command removes a storage image user account. CLI users with administrative authority use this command to delete a user account file. Administrators use their passwords in the required field.
rmvolgrp	storage configuration	The rmvolgrp command deletes existing volume groups from a storage image.
setcontactinfo	DS6000 remote support and notification	The setcontactinfo command provides contact information for your storage system administrator. When you use any of the remote support features, this information is sent to IBM so that an IBM service representative can contact you.
setdialhome	DS6000 remote support and notification	The setdialhome command activates the call home feature and sets one or more telephone numbers to dial when a problem occurs on the storage unit.
setflashrevertible	Copy Services	The setflashrevertible command modifies a FlashCopy volume pair that is part of a Global Mirror relationship to revertible. This command must be run before the FlashCopy pair can be committed or reverted. Once a pair is revertible, the data can be committed to the target to form a new consistency, or reverted back to the last consistency.
setioport	I/O port and host connect configuration	The setioport command configures one or more I/O ports for open systems or zSeries host system connections. This command cannot be used for ESCON ports.

Command	Type	Description
setplex	DS6000 remote support and notification	The setplex command allows you to modify the 1750 storage complex settings. You can associate a unique name with the 1750 which allows you to open a secure shell connection to a storage unit for remote support.
setsim	DS6000 remote support and notification	On zSeries hosts, data storage and data retrieval errors are recorded and can be offloaded. A service information message (SIM) provides the error information. The setsim command activates the SIM notification feature.
setsmtp	DS6000 remote support and notification	The setsmtp command activates the e-mail notification feature, which sends notifications using e-mail when a problem occurs on a storage unit.
setsnmp	DS6000 remote support and notification	The setsnmp command activates the Simple Network Management Protocol (SNMP) trap notification feature, which sends notifications using SNMP when a problem occurs on a storage unit. Use the command to set the SNMP addresses for the notifications.
setremoteflashrevertible	Copy Services	The setremoteflashrevertible command modifies a remote FlashCopy volume pair that is part of a Global Mirror relationship to revertible. This command must be run before the FlashCopy pair can be committed or reverted. Once a pair is revertible, the data can be committed to the target to form a new consistency, or reverted back to the last consistency.
showarray	storage configuration	The showarray command displays detailed properties of a specific array.
showarraysite	storage configuration	The showarraysite command displays detailed properties of a specific storage image array site.
showckdvol	storage configuration	The showckdvol command displays detailed properties of an individual count key data volume. This command can also be used to display the performance metrics for an individual volume ID.
showcontactinfo	DS6000 remote support and notification	The showcontactinfo command displays customer contact information for the storage image.

Command	Type	Description
showextpool	storage configuration	The showextpool command displays detailed properties or performance metrics of an extent pool.
showfbvol	storage configuration	The showfbvol command displays detailed properties for an individual volume. This command can also be used to display the performance metrics of a fixed block volume.
showgmir	Copy Services	The showgmir command displays detailed properties and performance metrics for a Global Mirror.
showhostconnect	I/O port and host connect configuration	The showhostconnect command displays detailed properties of a storage image host connection.
showioport	I/O port and host connect configuration	The showioport command displays properties of an ESCON or fibre channel I/O port. It optionally displays the performance metrics for an I/O port.
showlcu	storage configuration	The showlcu command displays the detailed properties of an individual logical control unit (LCU).
showlss	storage configuration	The showlss command displays detailed properties of a logical subsystem (LSS).
showpass	user account and security	The showpass command lists the properties of passwords.
showplex	DS6000 remote support and notification	The showplex command displays detailed properties of a 1750 storage complex. Detailed properties include your names, descriptions, and notification settings for the storage complex.
showrank	storage configuration	The showrank command displays detailed properties or performance metrics of a rank.
showsi	storage image configuration	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 when using the lsavailpprcport and mkpprcpath commands.
showsu	storage unit configuration	The showsu command displays detailed properties of an individual storage unit.

Command	Type	Description
showuser	user account and security	The showuser command displays storage image user account details. A CLI user with administrative authority uses this command to display the properties (group assignment, user account status and number of failed logins) that is associated with a current user account name.
showvolgrp	storage configuration	The showvolgrp command displays detailed properties of a volume group.
testcallhome	DS6000 remote support and notification	The testcallhome command initiates a call home test by creating a test problem record.
unfreezeflash	Copy Services	The unfreezeflash command resets a FlashCopy consistency group that was previously established with the -freeze flag when the mkflash or resyncflash commands were issued.
unfreezepprc	Copy Services	The unfreezepprc command thaws an existing remote mirror and copy (formerly PPRC) consistency group. The command resets the queue full condition for the primary volume. All queued writes to the source volume are written.
ver	application key and version	The ver command displays the versions of the command-line interface, Storage Manager, and licensed machine code.

Command flags

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

Flag	Parameters	Description
-p	on | off	Turns paging on or off. Displays 24 rows at a time unless used with the -r flag. The default is off in single-shot mode and on in interactive mode. You can page by pressing any key. **Note:** This flag can be used only with the ls type (for example, lsuser, lskey, lsserver) commands and the help (setoutput) command.

Flag	Parameters	Description
-r	*number*	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. **Note:** This flag can be used only with the ls type (for example, lsuser, lskey, lsserver) commands and the help (setoutput) command.
-fmt	xml	Sets the output format to XML.
	stanza	Sets the output format to stanza.
	delim	Sets the output format to a table. You must set the column delimiter to a single character with the -delim flag.
	default	Sets the output to a space-separated plain text table.
-delim	*char*	Sets the output to delimited output and the delimiter to the single character *char*. You must enclose *char* in single or double quotation marks if the character is a shell metacharacter (such as * or \t). If *char* 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.
-hdr	on | off	Turns the header on or off. The default is on.
-bnr	on | off	Turns the banner on or off. The default is on.
-v	[on | off]	Turns verbose mode on or off. The default is off. If you specify the -v flag and do not specify on or off, then verbose mode defaults to on.
-fullid	Provides fully qualified IDs, which include the storage image ID, for every ID that is displayed in the command output. **Note:** This command flag can only be used with list (for example, lsioport, lskey) and show (for example, showsu, showlss) commands.	

Default configuration setup with a profile file

You can create default settings for the command-line interface by defining one or more profiles on the system. For example, you can specify the Storage Management console (SMC) for the session, specify the output format for list commands, specify the number of rows per page in the command-line output, and specify that a banner is included with the command-line output.

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

You have several options for using 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\IBM\DSCLI\profile\dscli.profile for the Windows platform .
- You can make a personal default profile by making a copy of the system default profile as <user_home>/dscli/profile/dscli.profile. The home directory, *<user_home>* is designated as follows:
  - Windows system: C:\Documents and Settings\<user_name>
- You can create a profile for the storage unit operations. Save the profile in the user profile directory. For example:
  - c:\Program Files\IBM\DSCLI\profile\operation_name1
  - c:\Program Files\IBM\DSCLI\profile\operation_name2

  These profile files can be specified using the DS CLI command parameter **-cfg** **<*profile_name*>**. If the -cfg file is not specified, the user's default profile is used. If a user's profile does not exist, the system default profile is used.

Note: A password file, generated using the **managepwfile** command, is located at the following directory: <user_home>/dscli/security/security.dat.

When you install the command-line interface software, the default profile is installed in the profile directory with the software. The file name is dscli.profile. For example. c:\Program Files\IBM\DSCLI\profile\dscli.profile.

The profile is a text file. Table 1 on page 40 provides the list of profile variables that can be used to create the profile.

Table 2. Profile variables

Variable	Description
banner: on|off	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.
delim	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	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.
format	Specifies the output format for list commands. Specify one of the following formats: • 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 horizontal table. This variable is equivalent to command option -fmt. The command option -fmt overrides this default value.

Table 2. Profile variables (continued)

Variable	Description
fullid	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	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	Specifies the secondary Storage Manager IP address. This variable is equivalent to the command option -hmc2. The command option -hmc2 overrides this default value.
locale	Specifies the language for the output on the local computer. • 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 2. Profile variables (continued)

Variable	Description
locale, *continued*	• 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
paging: on|off	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.
timeout	Set timeout value of client/server synchronous communication. The unit of the value is second. The default value is 420 seconds. You can set this timeout if the processing of a command ends by timeout due to network or client/server performance issue. **Note:** The command timeout value can be longer than this value because one command can consist of multiple client/server requests.
remotedevid	Specifies the remote storage image ID. This variable is equivalent to the command option -remotedev. The command option -remotedev overrides this default value.
rows	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


#
# Password filename
#    The password file can be generated using mkuser command.
#
#pwfile:  ibmadmin


#
# Default target Storage Image ID
#     "devid" and "remotedevid" are equivalent to
#     "-dev storage_image_ID" and "-remotedev storeage_image_ID" command options,
#      respectively.
#devid:   IBM.1750-AZ12341
#remotedevid: IBM.1750-AZ12341


#
# 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 420 seconds.
#timeout  420


#
# 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


# delimitter 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

# End of Profile
```

Command equivalents

Use this list to correlate commands that are supported on the Enterprise Storage Server machine type 2105 to equivalent commands on the DS6000 machine type 1750.

Enterprise Storage Server machine type 2105 command	DS6000 machine type 1750 command	Description
list server	lsserver	Like the 2105, a 2107 storage image contains one pair of servers. A 2107 storage image can contain two storage images.
list volumespace	lsextpool, showextpool, lsrank, showrank, lsarray, showarray, showarraysite	See Note 1.
create volumespace	mkextpool, mkarray, mkrank	
delete volumespace	rmrank, rmarray, rmextpool	
list diskgroup	lsarraysite, showarraysite	Like the 2105 disk group, a 2107 array site consists of eight storage devices that are made into a RAID array. A 1750 array site consists of eight storage devices that are made into a RAID array. The 2107 does not support the JBOD array configuration.

Enterprise Storage Server machine type 2105 command	DS6000 machine type 1750 command	Description
list port	lsioport, showioport	Like 2105, the 2107 supports fibre-channel and ESCON ports. The 2107 does not support parallel SCSI ports. The 1750 does not support ESCON ports. The maximum quantity of host device adapter cards and I/O ports is dependent on 2107 model number and on the quantity of installed I/O enclosure features. The 2107 CLI lsioport and showioport commands include the -metrics parameter that returns the performance counter values for the respective I/O port IDs. The -metrics parameter provides the means to monitor I/O port performance statistics. For 2107, a I/O adapter card is assigned to a storage image. For 1750, the I/O adapter is integrated with the RAID controller.
set port	setioport	See Note 2.
list volume	lsfbvol, lsckdvol	See Note 3.
create volume	mkfbvol, mkckdvol	
set volume	chfbvol, chckdvol	
list pav	lsckdvol, showckdvol	
create pav	mkckdvol	
delete pav	rmckdvol	
list volumeaccess	lsvolgrp, showvolgrp	See Note 4.
create volumeaccess	mkvolgrp, chvolgrp	
delete volumeacess	rmvolgrp	
list hostconnection	lshostconnect, showhostconnect	The 2105 and 2107 CLI commands are essentially the same, except that the 2107 commands include the volume group ID parameter. For 2107, the hostconnect commands concern SCSI-FCP host port connections to ESS I/O ports that are configured for SCSI-FCP and "identified" access mode.
create hostconnection	mkhostconnect	
delete hostconnection	rmhostconnect	
set hostconnection	chhostconnect, managehostconnect	
list log	Not applicable.	--
list featurecode	lsuser, mkuser, rmuser, chuser, lsrpc, lsstgencl	The 2107 CLI commands can display feature codes when the appropriate parameters are used with the commands.

Enterprise Storage Server machine type 2105 command	DS6000 machine type 1750 command	Description
list webuseraccount	Not applicable.	--
create webuseraccount	Not applicable.	
set webuseraccount	Not applicable.	
delete webuseraccount	Not applicable.	
list perfstats	lsioport, showioport, showrank, showextpool, showfbvol, showckdvol	The 2105 CLI list perfstats commands concern the Specialist facility that streams performance counter device adapter to the ESS Expert at predefined intervals. This facility does not exist for 2107. Use the 2107 CLI commands with the -metrics parameter to obtain current performance counter values.
create perfstats	Not applicable.	--
delete perfstats	Not applicable.	--
show remotesupport	showplex	The 2105 Specialist remote communication functions are implemented in the 1750 as attributes of the storage complex object. The following 1750 commands provide methods to view, set, and modify the remote communication attributes: setplex, showplex, setsmtp, setsnmp, setsim, setcontactinfo, and showcontactinfo. The setsmtp command activates the e-mail notification feature, which sends notifications using e-mail when a problem occurs. Use the showplex command to see the smtp setting.
set remotesupport	setsmtp, setcontactinfo	
show email	showcontactinfo	
create email	setsmtp, setcontactinfo	
delete email	setsmtp, setcontactinfo	
set email	setsmtp, setcontactinfo	
show pager	Not applicable.	
create pager	Not applicable.	
delete pager	Not applicable.	
set pager	Not applicable.	
show snmp	showplex	
create snmp	setsnmp	
set snmp	setsnmp	
delete snmp	setsnmp	
list problem	lsproblem	--
show problem	lsproblem	--
delete problem	closeproblem	--
list task	Not applicable.	--
show task	Not applicable.	--
list pprcpaths	lsflash, lsremoteflash, lspprcpath, lspprc, lspprcavailpprcport, showgmir	Unlike the 2105, the 2107 CLI Copy Services functions are not task-oriented. The 2107 CLI provides a complete set of FlashCopy and remote mirror and copy (formerly PPRC) make, change, remove, list, and show commands.
rsExecuteTask	Copy Services commands	The 2107 CLI provides a complete set of FlashCopy, remote mirror and copy (formerly PPRC) commands that can be used in the coding of scripts that emulate 2105 Copy Services tasks.

Enterprise Storage Server machine type 2105 command	DS6000 machine type 1750 command	Description
rsList2105s	lshostvol	The lshostvol command displays the mapping of host device or volume names to 2107, 2105, and 1750 and volume IDs.
rsPrimeServer	Not applicable.	--
rsQuery, rsQueryComplete, rsFlashCopyQuery	lsflash, lspprc	These 2107 Copy Services CLI commands are equivalent to the respective 2105 CLI commands. The 2107 mkflashcopy and mkpprc commands provide a -wait flag that delays command response until copy complete status is achieved.
rsTestConnection	ver	--

Note 1

Volume space configuration is a primary difference between 2105 and 2107. For 2105, one command configures an array site into a RAID array and rank. For 2107, one command configures an array site into an array, and a second command configures an array into a rank. For 2105, a rank is configured as fixed block or CKD, and a CKD rank can contain "interleave" CKD volumes. For 2107, a rank is assigned to a user-defined extent pool object, which the user defines as either the fixed block or CKD storage type. The "interleave" volume construct does not exist for 2107. For 2105, a volume is configured from a specific rank, and cannot span rank boundaries. For 2107, a volume is configured from an extent pool. An extent pool can contain multiple ranks. A 2107 volume consists of one or more extents that can be allocated from one or more ranks. A fixed block extent is 1 GB (128 logical blocks). Each block contains 512 bytes of usable data space. A CKD extent is 0.94 GB or 1113 CKD cylinders.

For 2105, a rank is either assigned to server 0 or server 1, dependent on array site location. A 2105 rank is assigned to one of four possible LSS IDs, dependent on device adapter pair location and storage type configuration.

For 2107, an extent pool is assigned to server 0 or server 1. A rank that is configured from any array site can be assigned to a server 0 or 1 extent pool. Array site position and device adapter pairs are not factors for the rank-to-extent-pool assignment. A volume that is created from a server 0 extent pool is assigned to an even-numbered LSS ID. A volume created from a server 1 extent pool is assigned to odd-numbered LSS ID. A user must define at least two extent pools (0 and 1) but can define as many extent pools as there are ranks. For 2105, a user can delete a rank but cannot delete a volume. For 2107, a user can delete a single volume, rank, or extent pool. The 2107 CLI showrank and showextpool commands include a -metrics parameter that returns the performance counter values for a specified rank or extent pool ID. The -metrics parameter provides the means to monitor rank and extent pool performance statistics.

Enterprise Storage Server machine type 2105 command	DS6000 machine type 1750 command	Description
Note 2 A 2107 ESCON I/O port is used for zSeries host attachment but cannot be configured as a remote mirror and copy path. Each ESCON I/O port must be assigned to only one address group. An address group is a set of 16 LSS IDs that are configured as CKD LCUs; for example, 0x00 to 0x0F. ESCON I/O port access to 2107 CKD volumes is constrained to the address group LCU volumes, up to 4096 volumes. A 2107 fibre-channel port is configured for either SCSI-FCP or FICON protocol. Like 2105, a FICON port is restricted to the point-to-point/switched fabric topology setting. A FICON I/O port is used for zSeries host attachment, but cannot be configured as a remote mirror and copy path. A FICON port must be configured for "anonymous" access mode, meaning that any zSeries host system port (WWNN or WWPN) has unrestricted access to all CKD volumes, up to 64 KB volumes. Like 2105, a 2107 fibre-channel SCSI-FCP I/O port can be configured for either the point-to-point/switched fabric or FC-AL connection topologies. A port that uses the point-to-point/switched fabric topology can be simultaneously used for OS host system I/O and for remote mirror and copy path configurations. Like 2105, a 2107 fibre-channel SCSI-FCP I/O port allows only "identified" host system ports to access volumes. A host system port WWPN must be identified (registered) to each I/O port through which volume access is intended. For 2107, this configuration constraint is defined as I/O port "identified" access mode. Host system port WWPN identification is accomplished by the CLI mkhostconnect command.		
Note 3 A 2107 storage image can contain up to 32 000 volumes, whereas a 2105 unit can contain up to 8 000 volumes. Otherwise, the 2105 and 2107 volume definitions and characteristics are essentially identical. For 2107 CKD PAV volumes, the CLI list and show commands identify both the original base and current base volume assignments. The original and current base concept exists for 2105, but specific relationships are not identified in the output. The 2107 CLI provides a specific set of volume commands for each storage type (fixed block or CKD) as a means to clarify input parameter and output device adapter definitions. The 2107 CLI showfbvol and showckdvol commands include a -metrics parameter that returns the performance counter values for a specified volume ID. The -metrics parameter provides the means to monitor volume performance statistics.		

Enterprise Storage Server machine type 2105 command	DS6000 machine type 1750 command	Description
Note 4		
The 2105 volume access commands concern volume ID assignment to a SCSI-FCP host port initiator or WWPN. For 2107, volume IDs are assigned to a user-defined volume group ID (mkvolgrp and chvolgrp). A volume group ID is then assigned to one or more host system ports (mkhostconnect and chhostconnect) as a means to complete the volume access configuration. The volume group construct also exists in the 2105 internal code, but the construct is not externalized by the 2105 Specialist or CLI commands. For 2107, a user must create a FICON/ESCON-all type volume group. This volume group ID is assigned to each ESCON I/O port and to each FICON I/O port. The volume group ID enables FICON access all storage image CKD volumes, up to 64 KB volumes. The volume group ID enables an ESCON I/O port to access to the storage image CKD Address Group volumes, up to 4 KB volumes. For 2107 fixed block volumes, a volume group must be configured as either ″SCSI-mask″ or ″SCSI-map-256″, depending whether the volume group is accessed by a SCSI-FCP host port that uses the report LUNs or poll LUNs access method protocol.		

Output field descriptions

This list describes the output field names, abbreviations, and field descriptions.

Output field name	Abbreviation	Description
Access	access	Access state. The term ″access″ is used throughout the CLI in different contexts.
Access state	accstate	The accessibility state of an object, online or offline.
Account	acct	Customer account name for a storage complex.
Active copy	actcpy	The FlashCopy background copy process is active.
Addr group	addrgrp	A set of 16 contiguous logical subsystems (LSSs) or logical control units (LCUs), starting at ID X0. Address group identifier that is assigned to this ESCON I/O port.
Address group	addrgrp	A set of 16 contiguous logical subsystems (LSSs) or logical control units (LCUs), starting at ID X0. Address group identifier that is assigned to this ESCON I/O port.
Array	array	An array of device drive modules (DDMs).
Array ID	arrayID	Array identifier that is assigned to a rank.

Output field name	Abbreviation	Description
Array site	arsite	Storage unit identifier followed by an array site identifier. Array site ID does not indicate physical location.
Attaching topology	atchtopo	Ports to which the host can attach.
Available storage	availstor	Storage that is available for a segment pool, in GB.
Background copy	bkgrndcopy	FlashCopy process that copies data from a source volume to a target volume.
Base Vol #	basevolnum	Lowest number of logical volumes in the address group.
Bypass cache	bypasscach	Count of bypass cache I/O requests.
Bytes read	byteread	Count of bytes that are transferred by SCSI read I/O operations, in 128 KB.
Bytes written	bytewrit	Count of bytes that are transferred by SCSI write I/O operations, in 128 KB.
Cache fast-write hits	cachfwhits	Count of cache fast-write write I/O operations where data did not move to or from a storage device.
Cache fast-write read hits	cachfwrhits	Count of cache fast-write read I/O operations where data was not moved to or from a storage device.
Cache fast-write read requests	cachfwrreqs	Count of cache fast-write read I/O operations issued by a host to a volume.
Cache fast-write requests	cachfwreqs	Count of cache fast-write write I/O operations issued by a host to a volume.
Cache space delay	cachspdelay	Count of delayed I/O operations from a host to a volume because of insufficient cache space.
Capacity	cap	Quantity of volume logical blocks or cylinders that are available for access by a host system.
CG attempts	CGattem	Number of attempts to form a consistency group.
CG drain	CGdrain	The maximum time that writes are inhibited to the remote site before stopping the current consistency group.
CG interval	CGinterval	The interval time between attempts to form a consistency group.
CG success	CGsuccess	The percentage of successful attempts to form consistency groups.
CG time	CGtime	The time when the last successful consistency group was formed.

Output field name	Abbreviation	Description
CKD irregular track accesses	CKDirtrkac	Count of I/O operations from a host to a CKD volume that has accessed at least one logical track not described by a regular track format descriptor.
CKD irregular track hits	CKDirtrkhits	Count of irregular track I/O operations where data did not move to or from a storage device.
CKD write promote hits	CKDwrtprohits	Count of write I/O operations to a volume, where track format descriptor data in cache has promoted at least one track to cache with requiring access to a storage device.
Config Vols	confgvol	Number of logical volumes configured on an address group.
Configuration	config	Storage unit internal I/O interface configuration: model and feature code dependent.
Configured volumes	confgvols	Number of configured volumes.
Contaminating writes	contamwrts	Count of side file additions to a volume from an update to a concurrent copy protected track or an update to an XRC monitored track.
Control ops received	conopsrcd	Count of remote mirror and copy SCSI control I/O operations that are received from a SCSI source.
Control ops sent	conopssent	Count of remote mirror and copy SCSI control I/O operations that are sent to a SCSI target.
Control unit base type	conbasetype	Default or user-assigned logical control unit type.
Copy state	cpystate	Global Mirror copy state.
CopyIndicator	CopyIndicator	Indicates Yes if the CopyIndicator is set for this FlashCopy relationship.
Created	created	Date of creation.
Crit mode	critmode	Status of critical heavy mode, either enabled or disabled.
Critical heavy mode	crithvmode	Status of critical heavy mode for remote mirror and copy (formerly PPRC) copy operations, either enabled or disabled.
Current base vol	curbasevol	Base and alias volume number.
Current FICON logins	curflogs	Current number of FICON N-port worldwide node name (WWNN) identifiers that are logged in to this I/O port.
Current SCSI logins	currentlogs	Current number of N-ports that are logged in to this I/O port.

Output field name	Abbreviation	Description
Current time	currtime	Current date, time, local time zone, and Daylight Savings Time.
DA pair	DA pair	Identifier of the device adapter pair that the DDM is associated with. The DA pair indicates I/O enclosure location.
DASD cache transfers	DASDtrans	Count of logical tracks for a volume that were promoted to cache in full or partial track mode (excluding sequential pre-state).
Data	data	Status of the array data access: normal, degraded, read only, failed, repairing, or inaccessible.
Data state	datastate	Status of data access: normal, degraded, read only, failed, repairing, or inaccessible.
Date	date	Date and time, including time zones and Daylight Savings Time.
Date (85)	date	Current clock setting of date.
DDM capacity (GB)	DDMcap	Minimum disk capacity of DDMs, in GBs.
DDM RPM (revolutions per minute)	DDMRPM	Minimum rate of disk revolutions per minute of the DDMs in an array.
Description	desc	User-defined description.
Disk capacity (GB)	dkcap	Capacity of the DDM, in GBs.
Disk interface	dkinf	Interface type of DDM.
Disk rate (Gb/Sec)	dkrate	Interface rate of DDM, in GBs per second.
Disk RPM	diskrpm	DDM revolutions per minute.
Disk usage	dkuse	DDM usage in an array site.
Dynamic relocation source	dyrelocsource	Counting number of extents that were source of a dynamic relocation.
Dynamic relocation target	dyreloctarget	Counting number of extents that were target of a dynamic relocation.
EC level	EClvl	Engineering change level of the listed enclosure.
E-mail addresses	emailaddr	One or more e-mail addresses that receive service notification.
Enclosure #	enclnum	Identifier for an I/O enclosure within a storage unit frame.
Ending track	endtrk	Ending track address or number.
ESS IO ports	ESSIOport	The set of Enterprise Storage Server I/O ports to which a SCSI host port can log in.
ESSNet	ESSnet	Status of storage complex ESSNet user interface, either enabled or disabled.

Output field name	Abbreviation	Description
Extended long busy active	xtndlbzactive	Default or user-assigned extended long busy setting, enabled or disabled.
Extended long busy timeout (secs)	xtndlbztimout	Default or user-assigned extended long busy timeout value.
Extent limit	extlim	Maximum number of possible extents.
Extent number	extentnum	LSS persistent cache extent number.
Extent pool	extpool	Extent pool.
Extent pool ID	extpoolID	Identifier for the extent pool of the assigned rank.
Extent pool name	extpoolnam	Name of the extent pool of the assigned rank.
Extent size	extsize	Number of logical tracks in an extent.
Extent threshold	extthresh	Extent allocation threshold setting that triggers notification.
Extents	exts	Number of extents in the rank.
Extents used	extused	Number of extents used by this volume ID.
Fan speed	fanspeed	Current speed of a fan.
Fatal reason	fatalrsn	Reason code for a fatal error.
Feature code	FC	Identifier code that is used to order the PC enclosure.
FICON	FICON	FICON I/O operations that are enabled for this port.
FICON enabled	fenabled	FICON status, enabled or disabled.
Firmware level	firmwarelevel	Identifier for the firmware level that is installed in the hardware management console (HMC) enclosure.
Frame	frame	Identifier of storage unit frame that contains this I/O enclosure. Frame identifier format is six hexadecimal characters.
Frame ID	frameID	Identifier of storage unit frame that contains this I/O enclosure. Frame identifier format is six hexadecimal characters.
Frame #	frm#	Frame number of a listed enclosure.
Group	group	--
Host ID	hostID	SCSI host identifier for an Open Systems host that is associated with this host port.
ID	ID	Storage image ID in the following format: manufacturer.type.serial number.

Output field name	Abbreviation	Description
I'mACopy	imacpy	Indicates Yes if the I'mAcopyBit is set for this FlashCopy relationship.
Inhibit cache loading	inhcachload	Count of inhibit cache loading I/O requests.
Interface address	interadd	FlashCopy arbitrated-loop base address of the storage image enclosure.
Interface IDs	interfID	Identifies four interface IDs that are associated with I/O ports on the HBA.
Interface rate	interrate	Minimum disk interface rate of the disk in an array, in GBs per second.
Interface type	interface type	Host attachment interface type (FC-AL, SCSI-FCP, or FICON).
Interfaces	interfs	Identifier of three interface ports for the HMC enclosure consisting of four hexadecimal characters.
Location	loc	Location of enclosure. Location format is *Utttt.mmm.ppsssss*.
Logical block	logblk	Logical block (512 bytes or 520 bytes).
Logical block size	logblksz	Logical block size.
Logical vols	logvols	Identifier of logical volumes.
Login limit	loglim	Maximum number of N-ports that can log in to this I/O port.
LSSs	LSSs	Number of logical subsystems in an address group.
LUN access	LUNacc	Quantity of LUNs that are accessible by this host attachment (256 LUNs or 64K LUNs).
LUN capacity	LUNcap	Quantity of LUNs that are accessible by this host attachment (256 LUNs or 64K LUNs).
Name	name	User-defined name.
NVS space allocations	NVSspallo	Count of I/O operations that cause nonvolatile storage (NVS) space allocation.
NVS space delay	NVSspadel	Count of I/O operations from a host to a volume.
Master count	mastcount	Quantity of master LSS IDs on this storage image ID.
Master ID	mastID	Master storage image ID.
Master session ID	mastsessID	Global Mirror session ID.
Master SSID	mastSSID	LSS subsystem identifier.
Memory	mem	Amount of processor memory in this PC enclosure, in MB.
Migration disk SN	migradiskSN	Migration disk serial number.

Output field name	Abbreviation	Description
MRPD interval	MRPDintvl	Number of days between dial home to report machine-reported product data (MRPD). This interval can be 0.
MTS	MTS	Manufacturer, machine type, and sequence number.
Narrow arrays	nararrays	Number of narrow arrays in a rank.
Normal read hits	normrdhits	Number of normal read operations where data did not move to or from a storage device.
Normal read requests	normrdrqts	Number of normal read operations issued by a host to a volume.
Normal write hits	normwritehits	Number of normal write operations where data did not move to or from a storage device.
Normal write operations	normwriteops	Number of command sequences with at least one write command.
Normal write requests	normwritereq	Number of normal write operations issued by a host to a volume.
NVS memory	NVSmem	Amount of nonvolatile storage (NVS) memory that is assigned to this server, in MB.
Number of logins	numlogins	Current number of valid N-ports that are logged in to this I/O port.
Number of logical vols	numlvols	Number of logical volumes configured from an extent pool.
Number of extents	numexts	Number of extents.
Number of ranks	numranks	Number of ranks configured in an extent pool.
Original base vol	orgbvols	Original base volume CKD volume identifier.
OS memory	OSmem	Amount of operating system memory that is assigned to the server, in MB.
Out-of-sync tracks	outsynctrks	The number of tracks that are not synchronized for this FlashCopy relationship.
Persistent	persistent	Status of persistent FlashCopy, either enabled or disabled.
Persistent cache (MB)	pcache	Amount of persistent cache memory that is assigned to a server, in MB.
Physical bytes read	phbyteread	Number of physical bytes read.
Physical bytes written	phbytewrit	Number of physical bytes written.
Physical read	phread	Number of physical storage read operations.
Physical write	phwrite	Number of physical storage write operations.
Port	port	I/O port.
Port group	portgrp	Group identifier for host port.

Output field name	Abbreviation	Description
Port profile	portpro	Port behavior identification for this SCSI host ID.
Position	pos	Position of DDM in an array configuration of DDMs.
Power mode	pw mode	Current storage unit power control mode.
Power state	pw state	Current storage unit power status.
PPRC control operations received	PPRCcntrloprec	Remote mirror and copy (formerly PPRC) I/O control operations.
PPRC control operations sent	PPRCcntrlopsent	Remote mirror and copy (formerly PPRC) I/O control operations.
PPRC source	PPRCsce	Remote mirror and copy (formerly PPRC) source I/O operations that are enabled for this port.
PPRC target	PPRCtgt	Remote mirror and copy (formerly PPRC) target I/O operations that are enabled for this port.
PPRC tracks	PPRCtrks	Count of logical tracks for a remote mirror and copy (formerly PPRC) primary volume that were transferred to a remote mirror and copy secondary volume.
Processor complex	procplex	Identifier of processor complex with which the central electronic complex enclosure is associated.
Processor qty	procqty	Number of processors in the PC enclosure.
Processors assigned	procassd	Number of processors that are assigned to the server.
Profile	profile	Host port profile.
Quick write promotes	qwriteprots	Count of logical tracks for a volume that have been destaged from cache to storage devices.
RAID type	RAIDtype	Type and configuration of RAID array.
Rank	rank	Identifier that the array is assigned to. Rank number consists of storage unit ID and a rank number.
Rank group	rnkgrp	Identifier of rank group where segment pool is configured.
Rank position	rankpos	Array position within the assigned rank.
Read operations	readops	Count of I/O command sequences in one read or search command (but no write commands).
Reads	reads	Count of read I/O operations.
Real allocated extents	realallocext	Count of real allocated extents.
Real extent conversion	realextconv	Count of real extent conversion.

Output field name	Abbreviation	Description
Real extent pool capacity	relextcap	Number of gigabytes of real extent pool capacity.
Real extents	realext	Count of real extents.
Reason	reason	The reason a condition exists.
Record cache misses	reccachemis	Number of normal record mode read operations where data moved to or from a storage device.
Record mode reads	recmoreads	Number of normal record mode read operations issued by a host to a volume.
Recording	rec	FlashCopy - record changed tracks.
Requested capacity	reqcap	Number of volume cylinders that are available for host system access.
Requested state	reqstate	Desired state of storage unit: online or offline.
Reserved extents	resvdexts	Extents that are reserved in an extent pool.
Reserved storage (GB)	resvdstor	Reserved storage in an extent pool, in GB.
Revertable	revertable	Revertable to previous Global Mirror state.
SCSI host port users	SCSIhostportusr	SCSI host port users of this volume group.
SCSI TGT	SCSItgt	SCSI target I/O operations that are enabled for this port.
Scheduled on	schl-on	User-defined time that the storage unit powers on.
Scheduled off	schl-off	User-defined time that the storage unit powers off.
Sequential DASD cache transfers	seqDASDtrans	Count of logical tracks for a volume that were promoted to cache because data was moved by sequential pre-stage and required movement from a storage device.
Sequential read hits	seqreadhits	Number of sequential read operations where data did not move to or from a storage device.
Sequential read requests	seqreadreqs	Number of sequential read operations issued by a host to a volume.
Sequential write hits	seqwritehits	Number of sequential write operations that did not require movement of data to or from a storage device before the completion of the operation.
Sequential write operations	seqwriteops	Number of command sequences that contain at least one sequential write command.

Output field name	Abbreviation	Description
Sequential write requests	seqwritereq	Number of sequential write operations issued by a host to a volume.
Serial number	SN	Internal identifier for the data space of an array.
Server	server	Server or DA group to which the DA is assigned.
SN	SN	Unique serial number.
SNMP addresses	SNMPaddr	One or two IP addresses where the storage complex sends SNMP error messages.
Source write enabled	sourcewrite	Host writes to the source volume are allowed.
Speed	speed	The current speed of this fan tray.
SRC cascade	SRCcascade	Source volume is enabled to be in a cascading remote mirror and copy (formerly PPRC) relationship.
SRC vol LSS	SRCvolLSS	Source volume LSS.
SS	SS	Subsystem.
Starting track	starttrk	The starting track address for the volume pinned data.
State	state	Storage unit functional status: online, offline, resuming, quiescing, quiesce exception, forced quiescing, or fenced.
State (FRU)	statefru	Current state of the disk drive module.
Storage devices	stordev	Number of storage devices in an enclosure.
Storage slots	storslot	Number of slots for storage devices in an enclosure.
Storage type	stortype	Extent pool type of the assigned rank.
Storage unit	su	One storage device.
Strip size	strpsize	Number of logical tracks in a strip.
Stripe size	strpesize	Number of logical tracks in a stripe.
Subordinate count	subcount	Count of subordinate associations.
Subordinate ID	subID	Subordinate storage unit ID.
Subordinate SSID	subSSID	Subordinate subsystem identifier.
Subsystem	subsys	User-assigned or default subsystem identifier.
Suspended	suspended	The relationship is suspended.
Synced	synced	Date the FlashCopy was synchronized.
Target write enabled	tgtwrite	Host write I/O operations to a target volume are allowed.

Output field name	Abbreviation	Description
Tgt cascade	tgtcascade	Target volume is enabled to be configured in a cascading remote mirror and copy relationship.
Tgt read enabled	tgtread	Host read I/O operations to a target volume are allowed.
Time	time	Current clock setting of time.
Time lower interface activity	timelowifact	Accumulated time of lower interface I/O activity for the volume.
Time on-channel	timeonchan	Amount of I/O port time for SCSI I/O operations, in seconds.
Time physical storage read	timephread	Accumulated time for physical storage read operations.
Time physical storage write	timephwrite	Accumulated time for physical storage write operations.
Time read	timeread	Accumulated time for all read operations.
Time write	timewrite	Accumulated time for all write operations.
Time zone	timez	Current clock settings of time zone and Daylight Savings Time.
Timout active copy recording	timoutactcpyrec	--
Total storage (GB)	totlstor	Amount of storage in an extent pool, in GB.
Topology	topo	Port topology.
Track size	trksize	Size of the track if the volume is CKD or fixed block.
Type	type	Type of storage unit enclosure.
Unknown SCSI IDs	unkSCSIlog	List of unknown SCSI N-port WWPN identifiers that attempted login into this I/O port.
Used extents	usedexts	Number of extents that are allocated to volumes in a rank.
Virtual extent conversion	virextconv	Count of virtual extent conversion.
Virtual extent pool capacity	virextcap	Number of gigabytes of virtual extent pool capacity.
Virtual extents	virext	Count of virtual extents.
Vol group	vol	Volume group ID. The unique identifier that is assigned to this volume.
Volume group	volgrp	Volume group.
Vols	vols	Number of logical volumes in an address group.
Volume type	voltype	Volume type.
Wide arrays	widearrays	Number of wide arrays in a rank.
Writes	writes	Count of write I/O operations.
WWNN	WWNN	Worldwide node name.

Output field name	Abbreviation	Description
WWPN	WWPN	Worldwide port name.
XDC interval	XDCintvl	Global Mirror copy interval.

Framework command

This section contains the user interface framework commands for the DS command-line interface.

The dscli command starts the DS command-line interface (CLI). Use this command to perform storage management tasks from the command-line.

dscli

The dscli command starts the command-line interface (CLI) program. Use this command to run CLI commands in interactive mode, to run a single command, or to run a set of commands from a script. For more information about how to use this command, see "Completing DS CLI postinstallation."

```
►►── dscli ──┬─────────────────────────┬──┬──────────────────┬──┬──────────────┬──┬──────────────┬──►
             ├─ -h ────────────────────┤  └─ -cfg─ profile ──┘  └─ -hmc1─ HMC1 ─┘  └─ -hmc2─ HMC2 ─┘
             ├─ -help ─────────────────┤
             ├─ -? ────────────────────┤
             ├─ -ver ──────────────────┤
             ├─ -overview ─────────────┤
             ├─ -script file_name ─────┤
             └─ command ───────────────┘

►──┬──────────────────────┬──┬─────────────────────┬──┬────────────────────────┬──►◄
   └─ -user─ user_name ───┘  └─ -passwd─ password ─┘  └─ -pwfile─ passwordfile ─┘
```
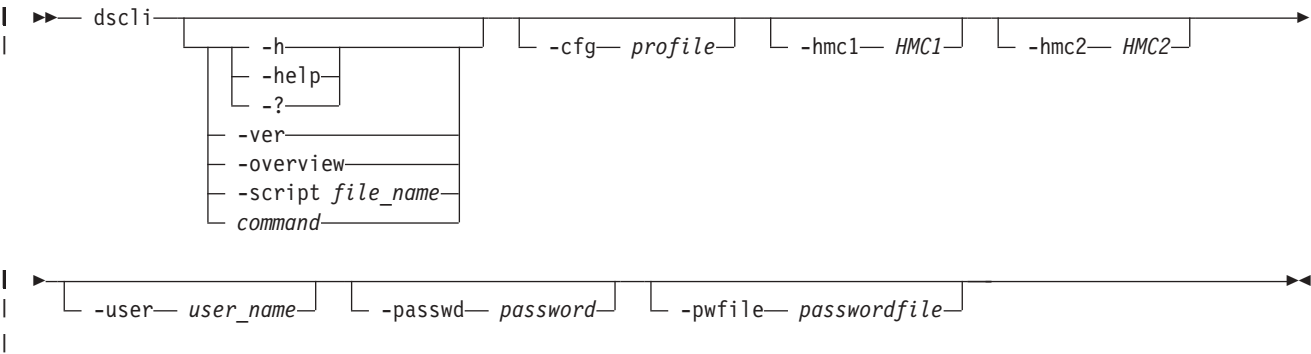
Parameters

-help | -h | -?
Displays a help screen about how to use the DS CLI program.

-ver
Displays the DS command-line interface version.

-overview
Provides overview information about the DS CLI application.

-script *file_name*
Initiates the script mode so that multiple dscli program commands can be issued consecutively using a saved file.

  file_name
  (Required) Specifies the file with the stored program commands to be executed.

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.

command
> Specifies the single command that you want to run.

-cfg *profile*
> Specifies a profile file. This parameter is not required if you are using default profiles. The default profile is the dscli.profile, and it is provided as part of the DS CLI package under the profile directory.

-hmc1 *HMC1*
> Specifies the primary management console IP address or the host name.

> *HMC1*
>> (Required) The IP address for the primary management console.

> This parameter is not required if you have established this information as a profile variable.

-hmc2 *HMC2*
> Specifies the secondary management console IP address or the host name.

> *HMC2*
>> (Required) The IP address for the secondary management console.

> This parameter is not required if you have established this information as a profile variable.

> **Note:** The **HMC1** and **HMC2** values must apply to two different management consoles.

-user *user_name*
> Specifies your user name for issuing DS CLI commands on the command-line.

> *user_name*
>> (Required) Your user name.

> This parameter is not required if you have established this information as a profile variable.

-passwd *password*
> Specifies the password that you use for issuing DS CLI commands on the command line.

> *password*
>> (Required) Your password.

> This parameter is not required or 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 application.

-pwfile *passwordfile*
> Specifies the password file that contains your password.

> *passwordfile*
>> Specifies a password file as an alternative to the **–passwd** parameter.

Example

This command invokes the CLI in interactive mode:

```
>dscli
```

| **The resulting output**
| `dscli>`

exit

Ends an interactive command-line interface session.

```
►►─exit─┬────────┬──────────────────────────────────────────────►◄
        ├─ -? ───┤
        ├─ -h ───┤
        └─ -help ┘
```

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.

Example

Exit interactive mode
`dscli>exit`

Out of interactive mode
`#`

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.
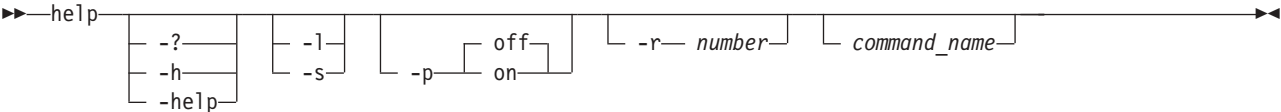
```
►►─help─┬────────┬──┬─────┬──┬──────────┬──┬─────────────┬──┬──────────────┬──►◄
        ├─ -? ───┤  ├─ -l ┤  │   ┌─off─┐ │  └─ -r─ number ┘  └─ command_name ┘
        ├─ -h ───┤  └─ -s ┘  └─ -p ─┴─on─┘
        └─ -help ┘
```

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*
Specifies whether to display one page of text at a time or all text at once.

off Displays all text at one time. This is the default value.

on Displays one page of text at a time. Pressing any key displays the next page.

-r *number*
Specifies the number of rows per page to display when the -p parameter is on. The default is 24 rows. You can specify a value from 1 to 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.

Example

Invoke help

```
#dscli>help -s exit
```

The resulting output

```
Ends a command-line interface session.
```

quit

Ends an interactive command-line interface session.

```
►►—quit──┬──────┬──────────────────────────────────────────────────►◄
         ├─ -?──┤
         ├─ -h──┤
         └─-help┘
```

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.

Example

Quit interactive mode

```
dscli>quit
```

Out of interactive mode

```
#
```

setoutput

The setoutput command sets or displays command output format options. You can use this command to set either default or user-defined output formats. The output format set by this command remains in effect for the duration of the interactive command session unless reset either with a command option or the re-issuance of the setoutput command. Running this command with no parameters displays the current output settings in the default output format.
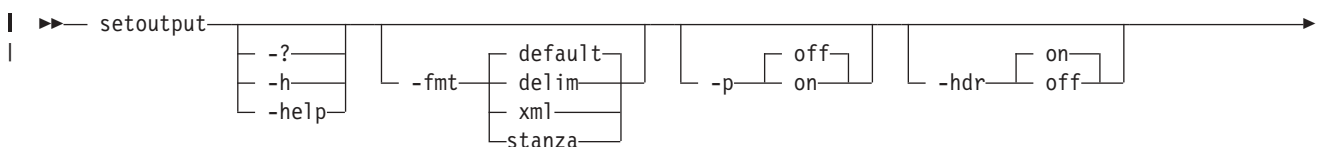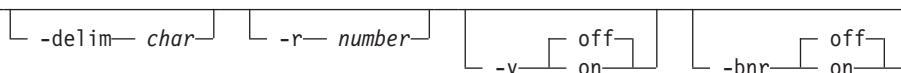
```
►►— setoutput──┬───────┬──┬─────┬─default─┬──┬───┬────┬──┬────┬──on──┬──►
               ├─ -?──┤  └-fmt─┼─delim──┤  └-p─┼─off─┤  └-hdr─┼─off─┘
               ├─ -h──┤        ├─xml────┤      └─on──┘
               └-help─┘        └─stanza─┘
```

```
├──┬─────────────────┬──┬──────────────┬──┬──────────────┬──┬──────────────┬──►◄
   └─ -delim─ char ──┘  └─ -r─ number ─┘  │  ┌─off─┐     │  │  ┌─off─┐     │
                                          └─-v─┤     ├───┘  └─-bnr─┤     ├──┘
                                               └─on──┘             └─on──┘
```

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.

-fmt default | **delim** | **xml** | **stanza**
> Specifies the format of the output. You can specify one of the following values:
>
> **default**
> > Specifies that the output be displayed in a tabular format using spaces as the delimiter between the columns. This is the default value.
>
> **delim**
> > Specifies that the output format be set to a table and sets the column delimiter to a single character specified by the -delim char option.
>
> **xml**
> > Specifies that the output be displayed in XML format.
>
> **stanza**
> > Specifies that the output be displayed in stanza (horizontal table) format.

-p *off* | *on*
> Specifies whether to display one page of text at a time or all text at once.
>
> **off**
> > Displays all text at one time. This is the default value.
>
> **on** Displays one page of text at a time. Pressing any key displays the next page.

-hdr on | **off**
> Specifies whether to display the table header.
>
> **on** Displays the table header. This is the default value.
>
> **off**
> > Does not display the table header.

-delim *char*
> Specifies the delimiter character (such as a comma) used in the report.

-r *number*
> Specifies the number of rows per page to display when the -p parameter is on. The default is 24 rows. You can specify a value from 1 to 100.

-v off | **on**
> Specifies whether to enable verbose mode.
>
> **off**
> > Disables verbose mode. This is the default value.
>
> **on** Enables verbose mode.

-bnr off | **on**
> Specifies whether the banner (command header) message be enabled.

off

> Turns the header mode off so that the command header does not display.

on Turns the header mode on so that the command header is displayed.

Format Examples

Invoke the setoutput command with no options

When you specify the **setoutput** command with no options, the DS CLI always displays the current output settings in the default format (space-separated plain text table), regardless of the values of the output settings. Issue the **setoutput** command as follows:

```
dscli>setoutput
```

The resulting output

```
Paging   Rows    Format  Header  Verbose   Banner
==================================
Off     -     Default On   Off   On
```

Invoke the setoutput command using the -delim parameter

The following is an example of the commands that you would issue to get (long) output in comma-separated format for an unassigned rank only. Issue the **setoutput** command to specify the report format and then issue the **lsrank** command to designate the rank being queried.

```
dscli> setoutput -fmt delim –delim ,
dscli> lsrank –dev IBM.1750-75FA120 -state unassigned
```

The resulting output

Note: While this example shows the header turned on, you can choose to turn the header off, in which case you issue the command and include the **-hdr off** parameter.

```
ID,Group,State,datastate,Array,RAIDtype,extpoolID,stgtype
=========================================================
R0,-,Unassigned,Normal,A0,5,-,fb
```

Invoke the setoutput command using the -fmt xml parameter

The following is an example of the commands that you would issue to get (long) output in XML format for an unassigned rank only. Issue the **setoutput** command to specify the report format and then issue the **lsrank** command to designate the unassigned rank being queried.

```
dscli> setoutput -fmt xml
dscli> lsrank –dev IBM.1750-75FA120 –state unassigned
```

The resulting 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>
```

Invoke the setoutput command using the -fmt stanza parameter

When columns are horizontally long, output can be difficult to visually align. Using the stanza format option eliminates this problem. The following is an example of the commands that you would issue to get (long) output in stanza format for an unassigned rank only. Issue the **setoutput** command to specify the report format and then issue the **lsrank** command to designate the unassigned rank being queried.

```
dscli> setoutput -fmt stanza
dscli> lsrank —dev IBM.1750-75FA120 —state unassigned
```

The resulting output

```
ID R0
Group -
State unassigned
datastate normal
Array A0
RAIDtype 5
extpoolID -
stgtype fb
```

User account and security commands

This section contains commands that are used to maintain command-line interface (CLI) user accounts and security.

The following commands add, modify, delete, and show CLI user accounts and security information.

chpass

The chpass command changes the password expiration time and the number of login attempts for a storage complex.

```
►►— chpass─────────────────────────────────────────────────────►◄
        └─ -expire— number─┘  └─ -fail— number─┘
```

Parameters

-expire *number*
    (Optional) Specifies the number of days a Storage Manager user account password is valid before it expires. The default number of days is 365. If you do not want the password to expire, enter 0. After the password expires, the user is not allowed to log in unless the password is changed.

-fail *number*
    (Optional) Specifies the number of login attempts allowed on any given Storage Manager user account. The number of login attempts can be 0 to nine. The

| default number of login attempts is three. If you do not want a limit on the
| number of login attempts, enter zero (0). After the number of login attempts is
| exceeded, the user account is locked.

Example

Invoking the chpass command

```
dscli>chpass -expire 20 -fail 0
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS  CLI
Version 5.0.0.0 DS:IBM 1750–75FA120
Password parameters successfully changed.
```

chuser

The chuser command is used to modify and lock or unlock a DS CLI or a DS
Storage Manager user account. A CLI user with administrative authority uses this
command to update a user account password, modify user group authority, or to
lock or unlock a user account. Users that do not have administrator authority, use
this command to change an expired password and create a password that is not
known to the administrator who created their account.

```
►►─chuser─────────────────────────────────────────────────────────────────►
             └─ -pw─new_password─┘  └─-lock─┘  └─-unlock─┘  └─ -group─group_name [ . . . ]─┘

►─┬─User Name─┬──────────────────────────────────────────────────────────►◄
  └─ " - " ───┘
```

Parameters

Note: When a person with administrator authority designates the password, the
password is set as expired upon its initial use. The user of the password is
required to establish a new password using the chuser command before
access to the rest of the DS CLI application is granted.

-pw
(Optional) Specifies that a new password be assigned to the user.

  Note:

  • When a person with administrator authority is using this parameter in
    association with the -unlock parameter, the new password is
    temporary and expires upon the initial use.
  • When a person without administrator authority uses this parameter,
    the new password becomes their valid password and replaces their
    prior password.

new_password
The new password.

The new password and its usage must meet the following criteria:
  • Be six to 16 characters long.
  • Must contain five or more letters, and it must begin and end with a
    letter.
  • Must contain one or more numbers.
  • Cannot contain the user's user ID.

- Is case-sensitive.

-lock
> (Optional) Locks a user account.
>
> Persons with administrator authority can use this parameter to lock a user account. The affect of this locking action is not enacted until the user authenticates their account. In other words, if a user is already active (authenticated) and using the DS CLI application, the lock does not take place until they log out of the application.

-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 into the DS CLI application. The reasons a user might not be able to log into the DS CLI application can include:
>
> - The user forgot their password and in an attempt to log in they 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) The user's access authority group.
>
> *group_name [...]*
> > The following list provides the list choices that can be assigned to a user. Multiple names must be separated by commas. For example, op_copy_services,service.
> >
> > **admin**
> > > The administrator user group has access to all management console server service methods and all storage image resources.
> >
> > **op_storage**
> > > The storage operator user group has access to physical configuration service methods and resources, including storage complex, storage image, array, rank, and extent pool objects. This user group inherits all the authority of the op_copy_services and monitor user groups, excluding security methods.
> >
> > **op_volume**
> > > The volume operator user group has 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 group inherits all authority of the monitor user group.
> >
> > **op_copy_services**
> > > The copy services operator user group has access to all Copy Services service methods and resources, excluding security methods. In addition, this user group inherits all authority of the monitor user group.

service

> The service user group includes monitor authority, plus access to all management console server service methods and resources, such as performing code loads and retrieving problem logs.

monitor

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

no access

> The no access user group does not have access to any service methods or storage image resources. By default, this user group is assigned to any user account in the security repository that is not associated with any other user group.

User Name | –

> (Required) The user account name.

> **Note:**
>
> - The administrator inserts the name of the user account that is affected by the changes (group name, lock, or unlocking).
> - Users who are changing their passwords insert their user account name.

> Alternatively accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chuser command

```
dscli>chuser -pw xy0abcde testuser
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

User Name testuser successfully modified.
```

lsuser

The lsuser command returns a list of storage image user account names and access authority levels.

►►—lsuser——————————————————————————————►◄

Parameters

There are no parameters for this command.

Example

Invoking the lsuser command

```
dscli>lsuser
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS  CLI

Name            Group              State
Testuser  services,op_copy_services  active
Biguser          admin              active
Smalluser      op_storage           locked
```

Column Header	Description
Name	User name assigned to the user account.
Group	The user's access authority group. One or more of the following group designations is displayed: • admin • op_storage • op_volume • op_copy_services • service • monitor • no access
State	The status of the user account for the specified user group, either active or locked.

managepwfile

The managepwfile command creates a password file for an existing ESS user account. This command processes the password requirements for 2105, 2107, and 1750 systems.

```
▶▶──managepwfile──┬──-action──┬──────────────────────────────────────────────────▶
                  │──add──     │  └─-pwfile── file_name─┘  └─-mc1── HMC1─┘  └─-mc2── HMC2─┘
                  │──remove──  │
                  └──change──  ┘

▶──┬──────────────────────┬──-pw── password──────────────────────────────────────────◀
   └─-name── username─┘
```
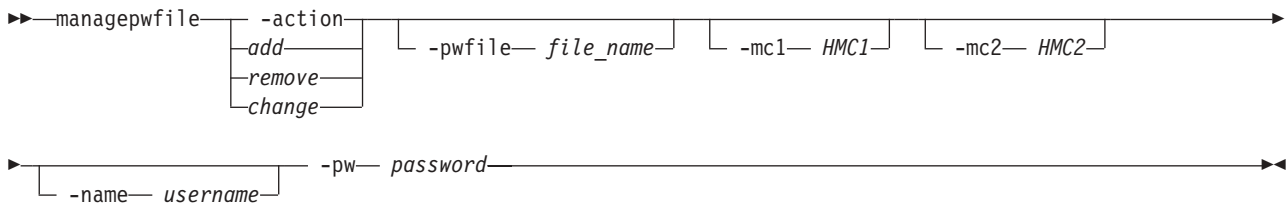
Parameters

-action
(Required) Specifies that a process that is designated by the subparameter be enacted on the password file.

add   Specifies that the password file be created, adding the first line of the file, which contains the primary HMC designation and the HMC username.

remove   Specifies that the password file be removed for the designated user.

change   Specifies that the password file be changed for the designated user.

-pwfile *file_name*
(Optional) Specifies the name that you want to use for the password file. The password file can be specified as an absolute path or a relative path. The relative path is obtained from the current working directory.

file_name

> The user-specified ESS password file name.

-mc1

> (Optional) Specifies the DNS name or the IP address.

> **Note:** You can use the default value that is specified for HMC1 in your profile file, or you can use the value specified for the current CLI session connection.

> *HMC1*
>
> > Designates the primary HMC or 2105 DNS name or IP address. This information along with the **-name** parameter is used as a key in the password file.

-mc2

> (Optional) Specifies the DNS name or the IP address of the secondary HMC.

> **Note:** You can use the default value that is specified for HMC2 in your profile file, or you can use the value specified for the current CLI session connection.

> *HMC2*
>
> > Designates the secondary HMC or 2105 DNS name or IP address.

-name

> (Optional) Specifies the name that you use to access the DS CLI application.

> *username*
>
> > Designates the user-specified SMC or 2105 user name. This information along with the **–mc1** parameter information is used as a key in the password file.

-pw *password*

> (Required) Specifies a user-assigned password.

> *password*
>
> > Specifies the password that enables user name access to this ESS CLI client installation. The password is case-sensitive.

Note:

- A password file is created with a user's default protection mask. The user needs to update the protection mask to allow access only to the owner of the file.
- The password file has a default value of <home>/dscli/security.dat. The following examples provide the environment variable for specific operating systems:
  - For Windows: %USERPROFILE%\dscli\security.dat
  - For UNIX : $HOME/dscli/security.dat

Example (1750)

Invoking the managepwfile command

```
dscli>managepwfile -action add -mc1 myess.ibm.com -name testuser –pw AB9cdefg
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS  CLI
Version 5.0.0.0 DS: IBM.1750-75FA120
Record myess.ibm.com/testuser successfully added to password file
c:\Documents and Settings\testuser\dscli\security.dat
```

mkuser

The mkuser command creates a DS CLI or a DS Storage Manager user account. A CLI user with administrative authority uses this command to create a user account with a password and user group authority.

```
►►──mkuser── -pw── password── -group──group_name [ . . . ]──┬─User Name─┬──────────────────►◄
                                                            └─ " - " ──┘
```

Parameters

pw
   (Required) Specifies the password that is assigned to the user that allows them to access the use of the DS CLI command line function. This password is temporary and set to expire after the initial use. The user must assign themselves a new password using the chuser command before they can us any other commands in the DS CLI application.

   password
      The password assigned by the administrator to user.

      The password and its usage must meet the following criteria:
      • Be six to 16 characters long.
      • Must contain five or more letters, and it must begin and end with a letter.
      • Must contain one or more numbers.
      • Cannot contain the user's user ID.
      • Is case-sensitive.

-group *group_name [...]*
   (Required) The user's access authority group.

   group_name [...]
      The following list provides the list choices that can be assigned to a user. Multiple names must be separated by commas. For example, op_copy_services,service.

      admin
         The administrator user group has access to all management console server service methods and all storage image resources.

      op_storage
         The storage operator user group has access to physical configuration service methods and resources, including storage complex, storage image, array, rank, and extent pool objects. This user group inherits all the authority of the op_copy_services and monitor user groups, excluding security methods.

      op_volume
         The volume operator user group has 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 group inherits all authority of the monitor user group.

op_copy_services

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

service

The service user group includes monitor authority, plus access to all management console server service methods and resources, such as performing code loads and retrieving problem logs.

monitor

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

no access

The no access user group does not have access to any service methods or storage image resources. By default, this user group is assigned to any user account in the security repository that is not associated with any other user group.

User Name | –

(Required) The current user account user name.

Alternatively accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkuser command

```
dscli>mkuser -pw AB9cdefg -group service,op_copy_services testuser
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS  CLI
Version 5.0.0.0 DS: IBM.1750-75FA120
User Name testuser successfully created.
```

rmuser

The rmuser command removes a storage image user account. CLI users with administrative authority use this command to delete a user account file. Administrators use their passwords in the required field.

```
►►──rmuser─┬───────┬─┬─User Name─┬──────────────────────────────────►◄
           └─-quiet─┘ └─ " - " ───┘
```

Parameters

-quiet

(Optional) Turns off the confirmation prompt.

User Name | –

(Required) The current user account user name.

Alternatively accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the rmuser command

```
dscli>rmuser testuser
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version 5.0.0.0 DS: IBM.1750-75FA120
Are you sure you want to delete User Name testuser? y/n
Y
User Name testuser successfully deleted.
```

showpass

The showpass command lists the properties of passwords.

►►── showpass ──◄◄

Parameters

There are no parameters for this command.

Example (1750)

Invoking the showpass command

```
dscli>showpass
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI
Version 5.0.0.0 DS: IBM.1750-75FA120
Password Expiration (days) 33 days
Failed Logins Allowed   5
```

showuser

The showuser command displays storage image user account details. A CLI user with administrative authority uses this command to display the properties (group assignment, user account status and number of failed logins) that is associated with a current user account name.

►►──showuser──┬─*User_Name*─┬──◄◄
              └─ " - " ─────┘

Parameters

User_Name | –
    (Required) The user account name.

    Alternatively accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the showuser command

```
dscli>showuser testuser
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI
Version: 5.0.0.0 DS: IBM.1750-75FA120

Name  testuser
Group services,op_copy_services
State  active
FailedLogins  2
```

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: • admin • op_storage • op_volume • op_copy_services • service • monitor • no_access
State	The status of the user account for the specified user group, either active or locked.
FailedLogins	Count of login failures since last successful login for this user.

Application key and version commands

This section contains commands that are used to maintain application keys and view the current CLI version.

Use the following commands to add and list application keys and show the current command-line interface version.

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. The file that contains the LMC keys must be downloaded from an IBM Web site.

```
►►── applykey───────────────────────────────────────── storage_image_ID ──────►◄
              └─ -key─ key [...]─┘   └─ -file─ file_name─┘  └─ " - " ─┘
```

Parameters

-key *key [...]*
    (Optional) Specifies the LMC key. 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) Specifies the file name of the LMC activation key file.

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

storage_image_ID | -
>> (Required) Specifies the storage image ID where the LMC activation key file will be imported. The ID includes manufacturer, type, and serial number.

>> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the applykey command
```
dscli>applykey -file keys.xml IBM.1750-75FA120
```

lskey

The lskey command displays the type of licensed machine code (LMC) activation keys that are installed and available for use by the storage image. For instance, the following list represents the type of LMC activation keys: Operating Environment, FlashCopy, Remote Mirror and Copy, Parallel Access Volumes, Remote Mirror for z/OS.

```
>>─── lskey──┬─ storage_image_ID──┬──────────────────────────────────────────><
             └─ " - "─────────────┘
```

Parameters

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

>> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following table represents the headers that are displayed on the output report that is associated with the **lskey** command. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the lskey command
```
dscli>lskey IBM.2107-75FA120
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI
```

Activation Key	Capacity (TB)	Storage Type
Operating Environment	45	All
FlashCopy	23	FB

Report field definitions

Activation key
>> Specifies the type of LMC activation key that is activated for the storage image. One of the following values are displayed:
>> - Operating Environment
>> - FlashCopy
>> - Remote Mirror and Copy

- Parallel Access Volumes
- Remote Mirror for z/OS

Capacity (TB)
>Specifies the capacity of the specified license feature for this image (quantity is displayed in terabytes).

Storage Type
>Specifies the storage type for the designated license: fixed block (FB), count key data (CKD), or ALL. Parallel Access Volumes and Remote Mirror for z/OS only display the values CKD or ALL.

ver

The ver command displays the versions of the command-line interface, Storage Manager, and licensed machine code.

```
►►── ver ─┬──────┬─┬───────┬─┬─────────┬─┬──────┬──────────►◄
          ├─ -s ─┤ └─ -cli ┘ └─ -stgmgr ┘ └─ -lmc ┘
          └─ -l ─┘
```
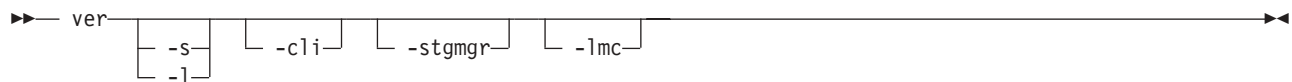
Parameters

-s (Optional) The -s displays the version of the command line interface program. You cannot use the -s and -l parameters together.

-l (Optional) The -l displays the versions of the command line interface, Storage Manager, and licensed machine code. You cannot use the -i and -s parameters together.

-cli
>(Optional) Displays the version of the command line interface program. Version numbers are in the format `version.release.modification.fixlevel`.

-stgmgr
>(Optional) Displays the version of the Storage Manager.

-lmc
>(Optional) Displays the version of the licensed machine code.

Example

Invoking the ver command

```
dscli>ver –l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS
Storage Manager 5.0.1.0
LMC   5.0.1.0
```

Physical enclosure information commands

This section contains commands that are used to view information about the physical enclosures in your storage complex.

Use the following commands to view information about the physical enclosures in your storage complex.

lsstgencl

The lsstgencl command displays a list of storage enclosures and status information for each enclosure in the list.

```
►►─lsstgencl──┬──────┬──┬──storage_image_ID── . . .──┬──────────────────────────►◄
              ├─ -s ─┤  └─ " - " ───────────────────┘
              └─ -l ─┘
```
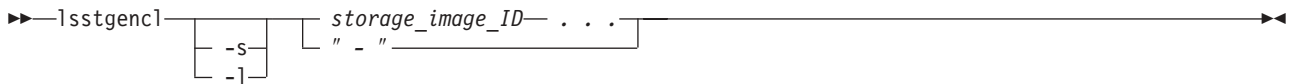
Parameters

-s (Optional) Displays the storage enclosure ID. You cannot use the -l and the -s parameters together.

-l (Optional) Displays default output, plus the storage enclosure feature code and engineering change level. You cannot use the -l and the -s parameters together.

storage_image_ID . . . | -
(Required) Displays storage enclosure information for the specified 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 an ID range.

Alternatively, accepts input from stdin when the dash (-) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsstgencl** command using the -l parameter. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the lsstgencl command

```
dscli>lsstgencl -l IBM.1750-75FA120
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI
Version: 5.0.0.0 DS: IBM.1750-75FA120
```

ID	Frame	Enclnum	Loc	FC	Interfaces
IBM.2107-D21.75FA120 /R1-S11	R1	S11	U2107. 921. 75FA120	3221	0111, 0112, 0113, 0114
IBM.2107-D21.75FA120 /R1-S12	R1	S12	U2107. 921. 75FA120	3221	0121, 0122, 0123, 0124

Interadd	Storslot	Stordev	Cap	RPM
0 x 0	16	16	145	10000
0 x 1	16	16	145	10000

Report field definitions

ID Specifies the enclosure ID and enclosure number.

> **Note:** This is the only information displayed if you use the -s parameter. None of the other values are displayed.

Frame Specifies the frame number within the designated storage unit that contains this storage enclosure.

Enclnum
Identifies a storage enclosure within a storage unit frame. The values displayed for the enclosure are S11 - S18 or S21 - S28. These values are interpreted as follows:

- Enclosures S1x are located in front of the frame.
- Enclosures S2x are located in the rear of the frame.
- Enclosure Sx1 is located at the top of the frame.
- Enclosure Sx8 is located at the bottom of the frame.

Loc Specifies the storage enclosure location by identifying the storage unit frame that contains the storage enclosure. The location format is: ″Utttt.mmm.ppsssss″.

FC Specifies the feature code that was used to order this storage enclosure.

Interfaces
Specifies a list of four interface identifiers, one for each DA I/O port.

A DA interface ID consists of four hexadecimal characters with a format of: '00eeeeeeaaaapppp'b, where:

- eeeeee = enclosure number
- aaaa = adapter number
- pppp = port number

Interadd
Specifies the FC-AL interface base address assigned to this storage enclosure for DDM access.

Storslot
Specifies the number of slots for storage devices in this storage enclosure.

Stordev
Specifies the number of storage devices installed in this storage enclosure.

Cap Specifies the capacity of DDMs in the storage enclosure.

RPM Specifies the RPM of the DDMs in the storage enclosure.

Field replaceable unit information commands

This section contains commands that are used to view information about the field replaceable units (FRUs) in your storage complex.

Use the following commands to view information about the field replaceable units in your storage complex.

lsddm

The lsddm command displays a list of device drive modules (DDMs) and status information for each DDM in the list.

```
►►──lsddm──────────────────────────────────────────────────────────────►◄
           ├─ -s ─┤   └─ -enclosure─ enclosure_ID ─┘   └─ -dapair─ dapair_ID ─┘
           └─ -l ─┘
```

```
├──────┬────────────────────────┬──┬──────┬──unassigned────┬──┬────────┬──normal──────┬──────────────▶
       └─ -arsite─ arraysite_ID─┘  └ -usage┼──unconfigured──┤  └ -state─┴──not_normal──┘
                                           ├──spare─────────┤
                                           ├──not_spare─────┤
                                           └──array_member──┘

▶──storage_image_ID──────────────────────────────────────────────────────────────────────────◀
  │              └─ . . . ─┘
  └─ " - " ────────────┘
```
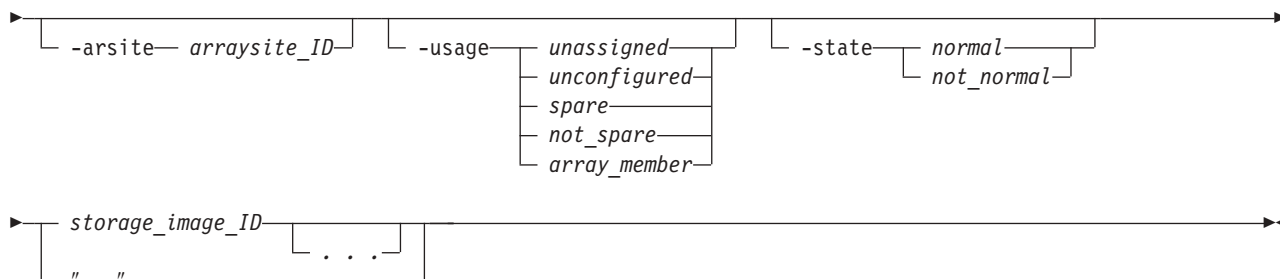
Parameters

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

-l   (Optional) Displays the default output. You cannot use the -s and -l parameters together.

-enclosure *enclosure_ID*
> (Optional) Displays DDMs that are associated with a common storage enclosure ID. Accepts a fully qualified enclosure ID, which includes either the storage image ID or a shortened version without the storage image ID. The shortened version is a hexadecimal number within the range (00 - 3F).

-dapair *dapair_ID*
> (Optional) Displays DDMs that are associated with a common DA pair ID. Accepts a fully qualified DA pair ID, which includes either 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 zeroes.

-arsite *arraysite_ID*
> (Optional) Displays DDMs that are associated with a common array site ID. Accepts a fully qualified array site ID, which includes either the storage image ID or a shortened version without the storage image ID. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter "S".

-usage *unassigned | unconfigured | spare | not_spare | array_member*
> (Optional) Displays DDMs that are associated with a specified usage.

-state *normal | not_normal*
> (Optional) Displays DDMs that are associated with a specified state.

storage_image_ID **. . .** | **-**
> (Required) Displays DDM information for the specified storage image IDs. A storage image ID includes manufacturer, type, and serial number. You can specify multiple IDs and when you do the IDs must be separated with a space between each ID.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsddm** command using the -l parameter. A separate example is not shown for the 1750 as the information is the same for both. The only difference is the model number designation, 2107 versus 1750. Also, the table shows only the first 2 DDMs.

Invoking the lsddm command

```
dscli>lsddm -l IBM.1750-75FA120
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

ID	loc	DA pair	dkcap (10^9B)	diskrpm	dkinf	dkrate
IBM.2107-D21-75FA120 /R1-S11-P1-D1	U2107.921 .75FA120	11	145	10000	FCAL	2
IBM.2107-D21-75FA120 /R1-S11-P1-D2	U2107.921 .75FA120	11	145	10000	FCAL	2

dkuse	arsite	Position	state
array member	S1123	1	Normal
array member	S1123	2	Normal

Report field definitions

ID   Specifies the system assigned unique identifier for the DDM.

loc   Specifies the storage enclosure and DDM location. DDM location format is "Pn-Dn', where "Pn" is the Planer number (1), and "Dn" is the DDM number (1 - 16).

DA pair
Identifies the DA pair ID. DA pairs are located in I/O enclosure pairs. DA pair ID implies 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 (10^9B)
Specifies the DDM raw capacity in gigabytes.

diskrpm
Specifies the DDM RPM. One for the following values is displayed:
- 10000
- 15000

dkinf   Specifies the DDM interface type.

dkrate   Specifies the DDM interface rate.

dkuse   Identifies the DDM usage in an array site. One of the following values are displayed:
- unassigned
- unconfigured

- spare required
- spare not required
- array member

arsite Specifies the array site ID.

Position
Specifies the DDM position in an array site configuration of DDMs.

State Specifies the current DDM state. One of the following values are displayed:

Normal
The storage device is operational and functional in its current disk usage.

Installing
A new storage device has been discovered.

Verifying
The storage device is made accessible to the device adapter, its characteristics are determined, cabling is checked, and diagnostics are run.

Formatting
A verified storage device requires low-level formatting and the formatting operation is in progress.

Initializing
The storage device is being initialized with all zero sectors.

Certifying
The storage device is being read accessed to determine that all sectors can be read.

Rebuilding
Sparing has occurred and this formerly spare storage device is being rebuilt with data from the array that it is now an array member of.

Migration Target
DDM migration is migrating another array member storage device to this spare storage device.

Migration Source
DDM migration is migrating this array member storage device to another spare storage device.

Failed
The storage device has failed and an immediate repair action is required.

Failed/Deferred Service
The storage device has failed and a repair action is not immediately required.

Storage unit configuration commands

This section contains commands that are used to configure a storage unit.

Use the following commands to configure a storage unit and show storage unit information.

chsu

The chsu command modifies a storage unit. You can use this command to power-on and power-off a storage unit.

```
►►── chsu──┬─────────────────────────────────────┬──┬──────────────────────────────┬──►
           └─ -pwrmode──┬─ manual ──────────┬───┘   └─ -desc── new_su_description ─┘
                        ├─ scheduled ───────┤
                        ├─ auto ────────────┤
                        ├─ scheduled auto ──┤
                        └─ zseries ─────────┘

►──┬───────────────────────┬──┬─ storage_unit_ID ─┬──────────────────────────────────►◄
   └─ -name── new_su_name ──┘  └─ " - " ───────────┘
```
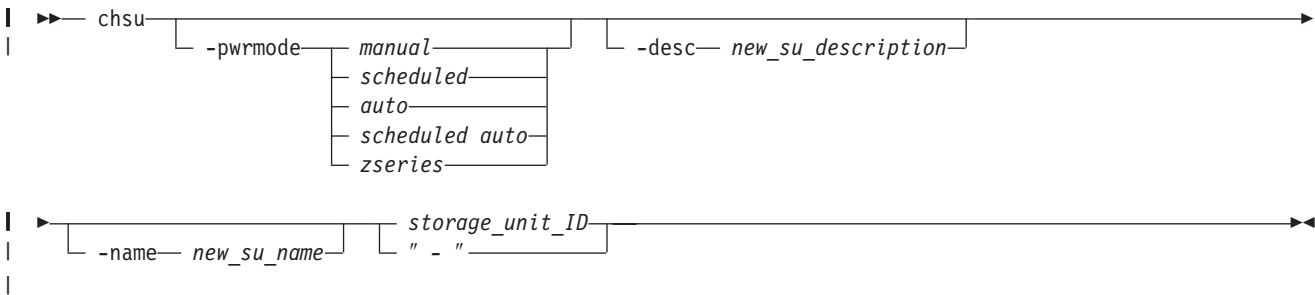
Parameters

Note: There is a local/remote switch under the cover on the rear of the first rack of a storage facility. This service switch is customer accessible when the rear cover is open. This control selects whether local or remote power controls are enabled. When the local/remote switch is set to local, the local power on/local force power-off switch controls storage facility power. When the local/remote switch is set to remote, the remote power control mode setting on the SMC determines which remote power control mode is in effect.

-pwrmode *manual | scheduled | auto | scheduled auto | zseries*
 (Optional) Sets a requested remote power control mode on the storage unit.

 manual
  Specifies that the storage facility power-on and power-off sequences are performed based on the manual power on and off controls.

 scheduled
  Specifies that a storage facility power on sequence is initiated if the current time is the same as the setting of the scheduled power on time control. A storage facility power off sequence is initiated if the current time is the same as the setting of the scheduled power off time control.

 auto
  A storage facility power-on sequence is performed when external power first becomes available to the first rack of a storage facility (for example, when standby power is first activated to the RPC cards).

 scheduled auto
  A storage facility power-on sequence is initiated if either of the following conditions exist:

  - The current time is the same as the setting of the scheduled power-on time control.
  - The current time is between the setting of the scheduled power on time control and the setting of the scheduled power off time control and external power first becomes available to the first rack of a storage facility (for example, when standby power is first activated to the RPC cards).

  Note: A storage facility power-off sequence is initiated if the current time is the same as the setting of the scheduled power-off time control.

zseries
> Specifies that the power control mode is set to zSeries remote power control.

-desc *new_su_description*
> (Optional) Allows you specify a description for the storage unit. 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 unit. This name is limited to 32 bytes or 16 double-byte characters.

storage_unit_ID | -
> (Required) Accepts the fully qualified storage unit ID. The storage unit ID consists of manufacturer, machine type, and serial number. For example, IBM.1750-75FA120.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chsu command
```
dscli>chsu -pwrmode manual IBM.1750-75FA120
```

The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Storage unit IBM.1750-75FA120 successfully modified.
```

lssu

The lssu command displays a list of storage units in a storage complex. You can use this command to look at the status and other properties of each storage unit in the list.
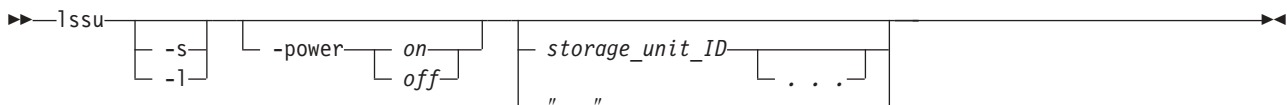
Parameters

-s (Optional) Displays storage unit IDs. You cannot use the -l and the -s parameters together.

-l (Optional) Displays default output and remote mode with scheduled power-on and power-off times, and the storage unit description. You cannot use the -l and the -s parameters together.

-power *on* | *off*
> (Optional) Displays only the storage units in the specified power state.

storage_unit_ID . . . | -
> (Optional) Displays storage units with the specified storage unit IDs. A storage unit ID includes manufacturer, type, and serial number. You must separate multiple IDs with a space between each ID.
>
> **Note:** You cannot specify ID ranges.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following table represents the headers that are displayed on the output report that is associated with the **lssu** command using the -l parameter. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the lssu command

```
dscli>lssu -l
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```

Name	ID	Model	WWNN	Pw State	Pw Mode	Desc
SU 1	IBM.2107-75FA110	921	3007ACF 3012399 E0	On	Local	Test
SU 2	IBM.2107-75FA120	921	3007ACF 3045699 E0	On	Local	Production
SU 3	IBM.2107-75FA130	921	3007ACF 3078999 E0	On	Local	Backup

Report field definitions

Name Specifies the user-defined name for each storage unit found within the storage complex. This value is null (-) if you have not assigned a name to a storage unit.

ID Specifies the storage unit ID which 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
Identifies the model number of the storage unit.

WWNN
Specifies the World Wide Node Name for the listed storage unit. This value is null (-) if the WWNN is not known

Pw State
Indicates the power status of the listed storage unit. One of the following values is displayed:

On
Indicates the storage unit power is on.

Off
Indicates the storage unit power is off.

Turning On
Indicates the storage unit power is in the process of turning on.

Turning Off
Indicates the storage unit power is in the process of turning off.

Power Exception
Indicates that storage unit power is on, but online operation is not possible due to a power fault in one of the storage unit frames.

Pw Mode
Indicates the power control mode in effect for the listed storage unit. One of the following values is displayed:

Local
Indicates that the SMC local/remote switch is set to the local power control mode.

Remote SMC Manual
Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to manual power control.

Remote SMC Scheduled
Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to scheduled power control.

Remote SMC Auto
Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to auto-power control.

Remote SMC Scheduled/Auto
Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to auto/scheduled power control.

Remote zSeries Power Control
Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to zSeries remote power control.

Desc Specifies the user-defined description for the listed storage unit. This value is displayed as a null (-) if no description has been assigned.

showsu

The showsu command displays detailed properties of an individual storage unit.

```
►►──showsu──┬─ storage_unit_ID ─┬──────────────────────────────────────────────►◄
            └─ " - " ───────────┘
```

Parameters

storage_unit_ID
(Required) Accepts a fully qualified storage unit ID. A storage unit ID consists of manufacturer, machine type, and serial number.

Alternatively, accepts input from stdin when the dash (-) is specified.

Example

Note: The following table represents the headers that are displayed on the output report that is associated with the **showsu** command. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the showsu command

```
dscli>showsu -fullid DS: IBM.2107-75FA120
```

**The resulting output**

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```

Name	Desc	ID	Model	WWNN	Config
My Stor-age Unit	This is my DS Stor-age Unit	IBM.2107-75FA120	921	3007ACF 3012399 E0	One I/O interface

Pw State	Pw Mode	Reqpm
On	Local	Remote SMC scheduled

Report field definitions

Name Specifies the user-defined name for the designated storage unit. This value is null (-) if you have not assigned a name to a storage unit.

Desc Specifies the user-defined description for the designated storage unit. This value is displayed as a null (-) if no description has been assigned.

ID Specifies the storage unit ID which consists of the manufacture name, machine type, and serial number.

Model Identifies the model number of the designated storage unit.

WWNN

Specifies the World Wide Node Name for the listed storage unit. This value is null (-) if the WWNN is not known.

Config

Specifies the internal I/O interface configuration for the storage unit. One of the following values is displayed:

Undefined

Indicates that a configuration upgrade is in progress that causes the configuration option to change.

One I/O interface

Indicates that there is one dedicated I/O interface between the I/O enclosure pairs and storage enclosures.

Two I/O interfaces

Indicates that there are two dedicated I/O interfaces between the I/O enclosure pairs and storage enclosures.

Four I/O interfaces

Indicates that there are four dedicated I/O interfaces between the I/O enclosure pairs and storage enclosures.

Six I/O interfaces

Indicates that there are six dedicated I/O interfaces between the I/O enclosure pairs and storage enclosures.

Pw State

Indicates the power status of the listed storage unit. One of the following values is displayed:

On

Indicates the storage unit power is on.

Off

Indicates the storage unit power is off.

Turning On

Indicates the storage unit power is in the process of turning on.

Turning Off

Indicates the storage unit power is in the process of turning off.

Power Exception

Indicates that storage unit power is on, but online operation is not possible due to a power fault in one of the storage unit frames.

Pw Mode

Indicates the power control mode in effect for the listed storage unit. One of the following values is displayed:

Local

Indicates that the SMC local/remote switch is set to the local power control mode.

Remote SMC Manual

Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to manual power control.

Remote SMC Scheduled

Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to scheduled power control.

Remote SMC Auto

Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to auto-power control.

Remote SMC Scheduled/Auto

Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to auto/scheduled power control.

Remote zSeries Power Control

Indicates that the SMC local/remote switch is set to remote and that the power control mode is set to zSeries remote power control.

Reqpm

Indicates 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 Scheduled
- Remote SMC Auto
- Remote SMC Scheduled/Auto
- Remote zSeries Power Control

Note: The default value is remote SMC Manual mode.

Storage image configuration commands

This section contains commands that are used to configure a storage image.

Use the following commands to configure a storage image and show storage image information.

chsi

The chsi command modifies a storage image. You can use it to set characteristics such as online or offline state, name, and description.

```
►►─chsi─┬──────────────────────────┬─┬─────────────────┬─┬──────────────────────────┬─────►
        └─-state─┬─online──┬───────┘ └─-essnetcs─┬─y─┬─┘ └─-volgrp─ volume_group_ID─┘
                 └─offline─┘                     └─n─┘

►─┬──────────────────────────────┬─┬──────────────────────┬─┬─ storage_image_ID ─────┬─►◄
  └─-desc─ new_si_description─────┘ └─-name─ new_si_name───┘ └─ " - " ────────────────┘
```
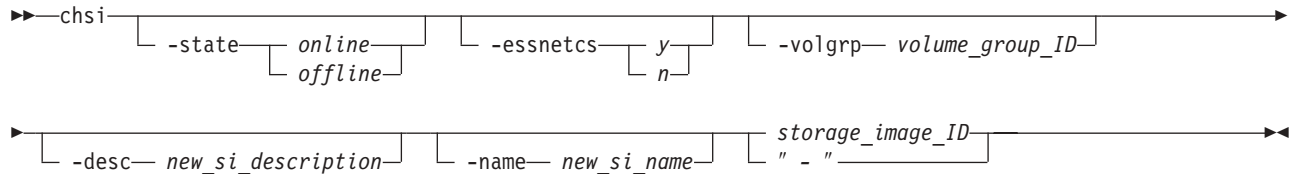
Parameters

-state *online* | *offline*
   (Optional) Sets a new, requested state for the storage image. Either online or offline.

-essnetcs *y* | *n*
   (Optional) Enables or disables the storage complex ESSNet user interface to invoke Copy Services operations for the storage image. *y* (yes) is the default.

-volgrp *volume_group_ID*
   (Optional) 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 zeroes, prefixed with the letter ″V″.

   If -essnetcs = ″y″, specifies the Copy Services type volume group that contains the logical volumes that are eligible to be controlled by Copy Services operations. If -essnetcs = ″y″ and the volume group ID is not specified, then all logical volumes are eligible to be controlled by Copy Services operations.

-desc *new_si_description*
   (Optional) Sets your description for the storage image. The description is limited to 256 byte or 128 double byte characters.

-name *new_si_name*
   (Optional) Sets your name for the storage image. The storage image name is limited to 32 byte or 16 double byte characters.

storage_image_ID | **-**
   (Required) Accepts a fully qualified storage image ID. The storage image ID consists of manufacturer, machine type, and serial number.

   Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chsi command
```
dscli>chsi -essnetcs n IBM.1750–75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750—75FA120

Storage image IBM.1750—75FA120 successfully modified.
```

lsserver

The lsserver command displays all servers in a storage complex or a list of
specified servers, and displays status information for each server in the list.

```
►►—lsserver─────┬──────┬──┬──── Server_ID ────────────┬──────────────►◄
                ├──-s──┤  │              └──. . .──┘   │
                └──-l──┘  └── " - " ──────────────────┘
```

Parameters

-s   (Optional) Displays the server ID. You cannot use the -l and the -s flags
together.

-l   (Optional) Displays the default output plus the state. You cannot use the -l and
the -s flags together.

Server_ID . . . | -
(Optional) Displays the server information for the specified server IDs. 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 zeroes.

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.

Alternatively accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the lsserver command

```
dscli>lsserver -l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120

ID  LPAR ID LPAR Name Power Control SFI
 State   LIC Version   MCP Version   Bundle Version
IBM.1750—75FA120/00  -   -    -
    Online  -   -   -
IBM.1750—75FA120/01  -   -    -
    Online  -   -   -
```

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 when using the lsavailpprcport and
mkpprcpath commands.

```
►►──lssi─┬──────┬─┬──────────────────────────┬─┬──────────────────────────┬──────►
         ├──-s──┤ └─-state─┬───online───┬─────┘ └─-su_id── storage_unit_ID─┘
         └──-l──┘          ├───offline──┤
                           └───fenced───┘

►──┬─ storage_image_ID ─┬─────────┬──┬──────────────────────────────────────────►◄
   │                    └─. . .───┘  │
   └─ " - " ───────────────────────────┘
```

Parameters

-s (Optional) Displays storage image IDs. You cannot use the -l and the -s flags together.

-l (Optional) Displays the default output, ESSNet, volume group, and storage image description. You cannot use the -l and the -s flags 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 unit. A storage unit 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.

   Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the lssi command

```
dscli>lssi -l
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750–75FA120

Name ID   Storage Unit   WWNN    State ESSNet
 Volume Group Desc
DS 1 IBM.1750–75FA111 IBM.1750–75FA110 3007ACF3012399E0 Online Enabled
 -  Test
DS 2 IBM.1750–75FA112 IBM.1750–75FA110 3007ACF3045699E0 Online Enabled
 -  Production
DS 3 IBM.1750–75FA120 IBM.1750–75FA120 3007ACF3078999E0 Online Enabled
 -  Backup
```

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 when using the lsavailpprcport and mkpprcpath commands.

```
►►──showsi──┬─ storage_image_ID ─┬──────────────────────────────────────────►◄
            └──── " - " ─────────┘
```

Parameters

storage_image_ID | -
> (Required) Accepts a fully qualified storage image ID. A storage image ID consists of a manufacturer, machine type, and serial number.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the showsi command

```
dscli>showsi -fullid IBM.1750—75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750—75FA120

name   My Storage Image
desc     This is my DS Storage Image
ID   IBM.1750—75FA120
Storage Unit   IBM.1750—75FA120
Model   921
WWNN   3007ACF3012399E0
Signature   0123—4500—0000
State   Online
ESSNet   Enabled
Volume Group   -
```

I/O port and host connection configuration commands

This section contains storage image I/O port and host connection configuration commands.

Use the following commands to configure your storage image I/O ports and host connections and to display connection information.

Storage image I/O port commands

This section contains commands that are used to configure storage image I/O port information and to display storage image I/O port information.

Use the following commands to configure storage image I/O port information and to display storage image I/O port information.

lsioport

The lsioport command displays a list of I/O ports (both ESCON and fibre channel) on a specified storage image and optionally provides performance metrics for each I/O port listed.

```
►►──lsioport──┬─────────────────────────────┬──┬──────┬──┬─────────────┬──────►
              └─ -dev── storage_image_ID ───┘  ├─ -s ─┤  └─ -type── fc ─┘
                                               └─ -l ─┘
```
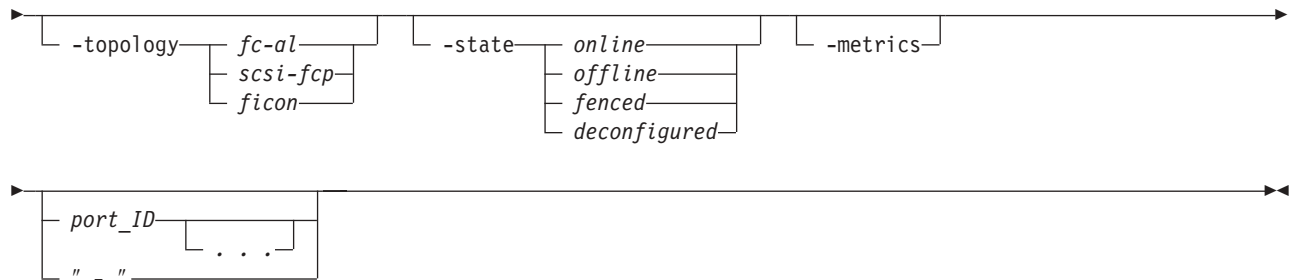
```
    ┌─ -topology ─┬─ fc-al ───┬─  ┌─ -state ─┬─ online ──────┬─  ┌─ -metrics ─┐
    └─            │  scsi-fcp │   └─         │  offline ─────│   └─           ─┘
                  └─ ficon ───┘              │  fenced ──────│
                                             └─ deconfigured ┘


    ┌─ port_ID ──┬──────────┬──
    │            └─ . . . ─┘
    └─ " - " ───────────────────
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number.

-s (Optional) Displays fully qualified port IDs. You cannot use the -l and -s flags together.

-l (Optional) Displays default output plus maximum login limit and the number of current logins. You cannot use the -l and -s flags together.

-topology *fc-al | scsi-fcp | ficon*
> (Optional) Displays fibre channel I/O ports with the specified topology.

-state *online | offline | fenced | deconfigured*
> (Optional) Displays I/O ports of the specified state.

-metrics
> (Optional) Displays port ID and performance metrics for each port specified.

port_ID . . . | -
> (Optional) Displays I/O ports matching the specified IDs. Accepts a fully qualified port ID, which includes the storage image ID, or a shortened version without the storage image ID when the -dev flag is specified.

> A port ID is prefixed with 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 - 01 (1750 machine types).
> - ″A″ is the adapter number and is specified as 0, 1, 2, or 3 (1750 machine types).
> - ″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.

> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the lsioport command
```
dscli>lsioport -fullid -dev IBM.1750–75FA120 -l
```
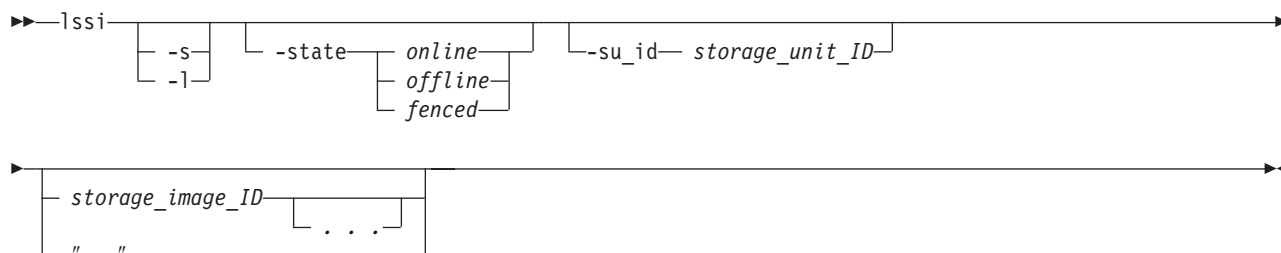
The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750—75FA120
ID,WWPN,State,Type,topo,potgrp

ID     WWPN   State Type topo portgroup
IBM.1750—75FA120/I0011 307BCF30A3299E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0012 307BCF30A3399E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0021 307BCF30A3499E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0022 307BCF30A3599E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0111 307BCF30A3699E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0112 307BCF30A3799E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0121 307BCF30A3899E0 Online FC-LW SCSI-FCP 0
IBM.1750—75FA120/I0122 307BCF30A3999E0 Online FC-LW SCSI-FCP 0
```

setioport

The setioport command configures one or more I/O ports for open systems or zSeries host system connections. This command cannot be used for ESCON ports.
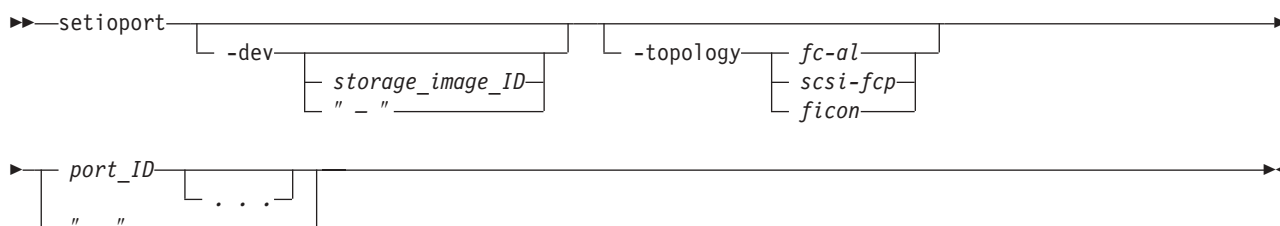
Parameters

-dev *storage_image_ID* | **-**
>   (Optional) Accepts a fully qualified storage image ID. The storage image ID consists of manufacturer, machine type, and serial number.

-topology *fc-al* | *scsi-fcp* | *ficon*
>   (Optional) Sets the topology for an I/O port, either fibre channel arbitrated loop, SCSI-FCP, or FICON.

>   **fibre channel arbitrated loop (code** *fc-al)*
>>   The fc-al topology setting enables the SCSI ULP with a FC-AL topology. The FC-AL topology does not support PPRC path I/O operations.

>   **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.

port_ID . . . | -
>   (Optional) Displays I/O ports matching the specified IDs. Accepts a fully qualified port ID, which includes the storage image ID, or a shortened version without the storage image ID when the -dev flag is specified.

>   A port ID is prefixed with 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 - 01 (1750 machine types).

- "A" is the adapter number and is specified as 0, 1, 2, or 3 (1750 machine types).
- "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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the setioport command

This example configures four I/O ports for FICON topology.

```
dscli>setioport -dev IBM.1750—75FA120 -topology ficon I0011 I0021  I0111  I0121
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120

I/O Port I0011 successfully configured.
I/O Port I0021 successfully configured.
I/O Port I0111 successfully configured.
I/O Port I0121 successfully configured.
```

showioport

The showioport command displays properties of an ESCON or fibre channel I/O port. It optionally displays the performance metrics for an I/O port.
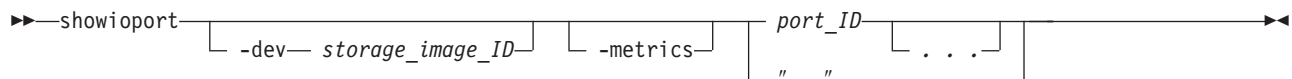
Parameters

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the port.

-metrics
Displays the port ID and performance metrics for the specified I/O port.

Note: All performance counts are an accumulation since the most recent counter wrap or counter reset. I/O port performance counters are reset each time a storage unit is powered up.

port_ID . . . | -
(Required) Displays the property level details for the specified port IDs. This command accepts a fully qualified unique port ID, that consists of the manufacturer, machine type, and serial number/portID.

For example IBM.1750—75FA120/I0023

A port ID is prefixed with 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 - 01 (1750 machine types).

- "A" is the adapter number and is specified as 0, 1, 2, or 3 (1750 machine types).
- "P" is the port number (0 - 3).

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the showioport command to show port information

```
dscli>showioport -dev IBM.1750–75FA120 I0112
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750–75FA120

ID   IBM.1750–75FA120/I0112
WWPN  307ACF30A2399E0
State  Online
loc  U1750–75FA123-I1-P1-C2-T1
Type  Fibre channel-LW
Speed (Gb/sec) 2
topo  SCSI-FCP
portgrp  0
unkSCSIlog -
```

Invoking the showioport command to show performance metrics

```
dscli>showioport -dev IBM.1750–75FA120 -metrics I0112
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750–75FA120

Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750–75FA120
ID                      IBM.1750-75FA120/I0112
Date                    10/11/04 02:23:47
byteread (FICON/ESCON)  10000
bytewrit (FICON/ESCON)  10000
Reads (FICON/ESCON)     10000
Writes (FICON/ESCON)    10000
timeread (FICON/ESCON)  10000
timewrite (FICON/ESCON) 10000
bytewrit (PPRC)         10000
byteread (PPRC)         10000
Writes (PPRC)           10000
Reads (PPRC)            10000
timewrite (PPRC)        10000
timeread (PPRC)         10000
byteread (SCSI)         10000
bytewrit (SCSI)         10000
Reads (SCSI)            10000
Writes (SCSI)           10000
timeread (SCSI)         10000
timewrite (SCSI)        10000
```

Host connection commands

This section contains commands that are used to configure host connections and to display host connection information.

Use the following commands to configure host connections and to display host connection information.

chhostconnect

The chhostconnect command modifies a SCSI host port configuration.
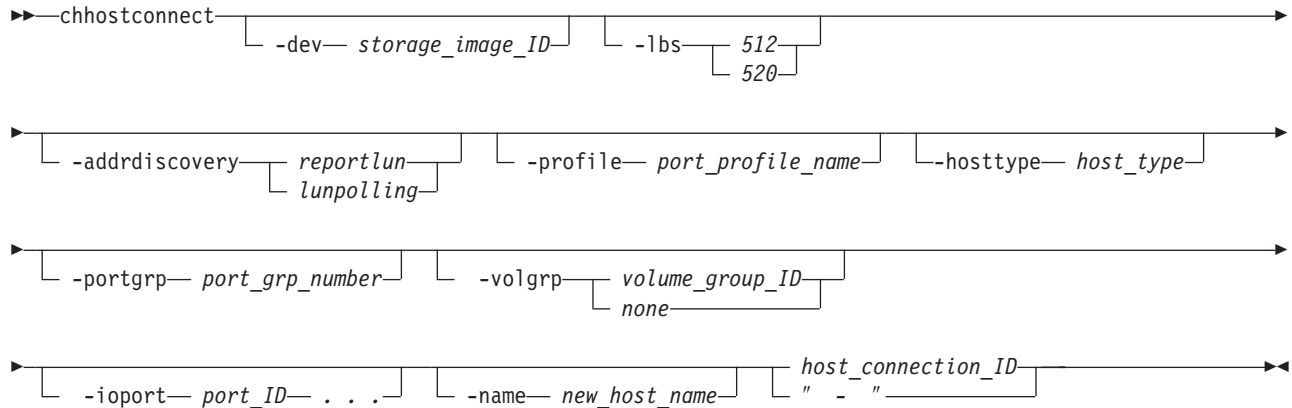
Parameters

Note: The chhostconnect command can be disruptive to host system I/O operations if the affected host port is logged into the target storage unit. You must ensure that the host port is offline to the host system before you process the chhostconnect command.

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified host connection ID.

Example of a fully qualified storage image ID: IBM.1750-75FA120

-lbs *512 | 520*
(Optional) Specifies 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 iSeries systems (OS/400).

Note:
- Do not use the -lbs parameter if you specify the -hosttype parameter.
- It is recommended that you use the lsportprof command to determine the block size that you need to specify.

-addrdiscovery *reportlun | lunpolling*
(Optional) Specifies the method for discovering logical unit number (LUN) addresses.
- The reportlun method specifies that the host system can access up to 64K LUNs.
- The lunpolling method specifies that the host system can access up to 256 LUNs.

Note:
- Do not use the -addrdiscovery parameter if you specify the -hosttype parameter.

- It is recommended that you use the lsportprof command to determine the size that you need to specify.

-profile *port_profile_name*
(Optional) Specifies 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".

Note:
- Do not use the -profile parameter if you specify the -hosttype parameter.
- Use the lsportprof command to get available profiles if you are not using the -hosttype parameter.

-hosttype *host_type*
(Optional) Specifies information about the following three parameters:
- -profile
- -addrdiscovery
- -lbs

With the -hosttype parameter, do not use the -profile, addrdiscovery, or -lbs parameters.

Note: Use the lshosttype command to obtain a list of known host types.

-portgrp *port_grp_number*
(Optional) Specifies a user-assigned number that you use to associate two or more host ports with access to a common volume group. Port group zero is reserved for ports that have not been associated with a port group.

-volgrp *volume_group_ID* | *none*
(Optional) Specifies 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 flag is specified. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter ″V″.

A host connection can use only one volume group per storage image. In other words, 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 . . .*
(Optional) Specifies all, none, one, or more I/O port IDs that allow host connection access to volumes.

Enter `all` to specify that you want to add all I/O ports.

Enter `none` to specify that you do not want any I/O ports added. If you do not specify I/O ports, the image is configured to allow host connection access to the specified volume group using any I/O port that is configured for FC-AL or SCSI-FCP topology.

You can select up to 128 ports for an open systems host attachment assignment. If you enter a list of I/O port IDs, access from this host connection to the specified volume group is allowed using only the specified list.

A port ID is prefixed with 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 - 01 (1750 machine types).
- *A* is the adapter number and is specified as 0, 1, 2, or 3 (1750 machine types).
- *P* is the port number (0 - 3).

To specify a range of port IDs, separate the port IDs with a hyphen.

Separate multiple port IDs or ranges of port IDs with a comma between each ID or range of IDs.

Note: Changing the I/O port values can result in a disruption of current logins by the host systems.

-name *new_host_name*
> (Optional) Specifies the user-assigned host system or port name. The name is limited to 32-byte or 16-double byte characters.

host_connection_ID | -
> (Required) Specifies the host connect ID which is a unique identifier using any number from 0 - 65534 within the scope of a storage image. This parameter accepts a fully qualified ID (includes manufacture.type–serial number/*hostconnectID*) or a shortened version if the -dev flag is specified.
>
> Example of a fully qualified host connection ID: IBM.1750-75FA120/2
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chhostconnect command
```
dscli>chhostconnect -dev IBM.1750—75FA120 -name host_1_port_2 1
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120

Host connection 1 successfully modified.
```

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.

```
►►—lshostconnect———————————————————————————————————————————————►
            └─ -dev— storage_image_ID ┘  └─ -s─┐  └─ -portgrp— port_grp_number ─┘
                                         └─ -l─┘

►—————————————————————————————————————————————————————————————►◄
   └─ -volgrp— volume_group_ID ─┘  ┌─ host_connection_ID ─┐
                                   │                  └─ . . . ─┘
                                   └─ " - " ─────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Displays the host connections for the specified storage image. A storage image ID consists of manufacturer, machine type, and serial number. This parameter is required if you do not specify a fully qualified host connect ID.

Example of a fully qualified storage image ID: IBM.1750-75FA120

-s (Optional) Displays the host connection IDs. You cannot use the -l and -s flags together.

-l (Optional) Displays the default output and your description for each host connection in the list. You cannot use the -l and -s flags together.

-portgrp *port_grp_number*
> (Optional) Displays the host connections that have an associated group number.

-volgrp *volume_group_ID*
> (Optional) Displays only the host connections with the specified volume group ID. 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 zeroes, prefixed with the letter ″V″.

host_connection_ID . . . | **-**
> (Optional) Displays host connection information for the specified host connection IDs. Accepts a fully qualified ID (includes manufacture.type–serial number/hostconnectID) or a shotened version if the -dev parameter is specified..
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of a fully qualified host connection ID: IBM.1750-75FA120/2

Example (1750)

Note: The following tables represent the headers that are displayed on the output report associated with the lshostconnect command using the -l parameter.

Invoking the lshostconnect command

```
dscli>lshostconnect -fullid -dev IBM.1750–75FA120 -l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750–75FA120
```

Name	ID	WWPN	HostType	LBS	Addrdis covery
My host port 1	IBM.1750-75FA120/1	3007ACF3 0A2399E0	Unknown	512	reportLUN
My host port 2	IBM.1750-75FA120/2	3007ACF3 0A2399E1	Unknown	512	reportLUN

Profile	portgrp	volgrpID	achtopo	ESSIOport
IBM pSeries - AIX	0	100	SCSI -FCP	I0111,I0121 I0211,I0221
IBM pSeries - AIX	0	100	SCSI -FCP	All

Report column definitions

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 hostconnectID component is a unique identifier (0-65,534) within the scope of a storage image.

WWPN
World wide name (WWPN) for this host system port.

HostType
The name of the Host Type.

″Unknown″ is displayed when the information is not available. This indicates that the host type was not specified when the host connection was created or modified.

LBS
The logical block sized used by this 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 iSeries host system attachments.

Addrdiscovery
The LUN address discovery method used by this 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 64K LUNs.

Profile
The name of the Host Connection behavior profile.

portgrp
Host Port Group ID. The ID associates a group of SCSI host port objects that are accessing a common volume group. If set to zero the host port is not associated with any port group.

volgrpID
Volume Group ID. A unique identifier within the DS6000 for the SCSI volume group that this SCSI host port is assigned to.

achtopo
Indicates attached ESS IO port topology.

ESSIOport
The set of ESS IO ports that this SCSI host port is allowed to log into. ″all″ indicates that this SCSI host port is allowed to log into any ESS IO port. A null (-) value indicates that this SCSI host port is not allowed to log into any ESS IO port.

lshostvol

The lshostvol command displays the mapping of host device names or volume names to machine type 2105, 2107, and 1750 volume IDs.

```
►►── lshostvol ──────────────────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Additional notes

The **lshostvol** command displays only volumes that are accessed 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 only has MSCP paths.
- Volumes to which the host system uses only MSCP paths at this time even though it has both MSCP and direct paths.

If you do not have IBM Subsystem Multipathing Device Driver (SDD) installed, the virtual path (vPath) name is not displayed..

Example (1750)

Invoking the lshostvol command

```
dscli>lshostvol
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Device/Volume Name Volume ID                Vpath Name
my_vol_01,my_vol_04 IBM.1750-75DA110/175D   vpath01
my_vol_02,my_vol_05 IBM.1750-75EA120/175E   vpath02
my_vol_03,my_vol_06 IBM.1750-75FA130/175F   vpath03
my_vol_07,my_vol_09 IBM.2105-29239/119E Vpath04
my_vol_08,my_vol_10 IBM.2105-29239/119F   Vpath05
```

lsportprof

The lsportprof command displays a list of port profiles that are supported on a storage image 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.

```
►►── lsportprof ──┬── storage_image_ID ──┬──────────────────────────────────────────►◄
                  └── " - " ─────────────┘
```

Parameters

storage_image_ID | -
    (Required) Displays a list of port profiles for the specified storage image IDs. A storage image ID consists of manufacturer, type, and serial number.

    Alternatively, accepts input from stdin when the dash (–) is specified.

    Example: IBM.1750-75FA120

Example (1750)

Invoking the lsportprof command

```
dscli>lsportprof IBM.1750-75FA120
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Name    AddrDiscovery  LBS
IBM pSeries — AIX  ReportLUN  512
IBM pSeries — pLinux  LUNPolling  512
...
```

managehostconnect

The managehostconnect command modifies the volume group assignment for a SCSI host port.

```
►►──managehostconnect─────────────────────────── -volgrp─┬─ volume_group_ID ─┬─────────────►
                      └─ -dev─ storage_image_ID ─┘              └─ none ─────────────┘

 ►─┬─ port_grp_number ─┬──────────────────────────────────────────────────────────────────►◄
   └─ " - " ───────────┘
```
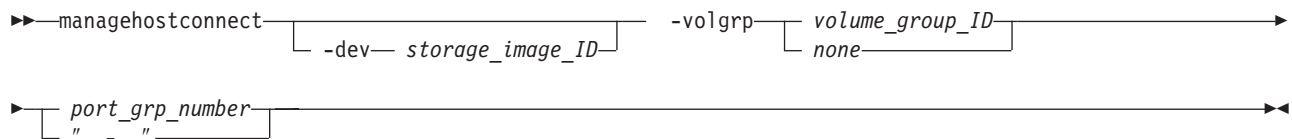
Parameters

Note: The managehostconnect command can be disruptive to host system I/O operations if the affected host port is logged into the target storage unit. Ensure that the host port is offline to the host system before processing the managehostconnect command.

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number.

-volgrp *volume_group_ID | none*
(Required) Specifies that SCSI host port connections that are associated with the specified port group number will be modified to access this volume group ID. A volume group ID is a four-digit decimal number with no leading zeroes, 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) Specifies your number that associates two or more host ports as having access to a common volume group.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the managehostconnect command

```
dscli>managehostconnect -dev IBM.1750-75FA120 -volgrp 10 1
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Port group number 1 successfully modified.
```

mkhostconnect

The mkhostconnect command configures open systems hosts port attachments to fibre channel ports that are configured for FC-AL or SCSI-FCP topology. Open systems hosts port attachments to fibre channel ports are configured for identified access mode and SCSI protocol.
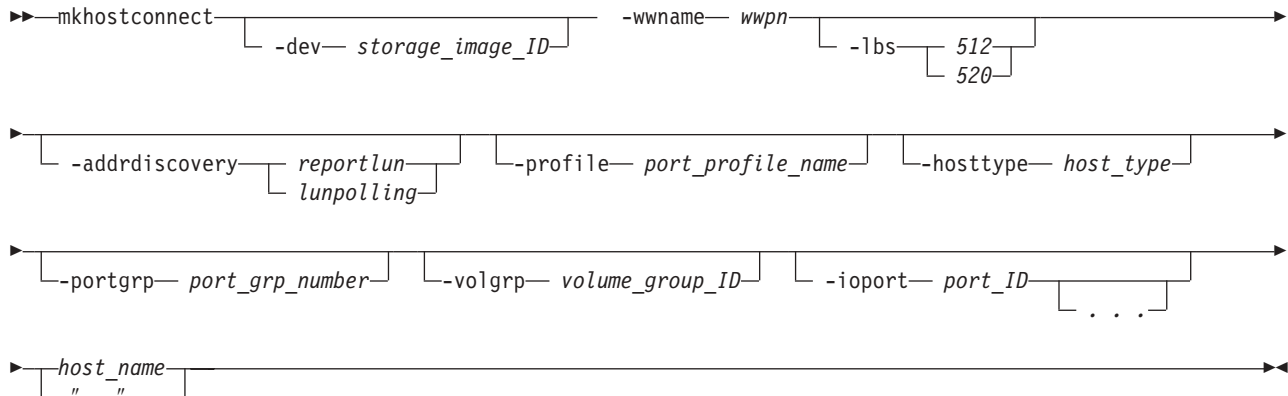
Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes the manufacturer, type, and serial number.

-wwname *wwpn*
> (Required) Specifies the worldwide port name (WWPN). The WWPN is a 16-character hexadecimal ID. The names are host attachment specific; for example, 12341234000A000F.

-lbs *512 | 520*
> (Optional) Specifies the logical block size that is used by this host system, in bytes. The block size must be compatible with the volume group type and the volume type configurations that apply to this host port connection. The 520-byte size is typically used by IBM iSeries™ systems (OS/400®).
>
> **Note:** Do not use the -lbs parameter if you specify the -hosttype parameter.

-addrdiscovery *reportlun | lunpolling*
> (Optional) Specifies the method for discovering logical unit number (LUN) addresses.
> - The reportlun method specifies that the host system can access up to 64K LUNs.
> - The lunpolling method specifies that the host system can access up to 256 LUNs.
>
> For Sun and Windows® operating systems, the lunpolling method is typically selected.
>
> **Note:** 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.) Specifies the name of the host connection behavior profile. If the name includes blank space, enclose the name with double quotation marks. For example, -profile "IBM pSeries – Sun".

Note:

- Do not use the -profile parameter if you specify the -hosttype parameter.
- Use the lsportprof command to get available profiles if you are not using the -hosttype parameter.

-hosttype *host_type*

(Optional) Specifies information about the following three parameters:

- -profile
- -addrdiscovery
- -lbs

When the -hosttype parameter is specified, do not use the -profile, addrdiscovery, or -lbs parameters.

Note: Use the lshosttype command to obtain a list of known host types.

-portgrp *port_grp_number*

(Optional) Specifies the number that associates two or more host ports with access to a common volume group. Port group zero is reserved for ports that have not been associated with a port group.

-volgrp *volume_group_ID*

(Optional) Specifies 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 zeroes, prefixed with the letter V.

A host connection uses only one volume group per storage image; in other words, 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 volume group ID is 65 535, which indicates that a valid volume group is not assigned.

-ioport *port_ID . . .*

(Optional) Specifies all, none, one, or more I/O port IDs that allow host connection access to volumes.

Enter `all` to specify that you want all I/O ports added.

Enter `none` to specify that you do not want I/O ports added. If you do not specify I/O ports, then the image is configured to allow host connection access to the specified volume group using any I/O port that is configured for FC-AL or SCSI-FCP topology.

You can select up to 128 ports for an open systems host attachment assignment. If you enter a list of I/O port IDs, then access from this host connection to the specified volume group is allowed only using the specified list.

A port ID is four hexadecimal characters in the format *EEAP*, where:

- *EE* is an I/O port enclosure number in the range of 00 - 01 (1750 machine types).

- *A* is the adapter number and is specified as 0, 1, 2, or 3 (1750 machine types).
- *″P″* is the port number (0–3).

This number is prefixed with the letter I.

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.

host_name | -
> (Required) Specifies your host system or port name, limited to 16 characters.

> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkhostconnect command
```
dscli>mkhostconnect -dev IBM.1750-75FA120 —wwname 12341234000A000F
 —profile "IBM pSeries — Sun" host_1_port_1
```

The resulting output
```
Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Host connection 0 successfully created.
```

rmhostconnect
The rmhostconnect command removes a SCSI host port connection from a storage image.

```
►►── rmhostconnect───────────────────────────────────────────────────────────►◄
            └─ -dev─ storage_image_ID─┘  └─ -quiet─┘  ┌─host_connection_ID─┐
                                                       └─ ″ - ″ ────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all host connections.

-quiet
> (Optional) Turns off the confirmation prompt.

host_connection_ID | **-**
> (Required) Specifies a fully qualified host connection ID, which consists of the manufacturer, type, and sequence number if the -dev flag is not used. The host_connection *ID* is a unique identifier (0-65,534) within the scope of a storage image. A number (0–65,534) is accepted if the -dev flag is used.

> Alternatively, you can provide input from stdin when the dash (–) is specified

Example (1750)

Invoking the rmhostconnect command
```
dscli>rmhostconnect -dev IBM.1750-75FA120 1
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

```
Are you sure you want to delete Host Connection IBM.1750-75FA120/1? y/n Y
Host Connection IBM.1750-75FA120/1 successfully deleted.
```

showhostconnect

The showhostconnect command displays detailed properties of a storage image host connection.

```
▶▶──showhostconnect───┬────────────────────────┬──┬──────────────────┬── host_connection_ID ──┬──────────────┬──────────────────────◀◀
                      └─ -dev── storage_image_ID─┘  └─ " - " ──────────┘                        └──────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the host connection.

host_connection_ID | **-**
> (Required) Specifies a fully qualified host connection ID, which includes the manufacturer, type, and sequence number if the -dev flag is not used. The host_connection *ID* is a unique identifier (0-65 534) within the scope of a storage image. It accepts a number (0 - 65 534) if the -dev flag is used.
>
> Alternatively, input from stdin is accepted when the dash (–) is specified

Example (1750)

Note: The following tables represent the headers that are displayed on the output report associated with the showhostconnect command using the -l parameter.

Invoking the lshostconnect command

```
dscli>lshostconnect -fullid -dev IBM.1750—75FA120 -l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120
```

Name	ID	WWPN	HostType	LBS	Addrdis covery
My host port 1	IBM.1750-75FA120/1	3007ACF3 0A2399E0	Unknown	512	reportLUN

Profile	portgrp	volgrpID	achtopo	ESSIOport
IBM pSeries - AIX	0	100	SCSI -FCP	I0111,I0121 I0211,I0221

Report column definitions

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

The value represented by the *host_connection_ID* parameter is a unique identifier (0-65 534) within the scope of a storage image.

WWPN
World wide port name (WWPN) for this host system port.

HostType
The name of the Host Type.

"Unknown" is displayed when the information is not available. This 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 iSeries 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 64K LUNs.

Profile
The name of the Host Connection behavior profile.

portgrp
Host Port Group ID. The ID associates a group of SCSI host port objects that are accessing a common volume group. If set to zero, the host port is not associated with any port group.

volgrpID
Volume Group ID. A unique identifier within the DS6000 for the SCSI volume group that this SCSI host port is assigned to.

achtopo
Indicates attached ESS I/O port topology.

ESSIOport
The set of ESS I/O ports that this SCSI host port can log into. "all" indicates that this SCSI host port is allowed to log into any ESS I/O port. A null (-) value indicates that this SCSI host port cannot log into any ESS I/O port.

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) Displays the host types only. You cannot use the -l and -s parameters together.

-l   (Optional) Displays the default output for the specified host type. You cannot use the -l and -s parameters together.

-type *volumeGroup_type*
   (Required) Displays 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 (1750)

Invoking the lshostconnect command

```
dscli>lshosttype -type -l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
```

Name	Profile	AdrDiscovery	LBS	Description
pSeries	IBM pSeries - AIX	reportlun	512	IBM pSeries, RS/6000 and RS/6000 SP Servers (AIX)

Storage configuration commands

This section contains storage configuration commands.

The following commands allow you to configure storage for zSeries and open system hosts.

Array site specific commands

This section contains commands that are used to display array site information.

Use the following commands to display array site image information.

lsarraysite

The lsarraysite command displays a list of array sites and status information for each array site in the list.

```
►►──lsarraysite─────────────────────────────────────────────────────────────►
             └─ -dev─ storage_image_ID─┘   ┌─ -s─┐   └─ -dapair─ dapair_ID─┘
                                            └─ -l─┘
```
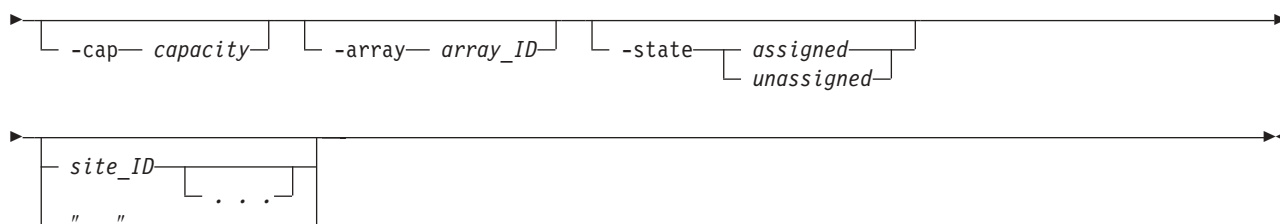
```
  ┌─────────────────────────┐  ┌───────────────────────┐  ┌─────────────┬─ assigned ───┬──►
──┤                         ├──┤                       ├──┤  -state     └─ unassigned ──┘
   └─ -cap── capacity ──┘      └─ -array── array_ID ──┘
```

```
──┬─ site_ID ──┬──────────┬─────────────────────────────────────────────────◄►
  │            └── . . . ──┘
  └── ″ - ″ ──────────────┘
```

Parameters

-dev *storage_image_ID*
>   (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if the qualified site ID is not specified.

-s   (Optional) Displays the array ID. You cannot use the -l and the -s parameters together.

-l   (Optional) Displays the default output and the disk drive module rpm (revolutions per minute). You cannot use the -l and the -s parameters together.

-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 zeroes.

-cap *capacity*
>   (Optional) Displays in GB the array sites that have the specified disk drive module capacity. You can specify up to three digits after the decimal point; for example -cap 144.7.

-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 zeroes, prefixed with the letter ″A″.

-state *assigned | unassigned*
>   (Optional) Displays array sites that are in the specified state.

site_ID . . . | -
>   (Optional) Displays array sites that have the specified IDs. An array site identifier is a four-digit decimal number with no leading zeroes, prefixed by 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.
>
>   Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsarraysite** command using the **-l** parameter. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the lsarraysite command

```
dscli>lsarraysite -fullid -dev IBM.1750-75FA120 -l
```

The resulting output

Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

arsite	DA pair	dkcap (10^9B)	diskrpm	State	Array
IBM.2107-75FA120/ S10	IBM.2107-75FA120 /11	300	15000	assigned	IBM.2107-75FA120 /A100
IBM.2107-75FA120 /S11	IBM.2107-75FA120 /11	300	15000	assigned	IBM.2107-75FA120 /A101
IBM.2107-75FA120 /S12	IBM.2107-75FA120 /12	300	15000	assigned	IBM.2107-75FA120 /A102
IBM.2107-75FA120 /S13	IBM.2107-75FA120 /12	300	15000	assigned	IBM.2107-75FA120 /A103

Report field definitions

arsite   Specifies the array site ID. The array site ID is a four-digit decimal number, with no leading zeros, prefixed by the letter S.

> **Note:** The array site ID does not imply a physical location.

DA pair
Identifies the DA pair ID. DA pairs are located in I/O enclosure pairs. DA pair ID implies 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 (10^9 Byte)
Specifies the minimum disk capacity of the disks in this array site in gigabytes.

diskrpm
Specifies the minimum disk RPM of the disks in this array site.

State   Identifies the array site state. An unassigned array site is available to be defined as an array.

Array   Specifies the array ID that this assigned array site is assigned to. The ID is prefixed by the letter A.

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) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the array site.

site_ID | -

(Required) Displays site information for the specified array site ID. 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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **showarraysite** command. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the showarraysite command

```
dscli>showarraysite -dev IBM.1750—75FA120 S11
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120
```

arsite	DA pair	dkcap (10^9B)	diskrpm	dkinf	dkrate
IBM.2107-75FA120/ S11	IBM.2107-75FA120 /11	146	15000	FC-AL	2

DDMSN	Spares	State	Array
0123456789 ABCDEF	0	Assigned	IBM.2107-75FA120 /A44

Report field definitions

arsite Identifies the array site ID. The array site ID is a four digit decimal number, no leading zeros, prefixed by the letter S.

> **Note:** The array site ID does not imply a physical location.

DA pair

Identifies the DA pair ID. DA pairs are located in I/O enclosure pairs. DA pair ID implies the I/O enclosure location.

dkcap (10^9B)

Specifies the minimum disk capacity of the disks in this array site in gigabytes.

diskrpm

Specifies the minimum disk RPM of the disks in this array site.

dkinf   Identifies the disk interface type for the disks in this array site.

dkrate Specifies the minimum disk interface rate of the disks in this array site.

DDMSN
> Specifies the list of DDM serial numbers that are associated with the array site.

Spares
> Identifies, if any, the number of spare DDMs that are allocated from the array site.

State   Identifies the array site state. An unassigned array site is available to be defined as an array.

Array   Identifies, if any, the array ID that this assigned array site is assigned to. The ID is prefixed by the letter A.
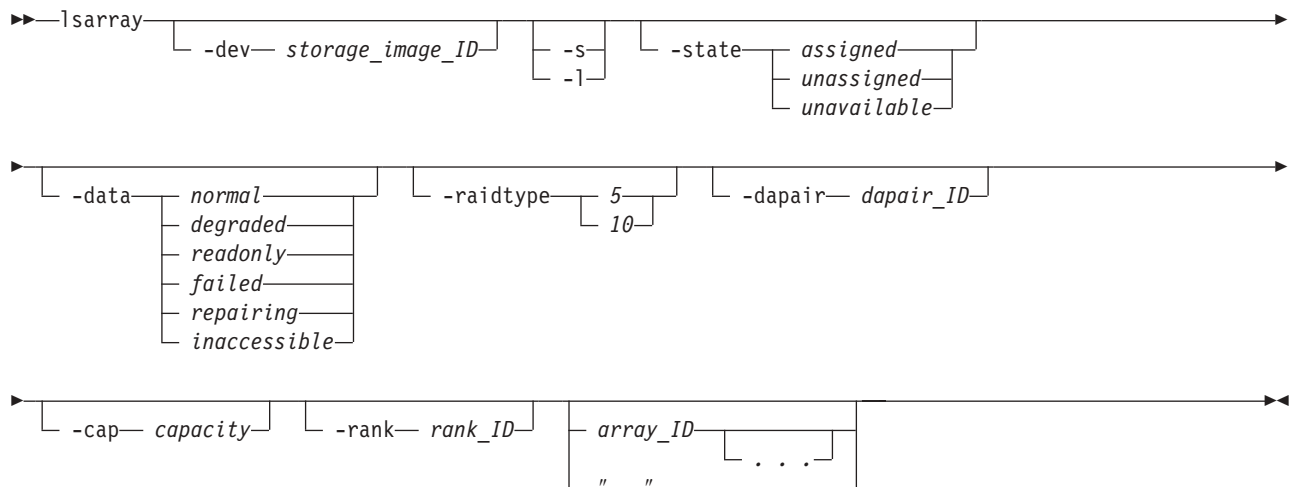
Array specific commands

This section contains commands that are used to create and delete arrays and to display array information.

Use the following commands to create and delete arrays and to display array information.

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) Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if the fully qualified array ID is not specified.

-s   (Optional) Displays the array ID. You cannot use the -l and the -s parameters together.

-l   (Optional) Displays the default output data. You cannot use the -l and the -s parameters together.

-state *assigned | unassigned | unavailable*

> (Optional) Displays the array in the specified state.

-data *normal | degraded | readonly | failed | repairing | inaccessible*

> (Optional) Displays the arrays in the specified data state.

-raidtype *5 | 10*

> (Optional) Displays arrays with the specified RAID type.

-dapair *dapair_ID*

> (Optional) Displays the arrays with the specified device adapter pair ID. A device adapter pair ID is a two-digit decimal number with no leading zeroes.

-cap *capacity*

> (Optional) Displays in GB the arrays with the specified DDM capacity. You can specify up to three digits after the decimal point, for example -cap 144.7.

-rank *rank_ID*

> (Optional) Displays the arrays that are assigned to the specified rank ID. A rank ID is a four-digit decimal number with no leading zeroes, prefixed with the letter ″R″.

array_ID . . . | –

> (Optional) Displays array information for the specified arrays. An array ID is a four-digit decimal number with no leading zeroes, 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 like dscli>lsarray -fullid IBM.1750–75FA120 -l A11 A12 A14-A16
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsarray** command using the **-l** parameter. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the lsarray command

```
dscli>lsarray -dev IBM.1750–75FA120
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750–75FA120
```

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)

arsite	Rank	DA Pair	DDMcap (10^9B)
S20	R11	10	145

arsite	Rank	DA Pair	DDMcap (10^9B)
S21	R12	11	145
S30	R13	20	300
S31	–	21	300

Report field descriptions

Array   Specifies the array number. The array number starts with an A prefix, followed by a four digit decimal number, no leading zeros (for example, A44).

State   Indicates 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.

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 unit 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 or 10) and the array configuration (for example, 6+P).

arsite Indicates the array sites that are associated with the array.

Rank Specifies 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 an R prefix, followed by a four-digit decimal number, with no leading zeros (for example, R26).

DA pair

Identifies the DA pair ID. DA pairs are located in I/O enclosure pairs. DA pair ID implies 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 (10^9 Byte)

Indicates the minimum disk capacity (10^9 Byte) of the storage devices (DDMs) in this array.

mkarray

The mkarray command creates arrays.

```
►►─mkarray─┬────────────────────────┬─ -raidtype ─┬─ 5 ──┬─ -arsite ─ array_site ─┬──────────┬─►◄
           └─ -dev ─ storage_image_ID ─┘           └─ 10 ─┘                        └─ . . . ─┘
```

Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified array site.

-raidtype *5 | 10*

(Required) Specifies a RAID type for the array.

-arsite *array_site | . . .*

(Required) Specify one or two array sites for IBM 1750 Raid types 5 and 10. If 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 zeroes, prefixed with the letter ″S″. Two arraysites must be separated by commas with no white space in between. Example: S10,S11.

Example (1750)

Invoking the mkarray command

```
dscli>mkarray -dev IBM.1750—75FA120 -raidtype 10 -arsite S10,S11
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120

Array A10 successfully created.
```

rmarray

The rmarray command deletes arrays.

```
►►──rmarray──┬─────────────────────────┬──┬─────────┬──┬──array_ID──┬──────────┬──────────────────►◄
             └─ -dev── storage_image_ID─┘  └─ -quiet─┘  │            └─ . . . ──┘
                                                        └── " - " ──────────────┘
```

Parameters

-dev *storage_image_ID*
: (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for all array IDs.

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

array_ID . . . | -
: (Required) Specifies 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 flag 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.

  Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the rmarray command

```
dscli>rmarray -dev IBM.1750—75FA120 A44
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750—75FA120

Are you sure you want to delete array IBM.1750—75FA120/A44? [y/n]: Y

Array Storage Image ID/A44 successfully deleted.
```

showarray

The showarray command displays detailed properties of a specific array.

```
►►──showarray──┬─────────────────────────┬──┬──array_ID──┬──────────────────────────────────────►◄
               └─ -dev── storage_image_ID─┘  └── " - " ───┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the array.

array_ID | -
> (Required) Specifies the array IDs of the arrays that you want to view. 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″.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **showarray** command. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the showarray command

```
dscli>showarray  -dev IBM.1750-75FA120 A44
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

Array	SN	State	datastate	RaidType	arsite
IBM.2107-75FA120/A44	AZ123AQ	Available	Normal	5 (6+P)	S21

Table 3.

Rank	DA pair	DDMcap (10^9B)	DDMRPM	Interface Type	Interrate (GB/secs)
2107-75FA123/R26	2107-75FA123/11	145	15000	FCAL	2

Report field definitions

Array Identifies the array ID number. The array ID number starts with an A prefix, followed by a four-digit decimal number, no leading zeros (for example, A44).

SN Identifies the unique internal identifier for the data space of this array (for example, AZ123AQ).

State Indicates 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.

datastate

This value reflects 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 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 state 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 unit cannot access a set of storage devices that are sufficient to access all the data on the array.

RaidType

Indentifies the type of RAID array (5 or 10) and the array configuration (for example, 6+P).

arsite Indentifies the array sites that are associated with the array.

Rank Identifies 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 an R prefix, followed by a four-digit decimal number, with no leading zeros (for example, R26).

> **Note:** If the array is unassigned, the field is null (–)

DA pair
> Identifies 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 will be 2.

DDMcap (10^9B)
> Indicates the minimum disk capacity (10^9B) of the storage devices (DDMs) in this array.

DDMRPM
> Indicates the minimum disk RPM of the DDMs in this array.

Interface Type
> Indicates the disk interface type of the DDMs in this array

Interrate
> Indicates the minimum disk interface rate of the disks in this array.

Rank specific commands

This section contains commands that are used to create, modify, and delete ranks and to display rank information.

Use the following commands to create, modify, and delete ranks and to display rank information.

chrank

The chrank command assigns an unassigned rank to a extent pool, or removes an assigned rank from a extent pool. This action can change an assigned rank to an unassigned rank.

```
►►─chrank─┬──────────────────────────┬─┬──────────┬─┬──────────┬─┬───────────┬─►
          └─-dev── storage_image_ID──┘ └─-reserve─┘ └─-release─┘ └─-unassign─┘

►─┬──────────────────────────────┬─┬──rank_ID──┬────────────────────────────────►◄
  └─-extpool── extentpool_ID──────┘ └──" - "────┘┬──────────┬
                                                 └── . . .──┘
```
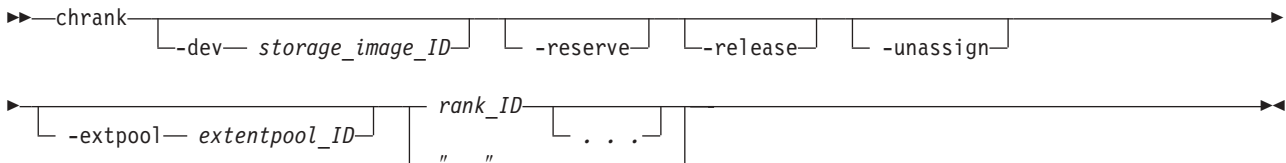
Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all ranks; otherwise, it is optional.

> Example: IBM.1750-75FA120

-reserve
> (Optional) Specifies that the rank configuration state be set to Reserved.

-release
　　(Optional) Specifies that the rank configuration state be set to Normal.

-unassign
　　(Optional) Specifies that the rank configuration state be set to Unassigned.

-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 flag is used. The shortened version is a four-digit decimal number with no leading zeroes, prefixed with the letter P.

rank_ID . . . | -
　　(Required) Specifies one or more ranks to be modified. Accepts either a fully qualified rank ID, or a rank number if the -dev flag 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.

　　Example: IBM.1750-75FA120/R2

　　Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chrank command
```
dscli>chrank -dev IBM.1750-75FA120  -extpool P101 R2
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Rank IBM.1750-75FA120/R2 successfully modified.
```

lsrank
The lsrank command displays a list of defined ranks in a storage image and status information for each rank.
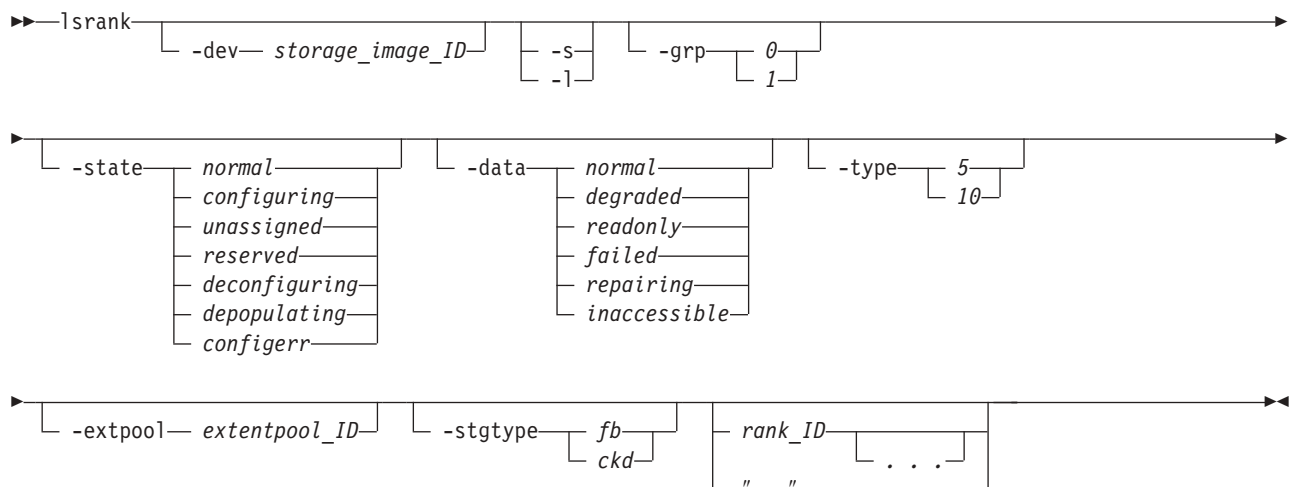
Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.
>
> Example: IBM.1750-75FA120

-s (Optional) Displays the rank ID. You cannot use the -l and the -s parameters together.

-l (Optional) Displays the default output, extent pool name, number of extents, and extents that are used 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 | configuring | unassigned | reserved | deconfiguring | | depopulating configerr*
> (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 | 10*
> (Optional) Displays only ranks of the specified RAID type.

-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 zeroes, prefixed with the letter P.

-stgtype *fb | ckd*
> (Optional) Displays only ranks that are configured for the specified storage type.

rank_ID . . . | –
> (Optional) Displays 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.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example: IBM.1750-75FA120

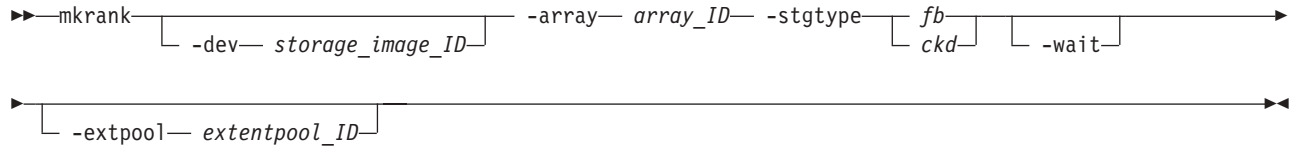### Example (1750)

Invoking the lsrank command

```
dscli>lsrank -dev IBM.1750-75FA120 -l -fullid
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
ID   Group State datastate Array RAID Type extentpoolID
 extpoolnam stgtype exts usedexts
IBM.1750-75FA120/R1 0 Normal Normal  A1 5  P1
 host_1_volumes  fb  1,000 500
IBM.1750-75FA120/R2 0 Normal Normal  A2 5  P1
 host_1_volumes  fb  1,000 500
IBM.1750-75FA120/R3 0 Normal Normal  A3 5  P1
 host_1_volumes  fb  1,000 500
IBM.1750-75FA120/R4 0 Normal Normal  A4 5  P1
 host_1_volumes  fb  1,000 500
```

mkrank

The mkrank command creates one fixed block or count key data (CKD) rank from one array.

```
►►──mkrank─────────────────────────────────────────────┬───────────┬──┬─────────┬──►
                   └─ -dev── storage_image_ID─┘  └─ -array── array_ID── -stgtype──┬─ fb─┬─┘  └─ -wait─┘
                                                                                  └─ ckd─┘

►────────────────────────────────────────────────────────────────────────────►◄
        └─ -extpool── extentpool_ID─┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.

-array *array_ID*
> (Required) Specifies 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 zeroes, prefixed with the letter A.

-stgtype *fb* | *ckd*
> (Required) Specifies the type of extent for which the rank will be configured, either fixed block or count key data.

-wait
> (Optional) Delays the command response until the rank configuration process completes.

-extpool *extentpool_ID*
> (Optional) Specifies the extent pool that contains the created rank extents. If an extent pool is specified, then the rank will be assigned to the extent pool. Otherwise, the rank state is unassigned. If specified, the extent pool must exist and must be compatible with the specified -stgtype option. An extent pool ID is a four-digit decimal number with no leading zeroes, prefixed with the letter P.

> **Note:** You will need to use the chrank command if you choose to specify the extent pool ID at a later time.

Example (1750)

Invoking the mkrank command
```
dscli>mkrank -dev IBM.1750-75FA120 -array A44 -stgtype fb
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Device: IBM.1750-75FA120

Rank IBM.1750-75FA120/R44 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.

```
▶▶──rmrank──────────────────────────────────────────────────────────────────────▶◀
            └─ -dev── storage_image_ID─┘  └─ -quiet─┘  ┌─ rank_ID ─┐
                                                       │           └── . . . ─┐
                                                       └─ " - " ──────────────┘
```

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 piece 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 processing the array cannot be removed or assigned to another rank. Also, until this process is fully completed, the array is listed as assigned to the rank from which it is has been removed. Using the **lsarray** command, you can continue to check on the progress of the processing. When you no longer see the array that is assigned to the rank from which you removed it, the remove rank process is complete.

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

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all ranks; otherwise, it is optional.

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

rank_ID . . . | -
> (Required) An array of one or more ranks to be deleted. Accepts a fully qualified rank ID, which includes the storage image ID, or a shortened version without the storage image ID if the -dev flag 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.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

**Invoking the rmrank command**
```
dscli>rmrank -dev IBM.1750-75FA120 R23
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Are you sure you want to delete rank R23? [y/n]: Y
```

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Rank R23 successfully deleted.
```

showrank

The showrank command displays detailed properties or performance metrics of a rank.

```
►►—showrank————————————————————————————————————————————————————————►◄
           └─ -dev— storage_image_ID─┘  └─ -metrics─┘  ─ rank_ID─
```
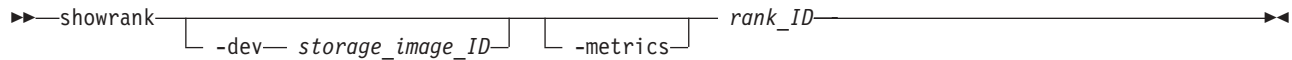
Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the rank; otherwise, it is optional.

-metrics
> (Optional) Displays 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 failback sequence

rank_ID
> (Required) Shows the properties for the rank specified. 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 (1750)

Invoking the showrank command to show rank properties
```
dscli>showrank -dev IBM.1750-75FA120 -fullid R34
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID   Storage Image ID/R34
SN   A23567
Group  0
State  Normal
datastate Normal
Array  IBM.1750-75FA120/A44
RAIDtype 10
extpoolID IBM.1750-75FA120/P48
extpoolnam host_4_extpool
volumes     IBM.1750-75FA120/R7
stgtype FB
exts  1,000
usedexts 500
widearrays 1
nararrays 0
trksize  128
strpsize 4
strpesize 4
extsize  16,384
```

Invoking the showrank command to show performance metrics

```
dscli>showrank -dev IBM.1750-75FA120  -metrics R34
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID IBM.1750-75FA120/R1
Date 10/11/04 02:23:47
byteread 10000
bytewrite  10000
Reads 10000
Writes 10000
timeread 10000
timewrite 10000
```
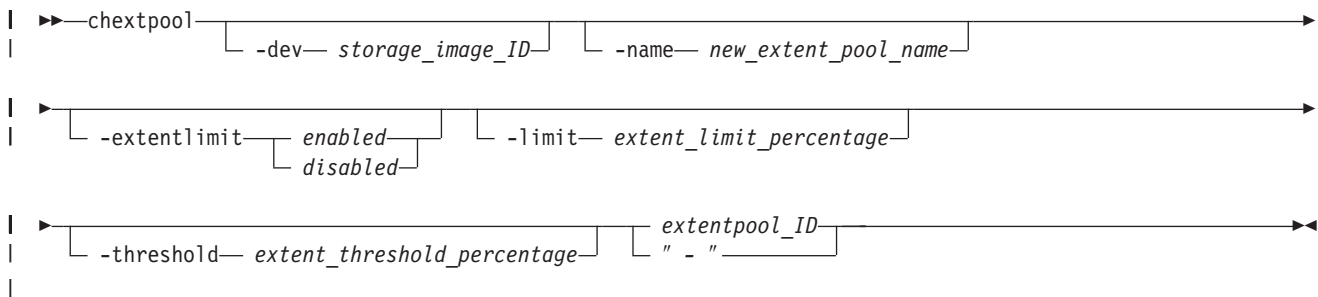
Extent pool specific commands

This section contains commands that are used to create, modify, and delete extent pools and to display extent pool information.

Use the following commands to create, modify, and delete extent pools and to display extent pool information.

chextpool

The chextpool command modifies an extent pool name.

```
►►──chextpool─────────────────────────────────────────────────────►
            └─-dev─ storage_image_ID─┘   └─-name─ new_extent_pool_name─┘

►────────────────────────────────────────────────────────────────►
  └─-extentlimit─┬─ enabled─┬─┘   └─-limit─ extent_limit_percentage─┘
                 └─ disabled─┘

►──────────────────────────────────────────┬─ extentpool_ID─┬─────►◄
  └─-threshold─ extent_threshold_percentage─┘   └─ " - "─────┘
```

Parameters

-dev *storage_image_ID*
    (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the extent pool; otherwise, it is optional.

-name *new_extent_pool_name*
    (Optional) Specifies a new name for the extent pool.

    Note: To change any other extent pool attributes, you must delete the extent pool and create a new one.

-extentlimit *enabled* | *disabled*
    (Optional) Specifies that the extent limit function be enabled or disabled.

-limit *extent_limit_precentage*
    (Optional) Specifies the maximum value of the percentage of allocated real extents that are allowed in this extent pool.

-threshold *extent_threshold_precentage*
    (Optional) Specifies threshold as a percentage of the available real extents that is compared to the actual percentage of available real extents.

extentpool_ID | –
> (Required) Specifies the ID of the extent pool to be changed. 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.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chextpool command
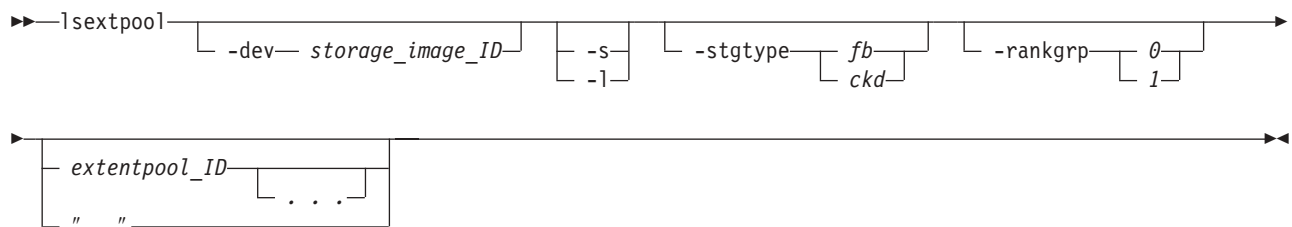
```
dscli>chextpool -name host_4_extpool IBM.1750-75FA120/P21
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Extent Pool IBM.1750-75FA120/P21 successfully modified.
```

lsextpool

The lsextpool command displays a list of extent pools in a storage image and status information on each extent pool in the list.

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number.

-s (Optional) Displays extent pool IDs. You cannot use the -l and the -s parameters together.

-l (Optional) Displays default output plus additional attributes that are identified as long output. 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.

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.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsextpool** command using the -l parameter. A separate example is not shown for the 1750 as the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the lsextpool command

```
dscli>lsextpool -dev IBM.2107-75FA120 -l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

Name	ID	Stgtype	Rankgrp	Status	Avail-stor (2^30B)
host_1 _extpool	IBM.2107-75FA120 /P21	fb	0	exceeded	1000
host_1 _extpool	IBM.2107-75FA120 /P22	fb	1	exceeded	1000
host_2 _extpool	IBM.2107-75FA120 /P23	fb	0	exceeded	1000
host_2 _extpool	IBM.2107-75FA120 /P24	fb	1	exceeded	1000
host_3 _extpool	IBM.2107-75FA120 /P25	fb	0	exceeded	1000
host_3 _extpool	IBM.2107-75FA120 /P26	fb	1	exceeded	1000

%allo-cated	Avail-able	Reser-ved	Num-vols	Num-ranks
10	1000	100	4	4
10	1000	100	4	4
10	1000	100	4	4
10	1000	100	4	4
10	1000	100	4	4
10	1000	100	4	4

Report field definitions

Name Identifies the name you assigned to the extent pool.

ID Specifies the system assigned unique identifier for the extent pool object.

stgtype

Identifies the storage type associated with the extent pool. One of the following is displayed:

- fb
- ckd

rankgrp

Specifies the rank group in which the designated extent pool is configured.

Status

Specifies the extent status. One of the following values is displayed:

exceeded

Specifies that the %Extents available is greater than the extent threshold

below

Specifies that the %Extents Available is less than the extent threshold

full

Specifies that the %Extents Available is 0.

availstor (2^30 Bytes)

Specifies the available storage for the designated extent pool, in gigabytes (2 ^ 30 Bytes).

%allocated

Specifies the percentage of extents allocated.

available

Specifies the maximum number of extents available for allocation in the designated extent pool.

reserved

Specifies the extents reserved in the designated extent pool.

numvols

Identifies the number of logical volumes that have been configured from the designated extent pool.

numranks

Identifies the number of ranks that have been configured in the designated extent pool.

mkextpool

The mkextpool command creates a fixed block or count key data (CKD) storage type extent pool.

```
►►─mkextpool──────────────────────────── -rankgrp─┬─0─┬── -stgtype─┬─fb──┬─────────►
              └─ -dev── storage_image_ID─┘         └─1─┘            └─ckd─┘

►─┬───────────────────────────────┬──┬──────────────────────────────────┬──────────►
  └─ -extentlimit─┬─enabled──┬─────┘  └─ -limit── extent_limit_percentage─┘
                  └─disabled─┘

►─┬──────────────────────────────────────────────┬── extent_pool_name── "-" ──────►◄
  └─ -threshold── extent_threshold_percentage─────┘
```

Parameters

Note:

- An extent pool object is assigned to either rank group 0 or 1, which allows the extent pool to be managed by storage unit server 0 or 1 respectively.
- Create extent pool objects before creating array and rank objects.
- Create extent pools of a given type for both rank groups 0 and 1 so that volumes that are assigned to a volume group can be spread across both rank groups 0 and 1.

-dev *storage_image_ID*
    (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.

-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 in order 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 so that volumes that are assigned to a volume group might be spread across both rank groups 0 and 1.

-stgtype *fb | ckd*
    (Required) Specifies the volume storage type that is contained by this extent pool.

-extentlimit *enabled | disabled*
    (Optional) Specifies that the extent limit function be enabled or disabled. Disabled is the default.

-limit *extent_limit_precentage*
    (Optional) Specifies 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_precentage*
    (Optional) Specifies threshold as a percentage of the available real extents that is compared to the actual percentage of available real extents.

extent_pool_name | –
    (Required) Specifies your extent pool name, which is limited to 16 characters.

    Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkextpool command
```
dscli>mkextpool -dev IBM.1750-75FA120 -rankgrp 0 -stgtype fb my_extpool
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Extent pool P2 successfully created.
```

rmextpool
The rmextpool command deletes extent pools from a storage image.
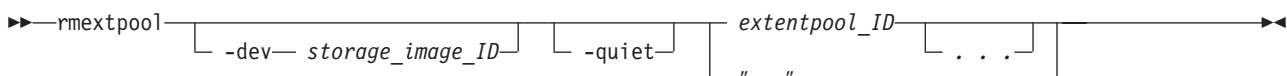
```
►►─rmextpool──┬────────────────────────┬──┬────────┬──┬─extentpool_ID─┬──┬─────────┬──►◄
              └─ -dev─ storage_image_ID─┘  └─ -quiet─┘  │               └─ . . .─┘  │
                                                        └─ " - "────────────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all extent pools; otherwise, it is optional.

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

extentpool_ID . . . | –
> (Required) Specifies 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 flag 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.

> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the rmextpool command

```
dscli>rmextpool IBM.1750-75FA120/P101
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Are you sure you want to delete extent pool IBM.1750-75FA120/P101? [y/n]: Y

Extent pool IBM.1750-75FA120/P101 successfully deleted.
```

showextpool

The showextpool command displays detailed properties or performance metrics of an extent pool.

```
►►── showextpool ──┬──────────────────────────┬──┬──────────┬──┬── extentpool_ID ──┬───────────────►◄
                   └─ -dev ── storage_image_ID ┘  └ -metrics ┘  └─ " - " ───────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the extent pool; otherwise, it is optional.

-metrics
> (Optional) Displays the extent pool ID and performance metrics for the specified extent pool.

Note: All performance metrics are an accumulation since the most recent counter wrap or counter reset. The extent pool performance counters are reset on the following occurrences:

- The storage unit is powered-up.
- A server has failed and the failover and failback sequence is performed.

.

extentpool_ID | -

(Required) Specifies the extent pool to be displayed. 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 zeroes, 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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output reports that are associated with the **showextpool** command. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the model number designation, 2107 versus 1750.

Invoking the showextpool command to show extent pool properties

```
dscli>showextpool -dev IBM.1750-75FA120 P101
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

Name	ID	stgtype	totlstor (2^30B)	availstor (2^30B)	resvdstor (2^30B)	rankgrp
host_4 _extpool	IBM.2107- 75FA120 /P21	fb	1000	800	0	0

num ranks	numvols	status	%allo- cated	%avail- able	config- ured	allowed	avail- able
4	3	exceeded	20	80	1000	600	800

allocated	reserved	%limit	%thres- hold
200	0	80	70

Report field definitions

Name Identifies the name you assigned to the extent pool.

ID Specifies the system assigned unique identifier for the extent pool object.

stgtype

Identifies the storage type associated with the extent pool. One of the following is displayed:

- fb
- ckd

totlstor (2^30 Bytes)
> Specifies the amount of storage associated with the extent pool, in gigabytes.

availstor (2^30 Bytes)
> Specifies the available storage for the designated extent pool, in gigabytes.

resvdstor (2^30 Bytes)
> Specifies the amount of reserved storage for the designated extent pool, in gigabytes.

rankgrp
> Specifies the rank group in which the designated extent pool is configured.

numranks
> Specifies the number of ranks configured in the designated extent pool.

numvols
> Identifies the number of logical volumes that have been configured from the designated extent pool.

status Specifies the extent status. One of the following values is displayed:

> **exceeded**
> > Specifies that the %Extents available is greater than the extent threshold

> **below**
> > Specifies that the %Extents Available is less than the extent threshold

> **full**
> > Specifies that the %Extents Available is zero.

%allocated
> Specifies the percentage of extents allocated. A value of 1 - 100 is displayed.

%available
> Specifies the percentage of extents available. A value of 1 - 100 is displayed.

configured
> Specifies the number of extents contained in the extent pool.

allowed
> Specifies the number of extents that are below the applicable extent limit.

available
> The number of extents of a given type that are available for allocation to a logical volume.

allocated
> Specifies the number of extents of a given type in the extent pool that are allocated to a logical volume or meta-volumes.

reserved
> Specifies the number of unallocated extents of a given type in the extent pool that are on ranks of the same extent type that are in the reserved state. In addition, the number of unallocated extents above the applicable extent limit on ranks of the same extent type that are not in the reserved state are included in this value.

%limit Specifies the maximum percentage of allocated real extents that are allowed in this extent pool.

%threshold
> Specifies threshold as a percentage of the real extents available that is compared to the actual percentage of real extents available.

Performance request

Invoking the showextpool command to show performance metrics

```
dscli>showextpool -metrics -fullid IBM.1750-75FA120/P101
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

ID	Date	real extcap	realext	real allocext	real extconv
IBM.2107-75FA120 /P101	10/11/04 02:23:47	10000	10000	10000	10000

dyreloc source	dyreloc target
10000	10000

Report field definitions

ID Specifies the system assigned unique identifier for the extent pool object.

Date Identifies the current time stamp for the extent pool performance counters.

realextcap
> Specifies the real extent pool capacity in gigabytes.

realext
> Specifies the number of real extents in the extent pool.

realallocext
> Specifies the number of real allocated extents in the extent pool..

realextconv
> Specifies real extent conversions.

dyrelocsource
> Specifies the number of extents that were sources of a dynamic extent relocation

dyreloctarget
> Specifies the number of extents that were targets of a dynamic extent relocation

Address group specific commands

This section contains commands that are used to display address group information.

Use the following commands to display address group information.

lsaddressgrp

The lsaddressgrp command displays a list of address groups for a storage image and status information for each address group in the list.

```
►►─lsaddressgrp─────────────────────────────────────────────────────────────────►◄
              └─-dev─ storage_image_ID─┘  ┌─-s─┐  └─-stgtype─┬─ fb ─┐
                                          └─-l─┘             └─ ckd─┘
```
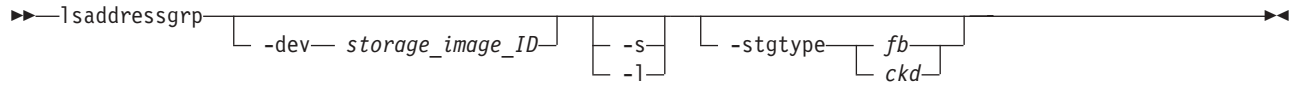
Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. Displays only the objects for the storage unit specified.
>
> Example: IBM.1750-75FA120

-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 with the specified storage type.
>
> Alternatively, accepts input from stdin if the dash (–) is specified.

Example (1750)

Invoking the lsaddressgrp command

```
dscli>lsaddressgrp  -dev IBM.1750-75FA120 -l -fullid
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID stgtype basevolnum Vols LSSs confgvols
IBM.1750-75FA120/0 fb 0000 4096 16 4096
IBM.1750-75FA120/1 fb 0100 4096 16 4096
IBM.1750-75FA120/2 ckd 0200 4096 16 4096
IBM.1750-75FA120/3 ckd 0300 4096 16 4096
```

Logical control unit specific commands

This section contains commands that are used to create, modify, and delete logical control units for zSeries systems and to display logical control unit information.

Use the following commands to create, modify, and delete logical control units and to display logical control unit information.

chlcu

The chlcu command modifies a logical control unit.
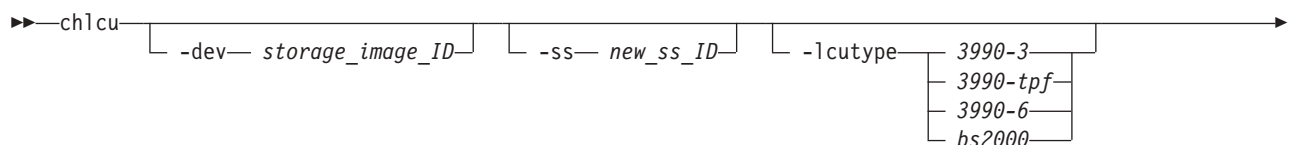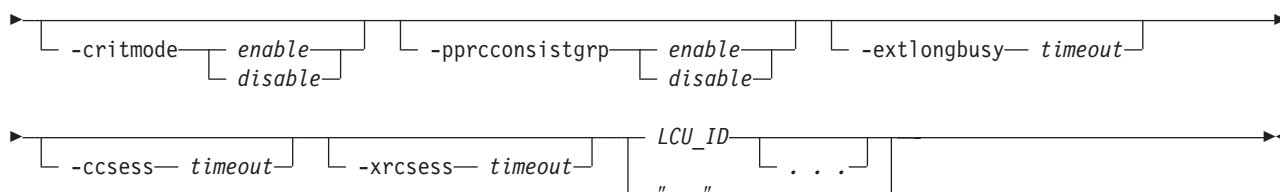
```
►►─chlcu──────────────────────────────────────────────────────────────────────►
         └─-dev─ storage_image_ID─┘  └─-ss─ new_ss_ID─┘  └─-lcutype─┬─ 3990-3 ──┐
                                                                    ├─ 3990-tpf─┤
                                                                    ├─ 3990-6 ──┤
                                                                    └─ bs2000 ──┘
```

```
    ┌─ -critmode ─┬─ enable ──┬─      ┌─ -pprcconsistgrp ─┬─ enable ──┬─     ┌─ -extlongbusy ─ timeout ─┐
────┤             └─ disable ─┘       │                   └─ disable ─┘     │                           ├───►
    └───────────────────────────────  └──────────────────────────────────  └───────────────────────────┘

    ┌─ -ccsess ─ timeout ─┐   ┌─ -xrcsess ─ timeout ─┐   ┌─ LCU_ID ─────────────┐
──►─┤                     ├───┤                      ├───┤         ┌─ . . . ─┐   ├───►◄
    └─────────────────────┘   └──────────────────────┘   └─ " - " ─┴─────────┘───┘
```

Parameters

-dev *storage_image_ID*
:   (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number.

    Example: IBM.1750-75FA120

-ss *new_ss_ID*
:   (Optional). Specifies your new LCU subsystem ID value (valid range is hexadecimal '0x0001 - 0xFFFF'). If this flag is specified, multiple LCUs are not allowed. The new SID 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*
:   (Optional). Updates the critical mode setting in the target LCUs. Critical mode controls the behavior of the remote mirror and copy (formerly PPRC) pairs that have a primary logical volume on this LCU that are in an LCU consistency group.

-pprcconsistgrp *enable | disable*
:   (Optional). Enables a volume that is associated with a logical subsystem and becomes suspended to enter an extended long busy state if it has not received a notification that a consistency group has been created.

-extlongbusy *timeout*
:   (Optional). Specifies 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). Sets the Copy Services parameter to the time in seconds that any LCU volume in a concurrent copy session stays long busy before suspending a concurrent copy session. The valid timeout range is 1 - 9999 seconds.

    Example: 500

-xrcsess *timeout*
> (Optional). This Copy Services parameter is the time in seconds that any LCU volume in an XRC session stays long busy before suspending an XRC session. The valid timeout range is 1 - 9999 seconds.
>
> Example: 500

LCU_ID . . . | -
> (Required). Specifies one or more LCUs that are to be modified by this command. An LCU ID is two hexadecimal characters '0-x00 - 0xFE'. You must separate multiple IDs and multiple ID ranges with a space. Accepts a fully qualified LCU ID, or a shortened version if the -dev flag 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.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example: 00-03 08

Example (1750)

Invoking the chlcu command
```
dscli>chlcu -dev IBM.1750-75FA120 -critmode enable 00-0F
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

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.
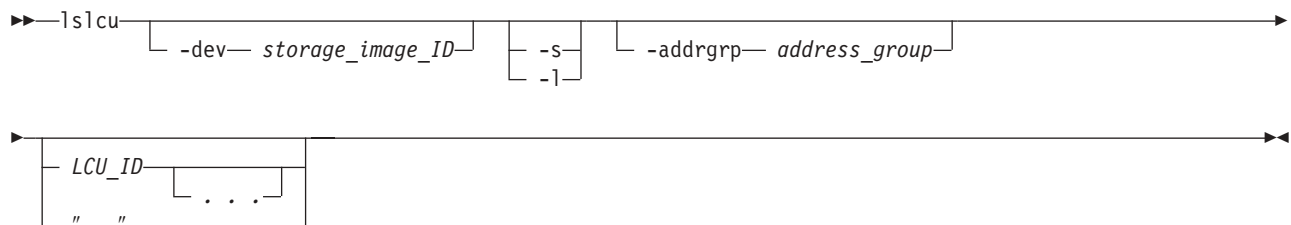
Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. Displays only the objects for the storage unit that is specified.
>
> Example: IBM.1750-75FA120

-s (Optional). Use this parameter to display LCU IDs only. You cannot use the -l and the -s flags together.

-l
(Optional). Use this parameter to display the default output. You cannot use the -l and the -s flags together.

-addgrp *address_group*
(Optional). Specifies 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.

LCU_ID . . . | -
(Optional). Specifies the ID associated with an LCU. An LCU ID is two hexadecimal characters '0x00 - 0xFE'.

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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example: 00-03 08

Example (1750)

Invoking the lslcu command
```
dscli>lslcu -dev IBM.1750-75FA120 -l
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID   Group addrgrp confgvols subsys
 conbasetype
IBM.1750-75FA120/10 0 0   256         8010
 3990-6
IBM.1750-75FA120/11 1 0   256         8011
 3990-6
IBM.1750-75FA120/12 0 0   256         8012
 3990-6
IBM.1750-75FA120/13 1 0   256         8013
 3990-6
```

mklcu
The mklcu command creates a logical control unit (LCU) in a storage image.

```
▶▶──mklcu── -dev── storage_image_ID── -qty── quantity── -id── lcu_ID── -ss── ss_ID──────────────────▶

▶──┬─────────────────────────────┬──┬────────────┬──┬───────────────────┬──┬─────────────────────────┬──▶
   └─-lcutype──┬─ 3990-3 ─┬──┘    └─-critmode─┘    └─-pprcconsistgrp─┘    └─-extlongbusy── timeout─┘
               ├─ 3990-tpf─┤
               ├─ 3990-6 ─┤
               └─ bs2000 ─┘

▶──┬──────────────────────┬──┬────────────────────┬─────────────────────────────────────────────────────▶◀
   └─-ccsess── timeout─┘    └─-xrcsess── timeout─┘
```
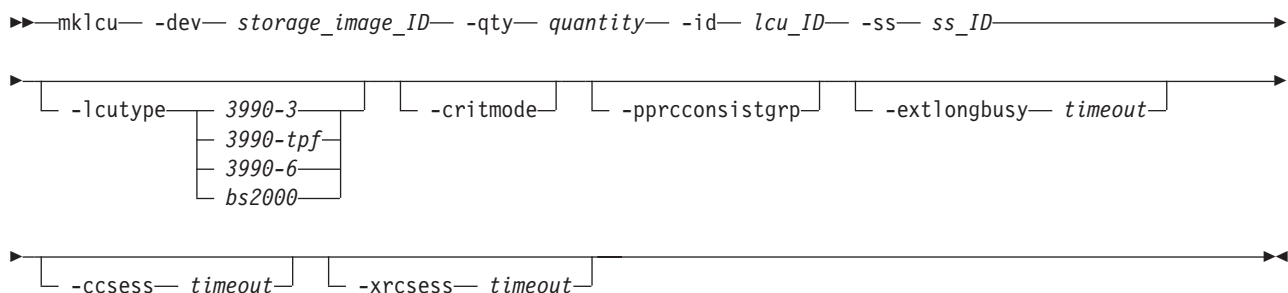
Parameters

Note:

    1. A logical control unit is configured to represent a grouping of logical CKD volumes.

2. Multiple sequential LCU IDs may be created with a single request, but all logical control units must be of the same type and specify the same options.

-dev *storage_image_ID*
(Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number.

Example: IBM.1750-75FA120

-qty *quantity*
(Required). Specifies the number of LCU IDs to be created. The valid range is 1 - 64.

This command is rejected if any of the LCU IDs, based on starting LCU ID and Quantity, are currently defined, or outside the range of supported LCU IDs. The valid LCU ID range is '0x00 – 00-3F'.

Example: 16

-id *lcu_ID*
(Required). Specifies the LCU ID to be created, or the first LCU ID in a sequence of LCU IDs to be created. A LCU ID is two hexadecimal characters '0x00 - 0x40'.

Example: 00

-ss *ss_ID*
(Required). Specifies the LCU subsystem ID. A subsystem ID is four hexadecimal characters '0x0001 - 0xFFFF'. If multiple LCU IDs are being created, then this value increments for each additional LCU ID that is created.

If 16 LCUs are created, starting with SSID 0x10, then the SSID values will be '0x0010 – 0x001F'.

Example: 0010

-lcutype *3990-3 | 3990-tpf | 3990-6 | bs2000*
(Optional). Creates LCUs of this type:

3990-3
type 3990 model 3

3990-tp
type 3990 model 3 for tpf

3990-6
type 3990 model 6

bs2000
type bs 2000

-critmode
(Optional). Enables critical mode to control 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.

-pprcconsistgrp
(Optional). Enables a volume that is associated with a logical subsystem and becomes suspended to enter an extended long busy state if it has not received a notification that a consistency group has been created.

-extlongbusy *timeout*
(Optional). Specifies 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). Specifies the Copy Services parameter as the time in seconds that any LCU volume in a concurrent copy session stays long busy before suspending a concurrent copy session. The valid timeout range is 1 - 9999 seconds.

Example: 500

-xrcsess *timeout*
(Optional). Specifies the Copy Services parameter as the time in seconds that any LCU volume in an XRC session stays long busy before suspending an XRC session. The valid timeout range is 1 - 9999 seconds.

Example: 500

Example (1750)

Invoking the mklcu command

```
dscli>dscli>mklcu -dev IBM.1750-75FA120 -qty 16 -id 00 -ss FF00
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

LCU 00 successfully created.
LCU 01 successfully created.
...
LCU 0F successfully created.
```

rmlcu
The rmlcu command deletes existing logical control units.
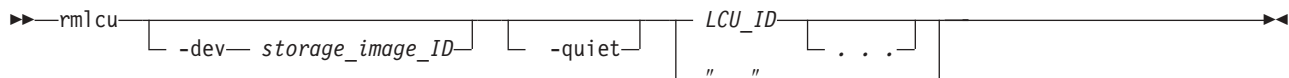
Parameters

-dev *storage_image_ID*
(Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all logical control units.

Example: IBM.1750-75FA120

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

LCU_ID . . . | -
(Required). An array of one or more LCUs to be removed. Accepts a fully qualified LCU ID or a shortened version, if the -dev flag is specified. A LCU ID is two hexadecimal characters in the range ″0x00 – 0xFE″.

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

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the rmlcu command

```
dscli>rmlcu -dev IBM.1750-75FA120 00-0F
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Are you sure you want to delete LCU 00 ? 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).

```
►►─showlcu──────────────────────────────────┬─LCU_ID─┬────────────────►◄
             └─ -dev── storage_image_ID─┘   └─ " - " ─┘
```

Parameters

-dev *storage_image_ID*
   (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the logical control unit.

   Example: IBM.1750-75FA120

LCU_ID | -
   (Required). Displays the properties for the specified logical control unit. 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 flag is specified.

   Alternatively, accepts input from stdin when the dash (–) is specified.

   Example: IBM.1750-75FA120/10

Example (1750)

Invoking the showlcu command

```
dscli>showlcu -dev IBM.1750-75FA120 10
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID   IBM.1750-75FA120/10
Group   0
addrgrp   1
confgvols   256
subsys   0010
conbasetype   3990-6
pprcconsistgrp Disabled
```

```
xtndlbztimout (secs) 120
ccsesstimout (secs) 300
xrcsesstimout (secs) 300
crithvmode  Disabled
```

CKD logical volume specific commands

This section contains commands that are used to create, modify, and delete count key data (CKD) logical volumes for zSeries systems and to display logical volume information.

Use the following commands to create, modify, and delete count key data logical volumes and to display logical volume information.

chckdvol

The chckdvol command changes the name of a count key data (CKD) base volume.

```
►►─chckdvol──────────────────────── ─-name── new_volume_name── ┬─ volume_ID─┬──────► ─►◄
             └─-dev── storage_image_ID─┘                        │      └─ . . .─┘     │
                                                                └─ ″ - ″─────────────┘
```

Parameters

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified volume_ID.

-name *new_volume_name*
(Required) User specified nickname for this CKD base volume. This nickname should not exceed 16 characters. It may contain one of the following wild cards:
- (#d) - insert volume_ID (decimal format)
- (#h) - insert volume_ID (hexadecimal format)

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 hexadecimal ″LLVV″, where ″LL″ is a logical control unit number (00 - FE), and ″VV″ is a volume number (00 - FF) that is contained by a logical subsystem object. You must fully qualify the volume ID with manufacturer, type, and serial number if you do not use the -dev flag.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chckdvol command

```
dscli>chckdvol -dev IBM.1750-75FA120 -name my_volume_#d 0100
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

```
CKD volume 0100 successfully modified.
```

lsckdvol

The lsckdvol command displays a list of count key data (CKD) base and alias volumes in a storage image and status information for each volume in the list.

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.

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

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

-datatype *3380* | *3390*
> (Optional) Displays only volumes of the specified volume data type.

-extpool *extentpool_ ID*
> (Optional) Display only volumes that are associated with the specified extent pool.

-access *online* | *fenced*
> (Optional) Displays only volumes with the specified access state.

-data *normal* | *not_normal*
> (Optional) Displays only volumes with the specified data state.

-config *normal* | *not_normal*
> (Optional) Displays volumes with the specified configuration state.

-lcu *lcu_ID*
> (Optional) Displays only volumes with IDs that contain the specified logical control unit ID (up to 256 volumes can contain a specified LCU ID). A logical control unit ID is two hexadecimal characters (00 - FE).

> **Note:** If you are doing a query on a fully configured storage unit, it is recommended that you specify a specific LCU. If you do not specify a specific LCU, the entire storage unit is queried resulting in a longer processing time.

volume_ID . . . | -
> (Optional) Displays volumes with the specified IDs. A volume ID is four hexadecimal characters (0000 - FEFF).
>
> 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
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsckdvol** command using the **-l** paramater. A separate example is not shown for the 1750 as the information is the same for both machine types. The only difference is the model number designation, 2107 versus 1750.

The following example is based on the output results for a volume with 3340 cylinders.

Invoking the lsckdvol

```
dscli>lsckdvol -l 1410
```

The resulting output

```
Date/Time: April 12, 2005 6:06:31 PM JST
IBM DS CLI Version: 5.0.3.40
DS: IBM.2107-1300861
```

Name	ID	acc state	data state	config state	device MTM	data type
My_ volume _1410	1410	Online	Normal	Normal	3390-9	3390

voltype	orgbvols	extentpool	exts	cap (cyl)	cap (2^30B)	cap (10^9B)
CKD base	-	P2	4	3340	2.6	2.8

Report field definitions

Name Identifies the nickname you assigned to for the designated volume object.

ID Identifies the unique identifier that is assigned to the designated volume object

accstate (access state)
> One of the following designations can be displayed:

> **Online**
> > Specifies that the logical volume is accessible to a host.

> **Fenced**
> > Specifies that the logical volume is in the volume fenced state and is not accessible to the host.

datastate

One of the following designations can be displayed:

Normal

Specifies that none of the other data states apply. The access state is Online.

Read only

Specifies that 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

Specifies that one or more extents associated with the logical volume are on a rank that is in the inaccessible data state. The access state is fenced.

Rank failed

Specifies that one or more extents associated with the logical volume are on a rank that is in the failed data state. The access state is Fenced. This condition might be cleared by using the **restorevolaccess** command.

Rank repairing

Specifies that one or more extents associated with the logical volume are on ranks that are in the repairing data state. The access state is fenced.

Rank repaired

Specifies that one or more extents 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. This condition might be cleared by using the **restorevolaccess** command.

- (null)

Specifies that the logical volume is designated as a CKD alias.

configstate (configuration state)

One of the following designations can be displayed:

Normal

Specifies that there are no logical volume configuration operations in progress.

Configuration pending

Specifies that a creation request for the logical volume has been accepted and is queued for processing. The logical volume object has been created.

Configuring

Specifies that the logical volume is in the process of being configured for the first time.

Deconfiguring

Specifies that the logical volume is in the process of being deleted.

Configuration Error

Specifies that the initial configuration did not complete successfully.

- (null)

Specifies that the logical volume is designated as a CKD alias.

deviceMTM

One of the following will be displayed:

- 3380-2
- 3380-3
- 3390-3
- 3390-9

Volume MTM is determined by the CKD base volume data type and volume capacity (in cylinders).

datatype

Identifies the volume data type setting.

voltype

Identifies that the logical volume is one of the following:

- CKD base
- CKD alias

orgbvols (original base vol)

One of the following will be specified:

- Identifies the original base CKD volume ID to which this CKD alias volume is assigned.
- For a CKD Alias type volume, the base and alias volume IDs are of a common LCU ID.
- - (null) is displayed for a CKD base volume type.

extpool

Identifies the extent pool ID. Volume extents are allocated from this extent pool ID.

exts (extents)

Identifies the number of extents used by the designated volume ID.

cap (cyl)

Specifies the quantity of volume CKD cylinders that are available for host system access.

cap (10^9B)

Specifies the size of volume that is available for host system access in 10^9B (decimal GB) unit.

cap (2^{30}B)

Specifies the size of volume that is available for host system access in 2^{30}B (binary GB) unit.

mkckdvol

The mkckdvol command creates zSeries count key data (CKD) base or CKD alias volumes in a storage image.

```
>>--mkckdvol------------------------------------------------------------------->
            └─ -dev─ storage_image_ID ─┘   └─ -extpool─ extentpool_ID ─┘   └─ -base─ volume_ID ─┘

>──────────────────────────────────────────────────────────────── volume_ID ──────────><
    └─ -3380 ─┘  └─ -cap─ capacity ─┘   └─ -name─ volume_name ─┘   └─ -wait ─┘       " - "       └─ . . . ─┘
```
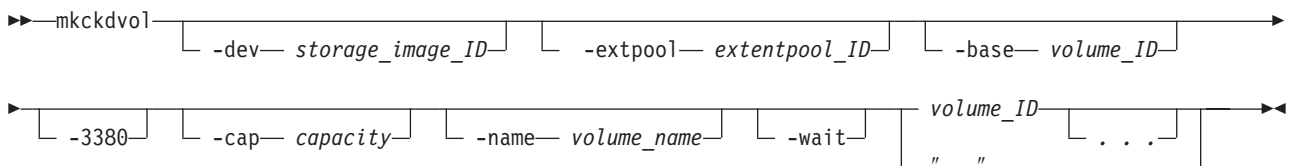
Parameters

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.

-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 zeroes, prefixed with the letter ″P″.

  Note: This parameter is not required and ignored if the **-base** parameter is specified.

-base *volume_ID*
  (Optional) Specifies an existing base CKD volume ID. The volume ID format is four hexadecimal characters ″LLVV″ where ″LL″ is a logical control unit number (00 - FE), and ″VV″ is a 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: It is recommended that you use the **-mkaliasvol** command to create alias volumes.

-3380
  (Optional) Specifies the 3380 volume type setting. Otherwise, the 3390 volume type is created. The **-3380** prameter is ignored when the **-base** parameter is specified.

  Note: You must ensure that the volume data type is compatible with the host systems that access this volume.

-cap *capacity*
  (Optional) Specifies the quantity of CKD cylinders that are allocated to this volume. The **-cap** parameter is ignored when the **-base** parameter is specified.

  For -3380, -cap=2226 (1.59 GB) or 3339 (2.37 GB).

  For 3390 volumes (default type), -cap=1 -65520 (849KB to 55.68 GB).

  Note: This parameter is not required, and it is ignored if the **-base** parameter is specified.

-name *volume_name*
  (Optional) Specifies 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 wild cards:
  • (#d) insert volume ID (decimal)
  • (#h) insert volume ID (hexadecimal)

  Note: The **-name** parameter is ignored when the **-base** parameter is specified.

-wait
  (Optional) Delays the command response until the volume configuration processes complete.

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 0.

The volume ID format is hexadecimal ″LLVV″ where ″LL″ is a logical control unit number (00 - FE), and ″VV″ is a 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. Example: 0100-010F 0180-018F 0120

Note: Multiple volumes can be created with a single request, but all volumes must have the same capacity, extent pool, and data type.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkckdvol command

```
dscli>mkckdvol -dev IBM.1750-75FA120 -extpool P0 -name my_volume_#d
   -cap 3339 0100 0101 0102 0103
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS IBM.1750-75FA120

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.

```
►►──rmckdvol─────────────────────────────────────────┬─ volume_ID ─┬───────────────────►◄
              └─ -dev── storage_image_ID ─┘  └─ -quiet ─┘  │             ├── . . . ──┤
                                                            └─ ″ - ″ ─────┘
```

Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all logical volumes.

-quiet

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

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 flag is specified. The shortened volume ID format is

hexadecimal ″LLVV″ where ″LL″ is a logical control unit (LCU) number (00 - FE), and ″VV″ is a volume number (00 - FF) that is contained by a logical control unit (logical subsystem).

Note: A CKD base volume cannot be removed if an alias volume is associated with it.

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 0180-018F 0120

Alternatively, accepts input from stdin when the dash (−) is specified.

Example (1750)

Invoking the rmckdvol command

```
dscli>rmckdvol -dev IBM.1750-75FA120  0000 0001
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Are you sure you want to delete Volume 0000? y/n Y
Volume 0000 successfully deleted.
Are you sure you want to delete Volume 0001? y/n Y
Volume 0001 successfully deleted.
```

mkaliasvol

The mkaliasvol command creates zSeries CKD alias volumes (generally referred to as parallel access volumes or PAVs) in a storage image.

```
►►─mkaliasvol─────────────────────────────────────────────────►
           └─-dev─ storage_image_ID─┘   └─-base─ volume_ID (volume_ID_range)─┘

►────────────────────────────────────────────────────────────►◄
   └─-order─increment─|─ decrement─┘  └─-qty─ quantity─┘  └─-wait─┘  ┌─volume_ID─┐
                                                                     ″ - ″
```
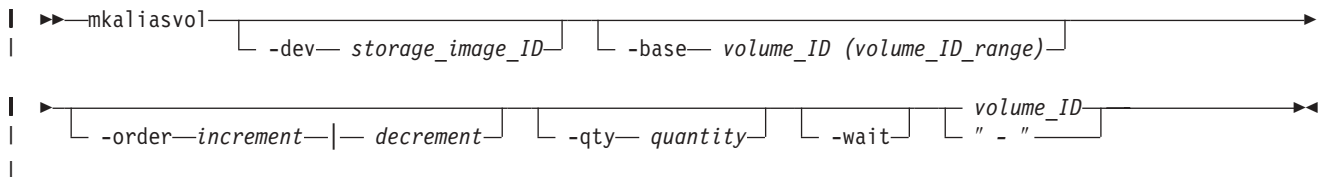
Parameters

Note: Volumes are automatically assigned to the FICON/ESCON – ALL volume group ID 10.

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.

-base *volume_ID (volume_ID_range)*
> (Required) Specifies 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) Specifies 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) Specifies the number of alias volumes that will be assigned to each specified CKD base volume.

-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 hexadecimal ″LLVV″ where ″LL″ is a logical control unit number (00 - FE), and ″VV″ is a volume number (00 - FF).

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkaliasvol command

```
dscli> mkaliasvol —dev IBM.2107-75FA120 —base 0100-010F -order
decrement -qty 2 01FF
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version:
5.0.0.0 DS: IBM.2107-75FA120
CKD Volume 01FF successfully created.
CKD Volume 01FE successfully created.
...
CKD Volume 01E1 successfully created.
CKD Volume 01E0 successfully created.
```

showckdvol

The showckdvol command displays detailed properties of an individual count key data volume. This command can also be used to display the performance metrics for an individual volume ID.

```
►►── showckdvol ─┬─────────────────────────┬──┬──────────┬──┬─────────────────────────────┬──►
                 └─ -dev─ storage_image_ID ─┘  └─ -metrics ─┘  └─ -volgrp─ volume_group_ID ─┘

►─┬─ volume_ID ─┬──────────────────────────────────────────────────────────────────────────►◄
  └─ " - " ─────┘
```

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 unit is turned on.
- There has been a server failure and the server failover or failback sequence has been initiated.

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the logical volume.

-metrics
  (Optional) Displays the volume ID and performance metrics for the specified volume.

-volgrp *volume_group_ID*
  (Required if you do not specify the *volume_ID* parameter.) Specifies that the CKD volumes that are associated with the designated volume group ID be displayed. There is only one volume group for CKD volumes and it contains all volumes.

  Note:

  - The *-volgrp* parameter can only be used when you are doing a query for performance metrics.
  - Do not use the *-volgrp* parameter with the *volume_ID* parameter.

volume_ID | –
  (Required when 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 shortened version format is hexadecimal *XXYZZ* where *X* is an address group number (0–F), *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

  Alternatively, accepts input from stdin when the dash (–) is specified.

  Note: Do not use the *volume_ID* parameter with the *-volgrp* parameter.

Example

Note: The following tables represent the headers that are displayed on the output reports that is associated with the **showckdvol** command using the -fullid command flag. A separate example is not shown for the 1750 because the information is the same for both machine types. The only difference is the machine type designations 2107 versus 1750.

Invoking the showckdvol to show volume properties

Note: The following example is based on the use of the **showckdvol** command for a 3390 volume with 3339 cylinders.

```
dscli>showckdvol 1410
```

The resulting output

```
Date/Time: April 13, 2005 3:44:27 PM JST IBM DS CLI Version: 5.0.3.40 DS:
IBM.2107-1300861
```

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)
CKD Base	–	1	P2	3	3339	2.6	2.8

Report field definitions (*-metrics* **parameter not specified)**

Name
> Specifies the nickname that you assigned for this volume object.

ID Specifies the unique identifier that is assigned to this volume object.

accstate
> One of the following designations can be displayed:

> **Online**
>> Specifies that the logical volume is accessible to a host.

> **Fenced**
>> Specifies that the logical volume is in the volume fenced state and is not accessible to the host.

datastate
> One of the following designations can be displayed:

> **Normal**
>> Specifies that none of the other data states apply. The access state is Online.

> **Read only**
>> Specifies that 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**
>> Specifies 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.

> **Rank failed**
>> Specifies 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. This condition might be cleared by using the **restorevolaccess** command.

Rank repairing
> Specifies 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
> Specifies 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. This condition might be cleared by using the **restorevolaccess** command.

– (null)
> Specifies that the logical volume is designated as a CKD alias.

configstate
> One of the following designations can be displayed:

Normal
> Specifies that there are no logical volume configuration operations in progress.

Configuration pending
> Specifies that a creation request for the logical volume has been accepted and is queued for processing. The logical volume object has been created.

Configuring
> Specifies that the logical volume is in the process of being configured for the first time.

Deconfiguring
> Specifies that the logical volume is in the process of being deleted.

Configuration Error
> Specifies that the initial configuration did not complete successfully.

- (null)
> Specifies that the logical volume is designated as a CKD alias.

deviceMTM
> One of the following will be displayed:
> - 3380-2
> - 3380-3
> - 3390-3
> - 3390-9

Volser
> Specifies the volume serial number. A volume serial number is six bytes of data, displayed as six characters.

datatype
> Specifies the volume data type setting (3380 or 3390).

voltype
> Specifies the designated volume ID as either a base or alias volume.

orgbvols
> One of the following will be specified:
> - Identifies the original base CKD volume ID to which this CKD alias volume is assigned.
> - For a CKD Alias type volume, the base and alias volume IDs share a common LCU ID.

- - (null) is displayed for a CKD base volume type.

addrgrp

Specifies the address group that contains this volume object. An address group ID is one hexadecimal character (0-F).

extpool

Specifies the extent pool ID.

exts

Specifies the number of extents used by the designated volume ID.

cap (cyl)

Specifies the quantity of volume cylinders that are available for host system access.

cap (10^9B)

Specifies the size of volume that is available for host system access in (10^9B decimal GB) units.

cap (2^30B)

Specifies the size of volume that is available for host system access in (2^30B binary GB) units.

Example

Invoking the showckdvol to show performance metrics

```
dscli>showckdvol -metrics -fullid
IBM.2107-75FA120/0101
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI
Version: 5.0.0.0 DS: IBM.2107-
75FA120

ID IBM.1750-75FA120/0101
Date 10/11/04 02:23:49
normrdrqts 10000
normrdhits 10000
normwritereq 10000
normwritehits 10000
seqreadreqs 10000
seqreadhits 10000
seqwritereq 10000
seqwritehits 10000
cachfwrreqs 10000
cachfwrhits 10000
cachfwreqs 10000
cachfwhits 10000
inbcachload 10000
bypasscach 10000
seqDASDtrans 10000
DASDtrans 10000
cachetrans 10000
NVSspadel 10000
normwriteops 10000
seqwriteops 10000
reccachemis 10000
qwriteprots 10000
CKDirtrkac 10000
CKDirtrkhits 10000
cachspdelay 10000
timelowifact 10000
phread     10000
```

```
phwrite    10000
phbyteread 10000
phbytewrit 10000
recmoreads 10000
sfiletrkreads 10000
contamwrts 10000
PPRCtrks 10000
NVSspallo 10000
timephread 10000
timephwrite 10000
byteread 10000
bytewrit 10000
timeread 10000
timewrite 10000
```

Report column definitions (*-metrics* **parameter specified)**

ID Specifies the unique identifier that is assigned to this volume object.

Date
Specifies the current time stamp for the volume performance counters.

normrdrqts
Specifies Search/Read Normal I/O Requests.

normrdhits
Specifies Search/Read Normal I/O Requests

normwritereq
Specifies Write Normal I/O Requests

normwritehits
Specifies DASD Fast Write I/O Request Hits

seqreadreqs
Specifies Search/Read Sequential I/O Requests

seqreadhits
Specifies Search/Read Sequential I/O Request Hits

seqwritereq
Specifies Write Sequential I/O Requests

seqwritehits
Specifies DASD Fast Write Sequential I/O Request Hits

cachfwrreqs
Specifies Search/Read Cache Fast Write I/O Requests

cachfwrhits
Specifies Search/Read Cache Fast Write I/O Request Hits

cachfwreqs
Specifies Cache Fast Write I/O Requests

cachfwhits
Specifies Cache Fast Write I/O Requests Hits

inbcachload
Specifies Inhibit Cache Loading I/O Requests that operate with DASD

bypasscach
Specifies Bypass Cache I/O Requests

seqDASDtrans
Specifies Sequential DASD to Cache Transfer Operations

DASDtrans
> Specifies DASD to Cache Transfer Operation Count

cachetrans
> Specifies Cache to DASD Transfer Operation Count

NVSspadel
> Specifies DASD Fast Write Operations Delayed Due to nonvolatile storage Space Constraints

normwriteops
> Specifies Normal 'DASD Fast Write' Write Operation Counts

seqwriteops
> Specifies Sequential Access 'DASD Fast Write' Write Operation Counts

reccachemis
> Specifies Number of record cache Read Misses

qwriteprots
> Specifies Quick Write Promotes

CKDirtrkac
> Specifies Irregular Track Accesses

CKDirtrkhits
> Specifies Irregular Track Accesses Hits

cachspdelay
> Specifies Operations Delayed Due To Cache Space Constraints

timelowifact
> Specifies Milliseconds of lower interface I/O activity for the indicated device.

phread
> Specifies Physical Storage Read Operations

phwrite
> Specifies Physical Storage Write Operations

phbyteread
> Specifies Physical Storage Bytes Read in 128 KB increments.

phbytewrit
> Specifies Physical Storage Bytes Written in 128 KB increments.

recmoreads
> Specifies Record Mode Read Operations

sfiletrkreads
> Specifies the Number of tracks read from the Concurrent Copy or XRC Sidefile.

contamwrts
> Specifies the Number of Contaminating writes for a Concurrent Copy or XRC volume

PPRCtrks
> Specifies the Number of tracks or portion of tracks that were transferred to the secondary device of a PPRC pair.

NVSspallo
> Specifies the NVS Space Allocations

timephread
> Specifies the physical storage read response time in 16 ms increments.

timephwrite
Specifies the physical storage write response time in 16 ms increments.

byteread
Specifies the number of bytes read in 128 KB increments

bytewrit
Specifies the number of bytes written in 128 KB incremnts.

timeread
Specifies the accumulated response time for all read operations.

timewrite
Specifies the accumulated response time for all write operations.

Logical subsystem specific commands

This section contains commands that are used to modify logical subsystems for Open Systems and to display logical subsystem information.

Use the following commands to modify logical subsystems and to display logical subsystem information.

chlss

The chlss command modifies a logical subsystem.
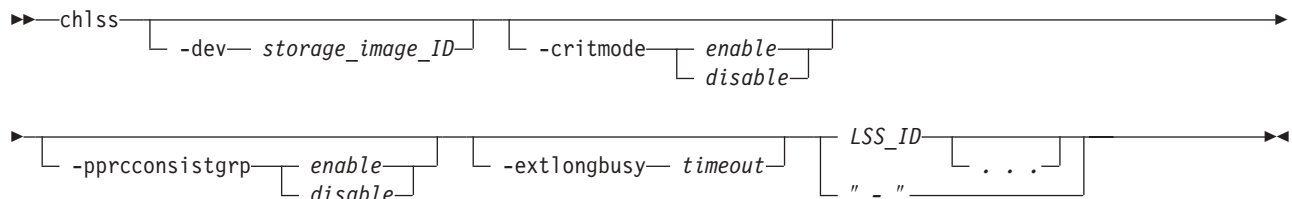
```
►►─chlss─┬───────────────────────┬─┬─────────────────────────┬─►
         └─-dev─ storage_image_ID─┘ └─-critmode─┬─enable──┬──┘
                                                └─disable─┘

►─┬──────────────────────────────┬─┬────────────────────┬─┬─LSS_ID──────────┬─►◄
  └─-pprcconsistgrp─┬─enable──┬──┘ └─-extlongbusy─timeout─┘ │        ┌─...─┐ │
                    └─disable─┘                             ├────────┴─────┴─┤
                                                           └─" - "──────────┘
```

Parameters

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all logical subsystems (LSSs); otherwise, it is optional.

-critmode *enable* | *disable*
(Optional) Updates the critical mode setting in the target LSS IDs. Critical mode controls the behavior of the remote mirror and copy (formerly PPRC) volume pairs that have a primary logical volume on this LSS that are in an LSS consistency group.

-pprcconsistgrp *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.

-extlongbusy *timeout*
(Optional) Specifies 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.

LSS_ID . . . | -

(Requiredl) Specifies 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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example: 00-03 08

Example (1750)

Invoking the chlss command

```
dscli>chlss -dev IBM.1750-75FA120 -critmode enable 06 0F
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

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.
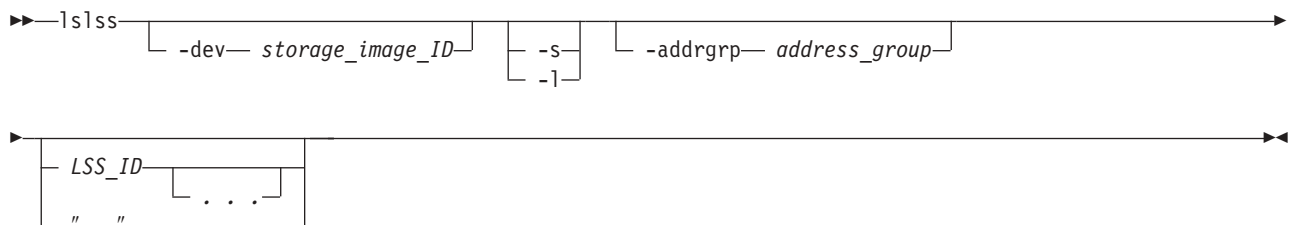
Parameters

-dev *storage_image_ID*
 (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number.

-s (Optional) Displays LSS 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 paraameters together.

-addgrp *address_group*
 (Optional) Displays only LSSs that belong to the specified address group. An address group is a single hexadecimal character (0 - F).

LSS_ID . . . | –
 (Optional) Specifies the logical subsystem IDs. An LSS ID is two hexadecimal characters (00 - EF).

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

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the lslss command

```
dscli>lslss -dev IBM.1750-75FA120 -l -fullid
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID Group addrgrp stgtype
 confgvols
IBM.1750-75FA120/10 0 1 fb
 256
IBM.1750-75FA120/11 1 1 fb
 256
IBM.1750-75FA120/12 0 1 fb
 256
```

showlss

The showlss command displays detailed properties of a logical subsystem (LSS).

Parameters

-dev *storage_image_ID*
    (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the logical subsystem; otherwise, it is optional.

LSS_ID | -
    (Required) Displays the properties for the specified logical subsystem. Accepted is 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.

    Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the showlss command to show default information

```
dscli>showlss IBM.1750-75FA120/10
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

ID   IBM.1750-75FA120/10
Group   0
addrgrp   1
stgtype   fb
```

```
confgvols  256
pprcconsistgrp Disabled
xtndlbztimout (secs) 120
crithvmode  Disabled
```

FB logical volume specific commands

This section contains commands that are used to create, modify, and delete fixed block (FB) logical volumes for Open Systems and to display logical volume information.

Use the following commands to create, modify, and delete fixed block logical volumes and to display logical volume information.

chfbvol

The chfbvol command changes the name or data type of a fixed block volume.
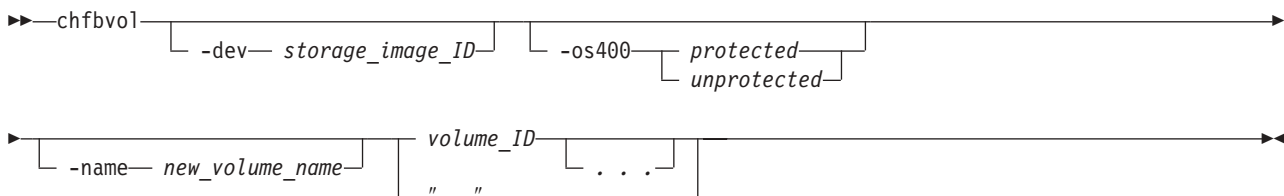
```
►►─chfbvol─┬──────────────────────────┬─┬────────────────────────────┬─────►
           └─ -dev─ storage_image_ID ─┘ └─ -os400─┬─ protected ───┬──┘
                                                   └─ unprotected ─┘

►─┬────────────────────────────┬─┬─ volume_ID ─┬───────┬──────────────────►◄
  └─ -name─ new_volume_name ───┘ │             └─ ... ─┘
                                 └─ " - " ──────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified volume ID.

-os400 *protected | unprotected*
> (Optional) Specifies options for the OS 400 volume data types. If the current volume data type is os400-protected(FB 520P) or os400-unprotected(FB 520U) then this data type may be modified to either os400-unprotected(FB 520U) or os400-protected(FB520P) respectively. If the current volume data type is 512, then this setting cannot be modified.

-name *new_volume_name*
> (Optional) Specifies your nickname for this volume. A nickname cannot exceed 16 characters.

volume_ID . . . | -
> (Required) Specifies one or more volume IDs to be modified. The volume ID format is hexadecimal *XYZZ*, where *X* is an address group number (0 - F), *XY* is a logical subsystem (LSS) number (00 - FE), and *ZZ* is a volume number (00 - FF). You must fully qualify the volume ID with manufacturer, type, and serial number if you do not use the -dev flag.
>
> 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
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the chfbvol command

```
dscli>chfbvol -dev IBM.1750-75FA120 -os400 protected 0100 0101
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

FB volume 0100 successfully modified.
FB volume 0101 successfully modified.
```

lsfbvol

The lsfbvol command displays a list of fixed block volumes in a storage image and status information for each volume in the list.
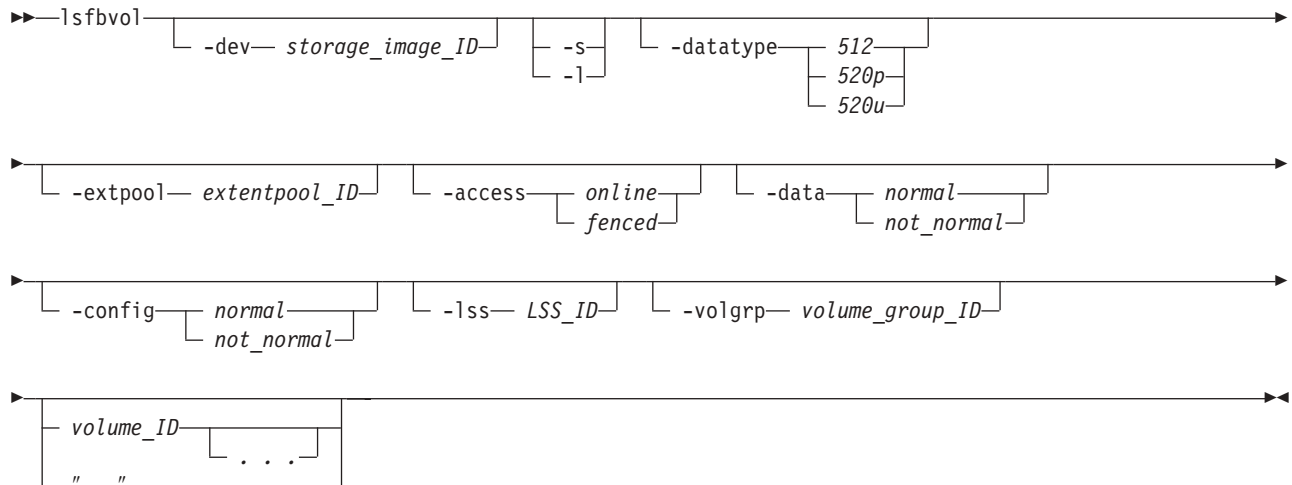
Parameters

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number.

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

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

-datatype *512 | 520p | 520e*
  (Optional) Displays volumes of the specified volume data type. Standard 2107/1750 volume (512), OS/400 protected (520p), OS/400 unprotected (520u).

-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 zeroes, 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 (up to 256 volumes can contain a specified logical subsystem ID). A logical subsystem ID is two hexadecimal characters (0x00 - 0xFF).

-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.

volume_ID . . . | –

(Optional) Displays volumes with the specified IDs. A volume ID is four hexadecimal characters (0000 - FEFF).

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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example: 0100-010F 0180-018F 0120

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsfbvol** command using the **-l** parameter. A separate example is not shown for the 1750 as the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

Invoking the lsfbvol command

```
dscli>lsfbvol -dev IBM.1750-75FA120 -volgrp -l
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

Name	ID	accstate	data	config state	device MTM	data type
My_ volume_ 0001	0100	Online	Normal	Normal	1750-511	FB 512
My_ volume_ 0002	0102	Online	Normal	Normal	1750-EX1	FB 520P
My_ _volume 0003	0103	Online	Normal	Normal	1750-511	FB 512

extpool	exts	captype	cap (2^30B)	cap (10^9B)	cap (blocks)
P21	1	DS	64.0	-	134217728
P31	1	iSeries	128.0	68.7	268435456
P21	1	ESS	-	35.0	68359424

Report field definitions

Name   Identifies the nickname you assigned for the specified volume object.

ID   Identifies 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.

data(state)
> One of the following data states are displayed:
>
> **Normal**
> > Specifies that none of the other data states apply. The access state is Online.
>
> **Read only**
> > Indicates that 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.
>
> **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. 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**
> > Indicates that 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**
> > 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. This condition might be cleared by using the **restorevolaccess** command.

configstate
> One of the following configuration states are displayed:
>
> **Normal**
> > Indicates that there are no logical volume configuration operations in progress.
>
> **Configuration pending**
> > Specifies that a creation request for the logical volume has been accepted and is queued for processing. The logical volume object has been created.

Configuring
Indicates that the logical volume is in the process of being configured for the first time.

Deconfiguring
Indicates that the logical volume is in the process of being deleted.

Configuration error
Indicates that the initial configuration did not complete successfully.

deviceMTM
Indicates 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 model is either 2107 or 1750; however, the MTM can be any one of the following depending on your system:

2107-900
Indicates a standard 2107 volume.

1750-500
Indicates a standard 1750 volume.

xxxx-**A0***x*
The *xxxx* is 2107 or 1750. The A0 indicates an OS/400 protected volume (for example, 2107-A01 or 1750-A07).

xxxx-**A8***x*
Indicates that the *xxxx* is 2107 or 1750. The A8 indicates an OS/400 unprotected volume (for example, 2107-A81 or 1750-A87).

datatype
Indicates the volume data type setting. One of the following binary (B) values will be displayed:
- FB 512
- FB 520P
- FB 520U

Extpool
Identifies the extent pool ID. Volume extents are allocated from this extent pool ID.

Exts (extents)
Identifies the number of extents used by the designated volume ID.

Captype
Indicates capacity unit type used at volume creation. One of the following values is displayed:

ESS
The capacity unit is 10^9B.

DS
The capacity unit is 2^{30}B.

DS/ESS
The capacity unit is 2^{30}B or 10^9B.

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 (2^30B)

Specifies the size of the volume that is available for host system access in 2^30B (binary GB) units.

Note: ″−″ (null) is displayed if the capacity unit type of the volume is ESS (captype=ESS)

cap (10^9B)

Specifies the size of the volume that is available for host system access in 10^9B (decimal GB) units.

Note: ″−″ (null) is displayed if the capacity unit type of the volume is DS (captype=DS)

cap blocks

Indicates the quantity of volume logical blocks that are available for host system access.

mkfbvol

The mkfbvol command creates open systems fixed block (FB) volumes in a storage image.

```
►►── mkfbvol ──────────────────────── -extpool── extentpool_ID ──────────────────►
              └─ -dev── storage_image_ID ─┘                      ┌─ -os400 ── A01 ─┐
                                                                 │          ├ A81 ┤
                                                                 │          ├ A02 ┤
                                                                 │          ├ A82 ┤
                                                                 │          ├ A04 ┤
                                                                 │          ├ A84 ┤
                                                                 │          ├ A05 ┤
                                                                 │          ├ A85 ┤
                                                                 │          ├ A06 ┤
                                                                 │          ├ A86 ┤
                                                                 │          ├ A07 ┤
                                                                 │          └ A87 ┘

►──┬─────────────────┬──┬─ -cap── capacity ─┬──┬─ -name── volume_name ─┬──────────►
   └─ -type ┬───────┬ ┘                                                
            ├─ ess ─┤
            ├─ ds ──┤
            └ blocks┘

►──┬──────────────────────────────┬──┬─ -wait ─┬──┬─ volume_ID ┬─────────────────►◄
   └─ -volgrp── volume_group_ID ─┘             └─ " _ " ──┘     └─ . . . ─┘
```

Parameters

Note:

- You can create multiple volumes with one command; however, all volumes must have the same capacity, extent pool, and data type.
- If host attachment volume groups have not yet been created, create temporary volume groups and assign new fixed block volumes to the temporary volume groups according to the volume type and capacity characteristics.

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number.

-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 zeroes, prefixed with the letter P.

-os400 *A01 | A81 | A02 | A82 | A04 | A84 | A05 | A85 | A06 | A86 | A07 | A87*
> (Optional) The OS 400 volume options.
>
> This parameter is required if capacity is not specified.
>
> The storage sizes and the data types for this volume:
> - A01 - 8.6 GB, protected
> - A81 - 8.6 GB, unprotected
> - A02 - 17.5 GB, protected
> - A82 - 17.5 GB, unprotected
> - A04 - 70.5 GB, protected
> - A84 - 70.5 GB, unprotected
> - A05 - 35.1 GB, protected
> - A85 - 35.1 GB, unprotected
> - A06 - 141.12 GB, protected
> - A86 - 141.12 GB, unprotected
> - A07 - 282.25 GB, protected
> - A87 - 282.25 GB, unprotected
>
> GB is 10^9 Byte.
>
> **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) Specifies the unit type of capacity that is specified by the **-cap** parameter.
>
> **ess**: Specifies that the unit is 10^9 Bytes.
>
> **ds**: Specifies that the unit is 2^{30} Bytes.
>
> **blocks**: Specifies that the unit is 512 blocks.
>
> **Note:**
> > - If the -type parameter is not specified the lun is created as type **ds**.
> > - The **-type** parameter is ignored when the **-os400** parameter is specified.

-cap *capacity*
> (Optional) Specifies the storage size that is allocated to this volume object.
>
> **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:
> - 1GB = 1,073,741,824 (2^{30} Bytes)
> - Supported storage sizes range from 1 to 2048.

If the **-type ess** parameter is specified:

- capacity = X.Y or X
    - where X is whole gigabytes, with 1 GB=1,000,000,000 (10^9 Bytes).
    - where Y represents a fraction of 1 GB. Y is limited to a single digit (0...9) to the right of the decimal.
- Supported storage sizes range from 0.1 to 982.2 (0.1 increment).

If the **-type blocks** parameter is specified, *capacity* is the number of 512 blocks. Supported storage sizes range from 1 to 4 GB blocks (the actual number of gigabytes is the number of blocks times 512).

-name *volume_name*
(Optional) Your nickname for this volume. The nickname can be 16 characters long, and it can contain one of the following wildcard characters:

- (#d) decimal volume ID
- (#h) hexadecimal volume ID

-volgrp *volume_group_ID*
(Optional) Specifies to which volume group the volumes are assigned. A volume group ID is a four-digit decimal number with no leading zeroes, 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 issue a new command.

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 hexadecimal *XYZZ* where *X* is an address group number (0 - F), *XY* is a logical subsystem number (00 - FE), and *ZZ* is a volume number (00 - FF) that is contained by a logical subsystem.

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

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkfbvol command

```
dscli>mkfbvol -dev IBM.1750-75FA120
 -extpool P1 -name my_vol_#d -type ess
 -cap 8.6 0100 0100 0101 0102 0103
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Device: IBM.1750-75FA120

FB volume 0100 sucessfully created.
FB volume 0101 sucessfully created.
FB volume 0102 sucessfully created.
FB volume 0103 sucessfully created.
```

rmfbvol

The rmfbvol command deletes fixed block volumes from a storage image.
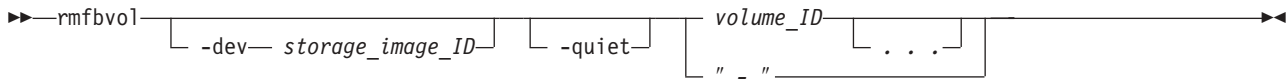
```
►►─rmfbvol─────────────────────────────────────────────────────── volume_ID ───────────────────►◄
              └─ -dev── storage_image_ID ─┘  └─ -quiet ─┘   └─────── . . . ───────┘
                                                         └─ " - " ──────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all logical volumes.

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

volume_ID . . . | -
> (Required) An array of one or more fixed block volume IDs 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 flag is specified. The volume ID format is hexadecimal *XYZZ* where *X* is an address group number (0–F), *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

> 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

> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the rmfbvol command
```
dscli>rmfbvol -dev IBM.1750-75FA120 0100 0101
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

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.
```

showfbvol

The showfbvol command displays detailed properties for an individual volume. This command can also be used to display the performance metrics of a fixed block volume.

```
►►─ showfbvol ───────────────────────────────────────────────────────────────────────────────►
               └─ -dev── storage_image_ID ─┘   └─ -metrics ─┘   └─ -volgrp── volume_group_ID ─┘

►─ volume_ID ──────────────────────────────────────────────────────────────────────────────►◄
   └─ " - " ──────┘
```
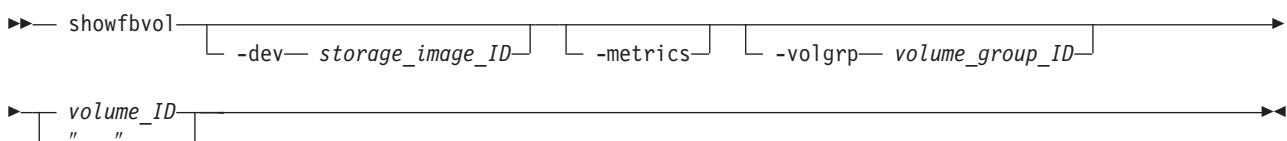
Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which consists of the manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the logical volume.

-metrics

(Optional) Displays volume ID and performance metrics for the specified volume.

Note: 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.

-volgrp *volume_group_ID*

(Required if you do not specify the *volume_ID* parameter.) Specifies that the fixed block volumes that are associated with the designated volume group ID be displayed.

Note:

- You can only use the *-volgrp* parameter when you are doing a query for performance metrics.
- Do not use the *-volgrp* parameter with the *volume_ID* parameter.

volume_ID | –

(Required when 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 shortened version format is hexadecimal *XXYZZ* where *X* is an address group number (0–F), *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Note: Do not use the *volume_ID* parameter with the *-volgrp* parameter.

Example

Note: The following tables represent the headers that are displayed on the output reports that are associated with the w**showfbvol** command. A separate example is not shown for the 1750 as the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

Invoking the showfbvol to show volume properties

Note: The example output is based on using the **showfbvol** command for a 1.0 (Binary) GB volume.

```
dscli>showfbvol 6000
```

The resulting output

```
Date/Time: April 13, 2005 2:38:14 PM JST IBM DS CLI Version: 5.0.3.40 DS: IBM.2107-
1300861
```

Name	ID	acc state	data state	config state	device MTM	data type	addgrp
My_ volume _6000	6000	Online	Normal	Normal	2107-900	FB 512	6

extpool	exts	captype	cap (2^30B)	cap (10^9B)	cap (blocks)	volgrp
P0	1	DS	1.0	–	2097152	V20

Report field definitions (*-metrics* parameter not specified)

Name

Specifies the nickname that you assigned for this volume object.

ID Specifies 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.

datastate

One of the following data states are displayed:

Normal

None of the other data states apply. The access state is Online.

Read only

Indicates that 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.

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. This data state transitions to Rank repairing if the rank transitions to the Rank repairing state through use of the repair array function.

Rank Repairing

Indicates that 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

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. This condition might be cleared by using the **restorevolaccess** command.

configstate

One of the following configuration states are displayed:

Normal

Indicates that there are no logical volume configuration operations in progress.

Configuration pending

Specifies that a creation request for the logical volume has been accepted and is queued for processing. The logical volume object has been created.

Configuring

Indicates that the logical volume is in the process of being configured for the first time.

Deconfiguring

Indicates that the logical volume is in the process of being deleted.

Configuration error

Indicates that the initial configuration did not complete successfully.

deviceMTM

Indicates the volume device type and the model. The volume MTM is determined by the fixed block volume data type and the volume capacity (in GB). The model is either 2107 or 1750, however the MTM can be any one of the following depending on your system:

2107-900

This indicates a standard 2107 volume.

1750-500

This indicates a standard 1750 volume.

xxxx-**A0***x*

The *xxxx* is 2107 or 1750; the A0 indicates an OS/400 protected volume (for example, 2107-A01 or 1750-A07).

xxxx-**A8***x*

The *xxxx* is 2107 or 1750; the A8 indicates an OS/400 unprotected volume (for example, 2107-A81 or 1750-A87).

datatype

Indicates the volume data type setting. One of the following values will be displayed:

- FB 512
- FB 520P
- FB 520U

addrgrp

Specifies the address group that contains the designated volume object. An address group ID is one hexadecimal character (0-F).

extpool

Specifies the extent pool ID. Volume extents are allocated from this extent pool ID.

exts

Specifies the number of extents used by the designated volume ID.

captype

Indicates capacity unit type used at volume creation. One of the following values is displayed:

ESS

The capacity unit is 10^9B.

DS

The capacity unit is 2^{30}B.

DS/ESS

The capacity unit is 2^{30}B or 10^9B.

Blocks

The capacity unit 512B.

iSeries

The capacity unit was not specified at volume creation. This fixed block volume was created for iSeries.

cap (2 ^ 30B)

Specifies the size of volume that is available for host system access in 2^{30}B (binary GB) unit.

Note: ″−″ (null) is displayed if the capacity unit type of the volume is ESS (captype=ESS)

cap (10 ^ 9B)

Specifies the size of volume that is available for host system access in 10^9B (decimal GB) unit.

Note: ″−″ (null) is displayed if the capacity unit type of the volume is DS (captype=DS)

cap blocks

Indicates the quantity of volume logical blocks that are available for host system access.

Example

Invoking the showfbvol to show performance metrics

```
dscli>showfbvol -metrics -dev
 IBM.2107-75FA120/0101
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS:
IBM.2107-75FA120

ID IBM.1750-75FA120/0101
Date 10/11/04 02:23:49
normrdrqts 10000
normrdhits 10000
normwritereq 10000
normwritehits 10000
seqreadreqs 10000
seqreadhits 10000
seqwritereq 10000
seqwritehits 10000
cachfwrreqs 10000
cachfwrhits 10000
cachfwreqs 10000
cachfwhits 10000
inbcachload 10000
bypasscach 10000
seqDASDtrans 10000
DASDtrans 10000
cachetrans 10000
```

```
NVSspadel 10000
normwriteops 10000
seqwriteops 10000
reccachemis 10000
qwriteprots 10000
CKDirtrkac 10000
CKDirtrkhits 10000
cachspdelay 10000
timelowifact 10000
phread      10000
phwrite    10000
phbyteread 10000
phbytewrit 10000
recmoreads 10000
sfiletrkreads 10000
contamwrts 10000
PPRCtrks 10000
NVSspallo 10000
timephread 10000
timephwrite 10000
byteread 10000
bytewrit 10000
timeread 10000
timewrite 10000
```

Report field definitions (*-metrics* **parameter specified)**

ID Specifies the unique identifier that is assigned to this volume object.

Date
Specifies the current time stamp for the volume performance counters.

normrdrqts
Specifies Search/Read Normal I/O Requests.

normrdhits
Specifies Search/Read Normal I/O Requests instances.

normwritereq
Specifies Write Normal I/O Requests.

normwritehits
Specifies DASD Fast Write I/O Request instances.

seqreadreqs
Specifies Search/Read Sequential I/O Requests.

seqreadhits
Specifies Search/Read Sequential I/O Request instances.

seqwritereq
Specifies Write Sequential I/O Requests.

seqwritehits
Specifies DASD Fast Write Sequential I/O Request instances.

cachfwrreqs
Specifies Search/Read Cache Fast Write I/O Requests.

cachfwrhits
Specifies Search/Read Cache Fast Write I/O Request instances.

cachfwreqs
Specifies Cache Fast Write I/O Requests.

cachfwhits
Specifies Cache Fast Write I/O Requests instances.

inbcachload

Specifies Inhibit Cache Loading I/O Requests that operate with DASD.

bypasscach

Specifies Bypass Cache I/O Requests.

seqDASDtrans

Specifies Sequential DASD to Cache Transfer Operations.

DASDtrans

Specifies DASD to Cache Transfer Operation Count.

cachetrans

Specifies Cache to DASD Transfer Operation Count.

NVSspadel

Specifies DASD Fast Write Operations Delayed Due to nonvolatile storage Space Constraints.

normwriteops

Specifies Normal 'DASD Fast Write' Write Operation Counts.

seqwriteops

Specifies Sequential Access 'DASD Fast Write' Write Operation Counts.

reccachemis

Specifies Number of record cache Read Misses.

qwriteprots

Specifies Quick Write Promotes.

CKDirtrkac

Specifies Irregular Track Accesses.

CKDirtrkhits

Specifies Irregular Track Accesses instances.

cachspdelay

Specifies Operations Delayed Due To Cache Space Constraints.

timelowifact

Specifies Milliseconds of lower interface I/O activity for the indicated device.

phread

Specifies Physical Storage Read Operations.

phwrite

Specifies Physical Storage Write Operations.

phbyteread

Specifies Physical Storage Bytes Read in 128 KB increments.

phbytewrit

Specifies Physical Storage Bytes Written in 128 KB incremnts.

recmoreads

Specifies Record Mode Read Operations.

sfiletrkreads

Specifies the Number of tracks read from the Concurrent Copy or XRC Sidefile.

contamwrts

Specifies the Number of Contaminating writes for a Concurrent Copy or XRC volume.

PPRCtrks
Specifies the Number of tracks or portion of tracks that were transferred to the secondary device of a PPRC pair.

NVSspallo
Specifies the NVS Space Allocations.

timephread
Specifies the Physical Storage Read Response Time in 16 ms increments.

timephwrite
Specifies the Physical Storage Write Response Time in 16 ms increments.

byteread
Specifies the number of Bytes read in 128 KB increments.

bytewrit
Specifies the number of Bytes written in 128 KB incremnts.

timeread
Specifies the accumulated response time for all read operations.

timewrite
Specifies the accumulated response time for all write operations.

Volume group specific commands

This section contains commands that are used to create, modify, and delete volume groups and to display volume group information.

Use the following commands to create, modify, and delete volume groups and to display volume group information.

chvolgrp

The chvolgrp command modifies a volume group name and volume members.
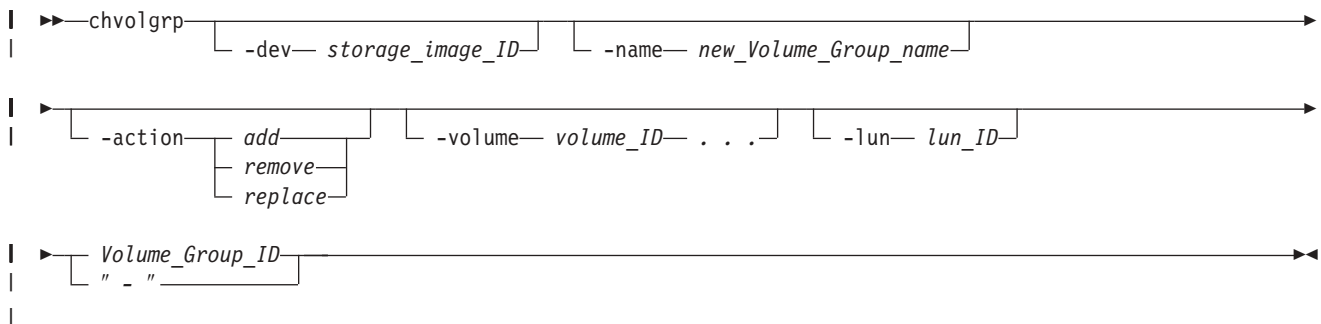
```
►►──chvolgrp──────────────────────────────────────────────────────►
              └─ -dev─ storage_image_ID─┘ └─ -name─ new_Volume_Group_name─┘

►──────────────────────────────────────────────────────────────────►
   └─ -action─┬─ add ─────┬─┘ └─ -volume─ volume_ID─ . . .─┘ └─ -lun─ lun_ID─┘
              ├─ remove ──┤
              └─ replace ─┘

►──┬─ Volume_Group_ID ─┬────────────────────────────────────────────►◄
   └─ " - " ───────────┘
```

Parameters

-dev *storage_image_ID*
(Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the volume group ID.

Example: IBM.1750-75FA120

-name *new_Volume_Group_name*
(Optional). Specifies 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 image.

-action *add | remove | replace*

(Optional).

add Specifies that the volumes be added to the volume group.

remove

Specifies that the volumes be removed from the volume group.

replace

Specifies that the existing volumes be replaced by the specified volumes.

If the **-action** parameter is not specified, the existing volumes are replaced by the specified volumes. The **-action** parameter is ignored if the **-volume** parameter is not specified.

-volume *volume_ID . . .*

(Optional). Specifies 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 format of the ID is a hexadecimal number '0000 - FEFF'.

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 - SCSI MAP 256 only). Specifies 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 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:
0000 : 10
0001 : 11
0002 : 00
0003 : 01
```

If the **-action replace** parameter is specified without specifying the **-lun** parameter, lun_ID=00 is assumed.

Volume_Group_ID | –

> (Required). Specifies the ID of the volume group being changed. The volume group ID is made up of the storage unit ID followed by the volume group ID. 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 zeroes, prefixed with the letter ″V″.
>
> Alternatively, accepts input from stdin if the dash (–) is specified.
>
> Example: IBM.1750-75FA1243/V1231

Example (1750)

Invoking the chvolgrp command

```
dscli>chvolgrp -volume 0000-000F IBM.1750-75FA120/V2341
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

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.
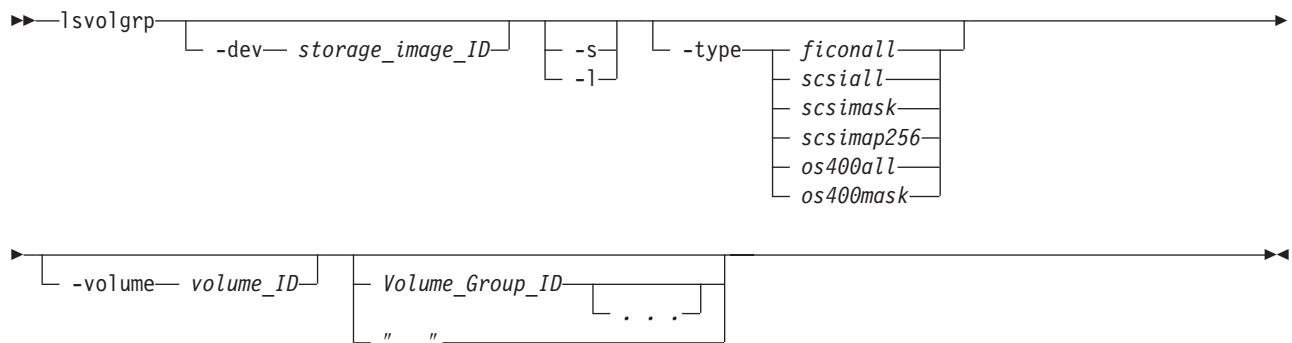
Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. Displays only the objects for the storage unit that is specified. This parameter is required if you do not specify a fully qualified volume group ID.
>
> Example: IBM.1750-75FA120

-s (Optional). Displays volume group IDs only. You cannot use the -l and the -s parameters together.

-l (Optional). Displays the default output plus users. 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. A volume ID is four hexadecimal characters '0x0000 - 0xFEFF'.

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″.

> Accepts a fully qualified volume group ID or a shortened version, if the -dev flag 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.

> Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the lsvolgrp command
```
dscli>lsvolgrp -dev IBM.1750-75FA120 -l
```

The resulting output
```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Device: IBM.1750-75FA120

Name ID Type
Host_xxx_volumes V1011 OS400 Mask
Host_yyy_volumes V1111 OS400 Map 256
Host_zzz_volumes V1211 SCSI Mask
```

mkvolgrp
The mkvolgrp command creates a volume group in a storage image.
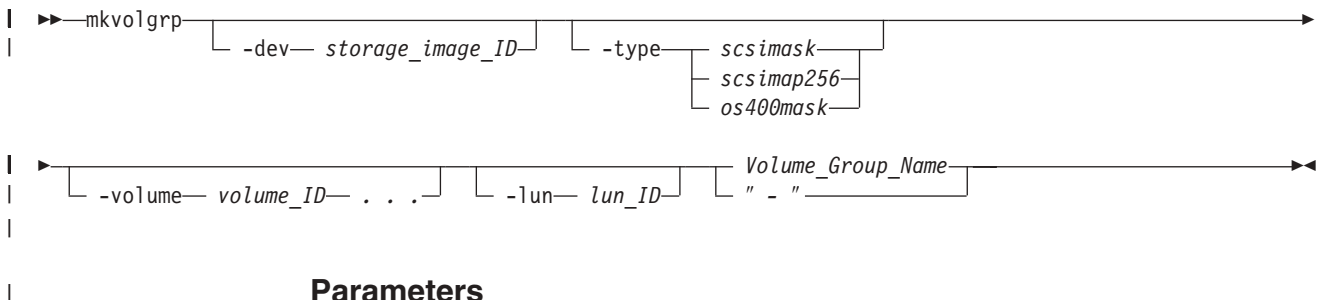
```
►►──mkvolgrp─────────────────────────────────────────────────────►
        └─-dev─ storage_image_ID─┘  └─-type─┬─ scsimask────┬─┘
                                            ├─ scsimap256──┤
                                            └─ os400mask───┘

►──────────────────────────────────────────────── Volume_Group_Name ──►◄
   └─-volume─ volume_ID─ . . .─┘  └─-lun─ lun_ID─┘  └─ ″ - ″ ──────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified volume group name.

> Example: IBM.1750-75FA120

-type | *scsimask* | *scsimap256* | *os400mask* |
> (Optional). Specifies 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 OS400 mask volume group. The IBM iSeries 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 OS400 MASK, SCSI520-MASK is referenced instead.

-volume *volume_ID | . . .*

(Optional). Specifies the array of volume IDs to include in the volume group. The format is a hexadecimal number in the range '0000 - FEFF'. For the **-scsimap256** parameter, the array cannot exceed 256 volume ID entries. Otherwise, up to 64 384 entries are allowed.

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)Specifies 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). Specifies 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.

Alternatively accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the mkvolgrp command

```
dscli>mkvolgrp -dev IBM.1750-75FA120
 -volume 0000-000F host_xyz_volumes
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Volume group V0 successfully created.
```

rmvolgrp

The rmvolgrp command deletes existing volume groups from a storage image.
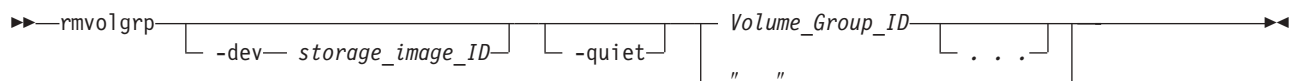
```
►►─rmvolgrp─┬──────────────────────┬─┬─────────┬─┬─Volume_Group_ID─┬───────┬──────────►◄
            └─-dev─ storage_image_ID─┘ └─-quiet─┘ │                 └─ . . . ─┘
                                                  └─ " - "──────────────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all volume groups (all ID values that take a storage image ID in the command input required for this command).

> Example: IBM.1750-75FA120

-quiet
> (Optional). Turns off the 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. 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 flag 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.

> Alternatively, accepts input from stdin when the dash (–) is specified.

> Example: IBM.1750-75FA1243/V123

Example (1750)

Invoking the rmvolgrp command

```
dscli>rmvolgrp IBM.1750-75FA1243/V123
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120

Are you sure you want to delete Volume Group IBM.1750-75FA1243/V123? y/n
Y
Volume group IBM.1750-75FA1243/V123 successfully deleted.
```

showvolgrp

The showvolgrp command displays detailed properties of a volume group.

```
►►──showvolgrp──┬──────────────────────────┬──┬─────────┬──┬─Volume_Group_ID─┬──────►◄
                └─-dev── storage_image_ID──┘  └─-lunmap─┘  └─ ″ - ″──────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the volume group.

> Example: IBM.1750-75FA120

-lunmap
>   (Optional). Specifies that a LUN mapping table be displayed that shows the volume ID and LUN ID relationship. This parameter is valid for all scsi and os400 type volume groups.

Volume_Group_ID | -
>   (Required). Shows the properties for the target volume group that are specified within the storage unit. 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″.
>
>   Alternatively, accepts input from stdin when the dash (–) is specified.
>
>   Example: IBM.1750-75FA120/V1001

Example

Note: The following tables represent the headers that are displayed on the output reports that are associated with the **showvolgrp** command. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

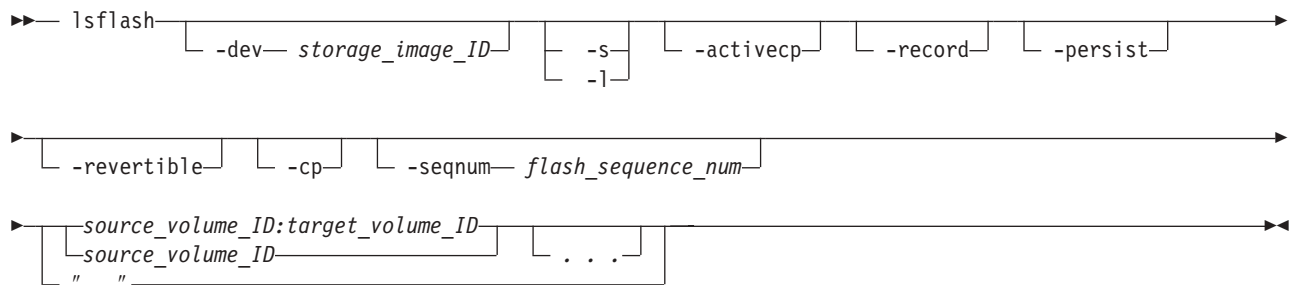### Invoking the showvolgrp command

```
dscli>showvolgrp -lunmap IBM.1750-75FA120/V1001
```

The resulting output

```
Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0 DS: IBM.1750-75FA120
```

Name	ID	Type	Vols
My_host_ system_ volumes	IBM.2107- 75FA120 /V100	SCSI- MAP 256	0000 0001 0002 0003

```
============================LUN Mapping===========================
```

Vol	LUN
0000	0A
0001	0B
0002	10
0003	11

Report field definitions

Name Specifies the name that you assigned for the designated volume group ID..

ID Specifies the storage unit ID followed by the volume group ID. The volume group identifier is a four-digit decimal number having no leading zeros, and prefixed by a V.

Type Specifies the configured volume group type.

Vols Identifies the complement of accessible volume numbers within the designated volume group.

Vol (part of LUN map table)
>   Specifies the volume ID.

LUNS (part of LUN map table)
Specifies the LUN ID that is mapped to the designated volume ID.

Advanced operation commands

This section contains commands that are used to further administer and tune storage.

Use the following commands to administer and tune storage.

clearvol

The clearvol command clears Copy Services relationships for a base logical volume.
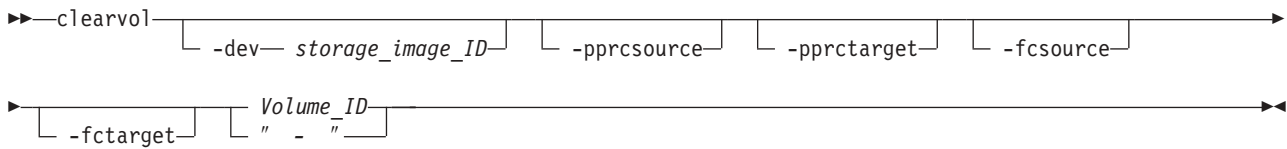
```
►►─clearvol──────────────────────────────────────────────────────────────►
              └─ -dev── storage_image_ID─┘  └─ -pprcsource─┘  └─ -pprctarget─┘  └─ -fcsource─┘

►─────────────────────── Volume_ID ──────────────────────────────────────►◄
    └─ -fctarget─┘      └─ " ─ " ─┘
```

Parameters

-dev *storage_image_ID*
   (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the volume ID.

   Example: IBM.1750-75FA120

-pprcsource
   (Optional). This is applicable to a base logical volume. Removes any remote mirror and copy (formerly PPRC) relationships on the logical volume where this logical volume operates as a remote mirror and copy source.

-pprctarget
   (Optional). This is applicable to a base logical volume. Removes any remote mirror and copy (formerly PPRC) relationships on the logical volume where this logical volume operates as a remote mirror and copy target.

-fcsource
   (Optional). This is applicable to a base logical volume. Removes any FlashCopy relationships on the logical volume where this logical volume operates as a FlashCopy source.

-fctarget
   (Optional). This is applicable to a base logical volume. Removes any FlashCopy relationships on the logical volume where this logical volume operates as a FlashCopy target.

Volume_ID | -
   (Required). Clears Copy Services relationships for the specified volume ID. Accepts a fully qualified volume ID, which includes the storage image ID or a shortened version, if the -dev flag is specified. The volume ID is four hexadecimal characters in the range '0000 - FEFF'.

   Alternatively, accepts input from stdin if the dash (–) is specified.

   Example: IBM.1750-75FA120/0001

Example (1750)

Invoking the clearvol command

```
dscli>clearvol -dev IBM.1750-75FA120 0001
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS:  IBM.1750-75FA120

Volume 0001 successfully cleared.
```

restorevolaccess

The restorevolaccess command resets the fenced access state for a volume when the volume is in a fenced access state.

```
►►──restorevolaccess──┬─────────────────────────┬──┬────────┬──┬──Volume_ID──┬──────────────────►◄
                      └─ -dev── storage_image_ID ─┘  └─ -quiet ─┘  ├─ " - " ─────┤
```

Parameters

Note:

1. If the logical volume is in the the rank repaired data state, the restore volume access function causes any indications that are associated with this condition to be reset. The data state is updated to reflect the current condition of the logical volume after this condition has been reset. Normally, the data state changes to normal or read-only.

2. If the restore volume access function command is accepted repeatedly, but does not result in an online access state, delete the logical volume and then reconfigure the logical volume.

-dev *storage_image_ID*

(Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the volume ID, which includes the storage image ID.

Example: IBM.1750-75FA120

-quiet

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

Volume_ID | -

(Required). Resets the fenced access state for the specified volume ID. 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 four hexadecimal characters '0000 - FEFF'.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example: IBM.1750-75FA120/0001

Example

Invoking the restorevolaccess command

```
 dscli>restorevolaccess -dev IBM.1750-75FA120 0001
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS:  IBM.1750-75FA120

Are you sure you want to reset the access state for Volume ID 0001? y/n Y
Access state for Volume 0001 successfully reset.
```

Copy Services commands

This section contains Copy Services commands.

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

FlashCopy commands

This section contains commands that are used to configure FlashCopy relationships and to display FlashCopy information.

Use the following commands to configure FlashCopy relationships and to display FlashCopy information.

commitflash

The commitflash command commits data to a target volume to form a consistency between the source and target. Before you use this command, you must first issue the mkflash command with the -record and -persist flags. After the pair is established, you must then issue the setflashrevertible command against the pair.

```
▶▶── commitflash ──────────────────────────────────────────────────────────▶
                  └─ -dev── storage_image_ID ─┘  └─ -seqnum── flash_sequence_num ─┘

▶── source_volume_ID ───────────────────────────────────────────────────────◀
    │                 └─ . . . ─┘
    └─ " - " ──────────────────┘
```

Parameters

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all the source volumes and you do not specify a value for the devid variable in your profile file.

  Example: IBM.1750-75FA120

-seqnum *flash_sequence_number*
  (Optional) When a flash sequence number is specified, the commit is performed only on those relations associated with the specified number. The sequence number is a four digit hexadecimal number (0000 - FFFF). The default value is 0000.

  This flag is not supported for machine type 2105.

  Example: 0010

source_volume_ID . . . | –
  (Required) Commits FlashCopy relationships for the source volumes with the IDs specified. The chosen FlashCopy pair is the one established or modified with the -record flag. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if either the -dev

flag 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 format of a volume ID is hexadecimal ″XYZZ″, where ″XY″ is a logical subsystem (LSS) number (00 - FE), and ″ZZ″ is a volume number (00 - FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified volume ID: IBM.1750-75FA120/0001

Example of a shortened version: 0001

Example of multiple IDs: 0001 0003 0008

Example (1750)

Invoking the commitflash command
```
dscli>commitflash IBM.1750-75FA120/0100
```

The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200 successfully committed.
```

resyncflash

The resyncflash command (formerly called incflash for an incremental FlashCopy process) increments an existing FlashCopy pair that has been established with the -record and -persist flags. When a pair is established with the -record and -persist flags, the pair initially synchronizes and then a record of all host writes to the source is maintained in the source volumes. When the resyncflash command is issued on the pair, the new writes to the source are copied to the target. The flags specified in this command will replace the flags in the existing relationship. In order to keep the initial -record and -persist flags, they must be specified in the resyncflash command.

Parameters

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes and you do not specify a value for the devid variable in your profile file.

Example: IBM.1750-75FA120

-record
(Optional) Records the changed tracks on both volumes within a FlashCopy

pair. Use this flag if you intend to use the resyncflash command again with this pair. The -persist flag is automatically selected when this flag is selected.

-persist
(Optional) Retains the FlashCopy relationship after the background copy completes. The FlashCopy relationship between the source and the target volumes remains indefinitely until broken by a rmflash command. This flag is automatically selected when the -record flag is selected. Select this flag along with the -record flag if you will be using this volume pair with the commands resyncflash, reverseflash, or setflashrevertible.

-freeze
(Optional) 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. 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 flag.

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

-tgtoffline
(Optional) Causes the mkflash command to be rejected if the target volume is online for host system access. This flag only applies to CKD volumes.

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

-seqnum *flash_sequence_num*
(Optional) Associates the FlashCopy relations that are established with the specified sequence number. This sequence number can be used as an identifier for a relation or group of relations. Only the relations that are modified successfully by the resyncflash command will get the specified sequence number, leaving the ones that failed with the previous one (if previously specified). The sequence number is a four digit hexadecimal number (0000 - FFFF). The default is 0000.

This flag is not supported for machine type 2105.

Example: 0010

source_volume_ID:target_volume_ID . . . | -
(Required) Increments a FlashCopy relationship for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal 'XYZZ', where 'XY' is a logical subsystem (LSS) number (00 - FE), and 'ZZ' is a volume number (00 - FF) that is contained by a logical subsystem..

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the resyncflash command
```
dscli>resyncflash IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
```

The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200 successfully incremented.
```

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) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes and you do not specify a value for the devid variable in your profile file.

Example: IBM.1750-75FA120

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

-l (Optional) Displays the default output plus copy indicator, out of sync tracks, date created, and date synchronized. You cannot use the -l and the -s flags 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, according to an internal algorithm.

-record
> (Optional) Displays the FlashCopy relationships that were established with the -record flag.

-persist
> (Optional) Displays the FlashCopy relationships that were established with the -persist flag.

-revertible
> (Optional) Displays the FlashCopy relationships that were established with the -revertible flag.

-cp
> (Optional) Displays the FlashCopy relationships that were established with the -cp flag.

-seqnum *flash_sequence_number*
> (Optional) Displays the FlashCopy relationships that are associated with the specified sequence number. The default is 0000.
>
> This parameter is not supported for machine type 2105.

source_volume_ID:target_volume_ID **|** *source_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 source volume ID is specified.
>
> Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag is specified or you 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 format of a volume ID is hexadecimal ″XYZZ″, where ″XY″ is a logical subsystem (LSS) number (00 - FE), and ″ZZ″ is a volume number (00 - FF) that is contained by a logical subsystem.
>
> You must separate multiple IDs with spaces. You can specify FlashCopy pair IDs and a range of FlashCopy pair IDs, or you can specify source volume IDs and a range of source volume IDs. You cannot specify a combination of FlashCopy pair IDs and source volumes IDs.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004
>
> Example of a shortened version: 0001:0004
>
> Example of multiple pairs: 0001:0004 0003:00FF 0008:000C

Example (1750)

Invoking the lsflash command
```
dscli>lsflash -s -fullid -hdr off -dev IBM.1750-75FA120 IBM.1750-75FA120/0100-0103
```

The resulting output
```
IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
IBM.1750-75FA120/0101:IBM.1750-75FA120/0201
IBM.1750-75FA120/0102:IBM.1750-75FA120/0202
IBM.1750-75FA120/0103:IBM.1750-75FA120/0203
```

mkflash
The mkflash command initiates a point-in-time copy from source volumes to target volumes.
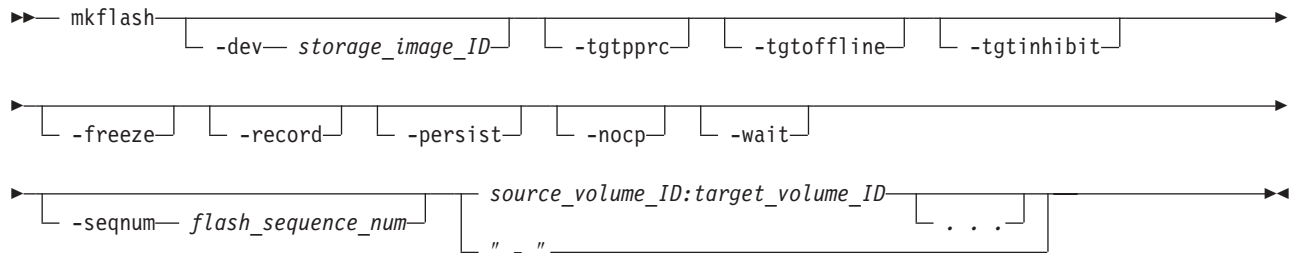
Parameters

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which consists of a manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes and you do not specify a value for the devid variable in your profile file.

Example: IBM.1750-75FA120

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

-tgtoffline
(Optional) Causes the mkflash command to be rejected if the target volume is online for host system access. This flag applies only to count key data volumes.

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

-freeze
(Optional) 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. 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 flag.

-record
(Optional) Records the changed tracks on both volumes within a FlashCopy pair. Select this flag when you establish an initial FlashCopy volume pair that you intend to use with the resyncflash command. The -persist flag is automatically selected when this flag is selected.

-persist

(Optional) Retains the FlashCopy relationship after the background copy completes. The FlashCopy relationship between the source and the target volumes remains indefinitely until you issue a rmflash command. This flag is automatically selected when the -record flag is selected. Select this flag along with the -record flag if you will be using this volume pair with the resyncflash, reverseflash, or setflashrevertible commands.

-nocp

(Optional) Inhibits 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.

-wait

(Optional) Delays the command response until the background copy process completes. You cannot use the -wait flag with either the -persist or -nocp flag.

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relations that are established with the specified sequence number. This sequence number can be used as an identifier for a relation or group of relations. The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

This parameter is not supported for machine type 2105.

Example: 0010

source_volume_ID:target_volume_ID . . . | -

(Required) Establishes a FlashCopy relationship for the source and target volume pairs with the specified IDs. This command accepts fully qualified volume IDs, which consist of storage image IDs or a shortened version without storage image IDs, if the -dev flag is specified. You can also 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.

Note: It is possible that during processing you will receive an error message indicating that relationships have been exceeded or that an initial volume format is in progress. This 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. Later, you can issue another the FlashCopy relationship after the initial volume format process is complete.

The format of a volume ID is hexadecimal XYZZ, where *XY* is a logical subsystem (LSS) number (00 - FE), and *ZZ* is a volume number (00 - FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the mkflash command

```
dscli>mkflash IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
```
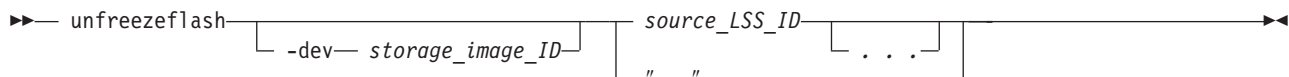
The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200 successfully created.
```

reverseflash

The direction of a FlashCopy relationship can be reversed, where the volume that was previously defined as the target becomes the source for the volume that was previously defined as the source (and is now the target). The data that has changed is copied to the volume that was previously defined as the source. For example, suppose 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.

```
►►── reverseflash ──┬──────────────────────────┬──┬─────────┬──┬──────────┬──┬───────┬──►
                    └─ -dev ── storage_image_ID ┘  └─ -record ┘  └─ -persist ┘  └─ -fast ┘

►──┬───────────┬──┬──────────────┬──┬──────────────┬──┬─────────────────────────────┬──►
   └─ -tgtpprc ┘  └─ -tgtoffline ┘  └─ -tgtinhibit ┘  └─ -seqnum ── flash_sequence_num ┘

►──┬─ source_volume_ID:target_volume_ID ──┬────────┬──────────────────────────────────►◄
   │                                       └─ . . . ┘
   └─ " - " ────────────────────────────────────
```
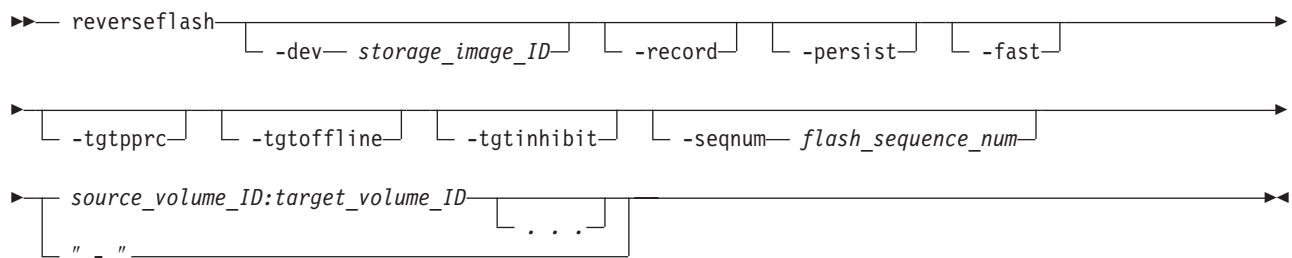
Parameters

The source volume and the target volume that are specified by this command are the current source and target volumes that, as a result of this command process, become reversed. The specified target volume becomes the source and the specified source volume becomes the target. The target parameters specified by this command apply to the new target (the source volume that becomes the target volume when this command is processed).

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

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

-dev *storage_image_ID*
    (Optional) Specifies the storage image ID, which includes manufacturer, type,

and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes and you do not specify a value for the devid variable in your profile file.

Example: IBM.1750-75FA120

-record
(Optional) Records the changed tracks on both volumes within a FlashCopy pair. Select this flag when you establish an initial FlashCopy volume pair that you intend to use with the resyncflash command. The -persist flag is automatically selected when this flag is selected.

-persist
(Optional) Retains the FlashCopy relationship after the background copy completes. The FlashCopy relationship between the source and the target volumes remains indefinitely until it is broken by a rmflash command. This flag is automatically selected when the -record flag is selected. Select this flag along with the -record flag if you are using this volume pair with the resyncflash, reverseflash, or setflashrevertible commands.

-fast
(Optional) Specify this flag when the reverseflash command will be issued before the background copy completes.

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

-tgtoffline
(Optional) Causes the reverseflash command to be rejected if the target volume is online for host system access. This flag only applies to CKD volumes.

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

-seqnum *flash_sequence_num*
(Optional) Associates the FlashCopy relations that are reversed with the specified sequence number. Only the relations that are successfully modified by the command receive the specified sequence number, leaving the ones that failed with the previous number (if previously specified). The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

Example: 0010

This parameter is not supported for machine type 2105.

source_volume_ID:target_volume_ID . . . | -
(Required) Reverses a FlashCopy relationship for the source and target volume pairs with the specified IDs. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal ″XYZZ″, where *XY* is a logical subsystem (LSS) number (00 - FE), and *ZZ* is a volume number (00 - FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the reverseflash command

```
dscli>reverseflash IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
successfully reverse restored.
```

revertflash

The revertflash command overwrites new data with data saved at the last consistency formation. To use this command, you must first issue the mkflash command with the -record and -persist flags. You must then issue the setflashrevertible command against the pair.

Parameters

-dev *storage_image_ID*
   (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source volume and you do not specify a value for the devid variable in your profile file.

   Example: IBM.1750-75FA120

-seqnum *flash_sequence_num*
   (Optional) Specifies the FlashCopy sequence number. When this number is specified, the revertflash operation is performed only on those relations associated with the specified number. The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

   This parameter is not supported for machine type 2105.

   Example: 0010

source_volume_ID . . . | -
   (Required) Specifies 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 flag. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal ″XYZZ″, where ″XY″ is a logical subsystem (LSS) number (00 - FE), and ″ZZ″ is a volume number (00 - FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (-) is specified.

Example of a fully qualified volume ID: IBM.1750-75FA120/0001

Example of a shortened version: 0001

Example of multiple IDs: 0001 0003 0008

Example (1750)

Invoking the revertflash command

```
dscli>revertflash IBM.1750-75FA120/0100
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
successfully reverted to the previous consistency.
```

rmflash

The rmflash command removes a relationship between FlashCopy volume pairs.

```
►►── rmflash──────────────────────────────────────────────────────────────►
            └─ -dev── storage_image_ID ─┘  └─ -quiet ─┘  └─ -tgtonly ─┘  └─ -cp ─┘

►──────────────────────────────────────────────────────────────────────────►
   └─ -resettgtinhibit ─┘  └─ -wait ─┘  └─ -seqnum── flash_sequence_number ─┘

►── source_volume_ID:target_volume_ID ──────────────────────────────────────►◄
   └─ ″ - ″ ──────────────────────────┘  └─ . . . ─┘
```
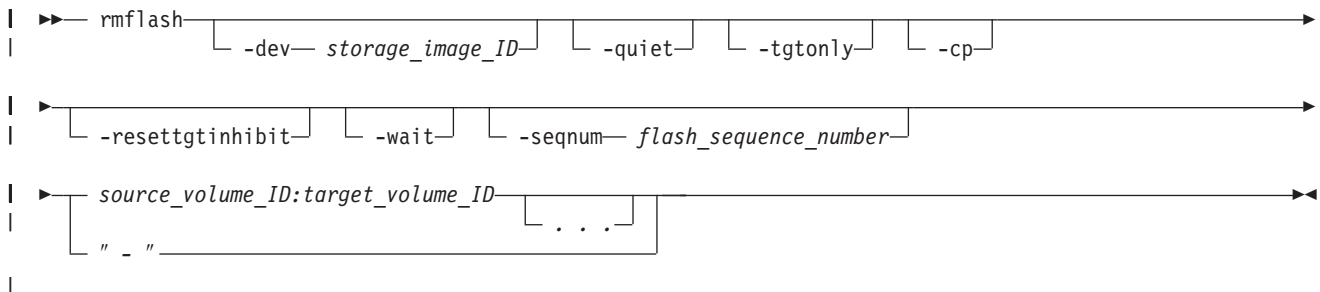
Parameters

Note:

- Invoking this command with the **-cp** parameter on a FlashCopy relationship that was previously marked with -persist will not remove the relationship. Instead, the source data is copied to the target.
- Invoking this command with the **-resettgtinhibit** parameter does not withdraw the relationship, but resets the **-tgtinhibit** option if it was previously set.
- All settings apply to all FlashCopy pairs specified.
- Do not use the **-wait** parameter on persistent relations.
- The **-seqnum** parameter is not supported for model 2105.

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which includes manufacturer, type,

and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes and you do not specify a value for the devid variable in your profile file.

Example: IBM.1750-75FA120

-quiet
(Optional) Specifies that the confirmation prompt for this command be turned off.

-tgtonly
(Optional) Specifies the target volume of the FlashCopy pair to remove the relationship. In addition, the Copy Indicator for the target volume is reset. This flag applies only to fixed block volumes.

-cp
(Optional) Specifies that the FlashCopy relationship be changed from No Copy to Copy and that the remaining source volume tracks be copied to the target volume. The relationship is removed when all the data is copied unless the relationship is persistent. When this flag is specified, the copy takes place for all volume pairs where the source volume ID is identical to the source volume specified in the command.

-resettgtinhibit
(Optional) Specifies that target write access is allowed. The **-resettgtinhibit** parameter resets the flag that does not allow host system write operations to the target ID while the FlashCopy relationship exists, in case it was previously set.

-wait
(Optional) Specifies that the command response be delayed until the background copy process completes.

Note: The -cp flag must be used with this flag.
Do not use this flag on relations that are marked -persist. This will result in an error.

-seqnum *flash_sequence_num*
(Optional) Specifies the FlashCopy sequence number. When this number is specified, the rmflash operation is performed only on those relations associated with the specified number. The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

Example: 0010

Note: This parameter is not supported for machine type 2105.

source_volume_ID:target_volume_ID . . . | -
(Required) Specifies the source and target volume pairs for which the FlashCopy relationships are removed. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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.

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

The format of a volume ID is hexadecimal ″XYZZ″, where ″XY″ is a logical subsystem (LSS) number (00 - FE), and ″ZZ″ is a volume number (00 - FF) that is contained by a logical subsystem..

Alternatively, accepts input from stdin when the dash (-) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the rmflash command

```
dscli>rmflash
IBM.1750-75FA12/00100:1750-75FA12/0200
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Are you sure you want to remove the FlashCopy pair
IBM.1750-75FA120/0001:IBM.1750-75FA120/0002? [y/n]: Y

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200 successfully removed.
```

unfreezeflash

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

```
►►── unfreezeflash─────────────────────┬─ source_LSS_ID─┬────────┬───────────────►◄
                    └─ -dev── storage_image_ID─┘   └─  ″ - ″ ──┘  └ . . . ┘
```

Parameters

-dev *storage_image_ID*
(Optional) Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified source LSS ID and you do not specify a value for the devid variable in your profile file.

Example: IBM.1750-75FA120

source_LSS_ID . . . | -
(Required) Resets the FlashCopy consistency group for these source logical subsystems (LSSs). Accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the -dev flag 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, where ″XX″ is a hexadecimal number in the range (00 - FE).

Alternatively, accepts input from stdin when the dash (-) is specified.

Example of a fully qualified LSS ID: IBM.1750-75FA120/00

Example of a shortened version: 00

Example of multiple IDs: 10 20 30

Example (1750)

Invoking the unfreezeflash command

```
dscli>unfreezeflash IBM.1750-75FA120/01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy consistency group for logical subsystem IBM.1750-75FA120/01
successfully reset.
```

setflashrevertible

The setflashrevertible command modifies a FlashCopy volume pair that is part of a Global Mirror relationship to revertible. This command must be run before the FlashCopy pair can be committed or reverted. Once a pair is revertible, the data can be committed to the target to form a new consistency, or reverted back to the last consistency.

```
►►── setflashrevertible ─────────────────────────────────────────────────►
                        └─ -dev─ storage_image_ID ─┘   └─ -tgtoffline ─┘

►──────────────────────────── source_volume_ID:target_volume_ID ──────────►◄
    └─ -seqnum─ flash_sequence_num ─┘  │                          └─ ... ─┘
                                       └─ " - " ──────────────────────────
```

Parameters

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

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source volume and you do not specify a value for the devid variable in your profile file.

  Example: IBM.1750-75FA120

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

-seqnum *flash_sequence_num*
  (Optional) Associates the FlashCopy relations that are changed with the specified sequence number. Only the relations that are successfully modified by the command will get the specified sequence number, leaving the ones that failed with the previous number (if previously specified). The sequence number is a four digit hexadecimal number (0000 - FFFF). The default is 0000.

  This parameter is not supported for machine type 2105.

  Example: 0010

source_volume_ID:target_volume_ID . . . | -

(Required) Modifies FlashCopy relationships for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal ″XYZZ″, where ″XY″ is a logical subsystem (LSS) number (00 - FE), and ″ZZ″ is a volume number (00 - FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (-) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the setflashrevertible command

```
dscli>setflashrevertible
 IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
```

The resulting output

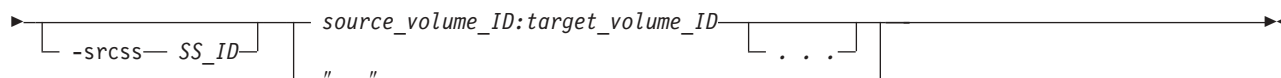```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy volume pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200 successfully
made revertible.
```

# Remote FlashCopy commands

This section contains commands that are used to configure Remote FlashCopy relationships and to display Remote FlashCopy information. Remote FlashCopy commands are used to process what was formerly known as inband FlashCopy transactions. These types of transactions can not be handled through the GUI.

Use the following commands to configure Remote FlashCopy relationships and to display Remote FlashCopy information. Also, see the *Processing Remote FlashCopy (inband) transactions* scenario for more details.

## commitremoteflash

The commitremoteflash command commits data to a target volume to form a consistency between the remote source and target FlashCopy pair. Before you use this command, you must first issue either the command mkflash or mkremoteflash with the -record and -persist flags. After the pair is established, you must then issue either the setflashrevertible or setremoteflashrevertible command against the pair.

```
►►── commitremoteflash──────────────────────── -conduit── LSS_ID──────────────────►
              └─ -dev── storage_image_ID─┘
```

```
 ┌──────────────────────────────┐  ┌────────────────┐  ┌─source_volume_ID─┐      ┌─────┐
─►┤ -seqnum─ flash_sequence_num  ├──┤ -srcss─ SS_ID  ├──┤                  ├──────┤ ... ├──►◄
  └──────────────────────────────┘  └────────────────┘  └─ " - " ─────────┘      └─────┘
```

Parameters

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for all the source volumes and you do not specify a value for the devid variable in your profile file.

  Example: IBM.1750-75FA120

-conduit *LSS_ID*
  (Required) Specifies 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 *source_volume_ID:target_volume_ID* 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. Accepts 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: IBM.1750-75FA120/00

-seqnum *flash_sequence_number*
  (Optional) Specifies that the commit is to be performed only on those source volumes associated with the sequence number specified. The sequence number is a four-digit hexadecimal number in the range (0000 - FFFF). The default value is 0000.

  This parameter is not supported for machine type 2105.

  Example: 0010

-srcss *SS_ID*
  (Optional) Specifies 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 flag is used, all source volumes must be within the same logical subsystem.

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

  Example: FF10

source_volume_ID . . . | -
  (Required) Commits remote FlashCopy relationships for the source volumes with the IDs specified. If multiple relationships exist for a source volume, then the chosen pair is the one with the enabled -record flag. You must separate multiple source volume IDs with spaces.

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

  The shortened volume ID format is hexadecimal ″XYZZ″, where ″X″ is an address group number (0 - F), ″XY″ is a logical subsystem (LSS) number (00 - FE), and ″ZZ″ is a volume number (00 - FF) that is contained by the logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified volume ID: IBM.1750-75FA120/0001

Example of a shortened version: 0001

Example of IDs: 0001 0003 0008

Example (1750)

Invoking the commitremoteflash command
```
dscli>commitremoteflash -conduit IBM.1750-75FA150/10 IBM.1750-75FA120/0100
```
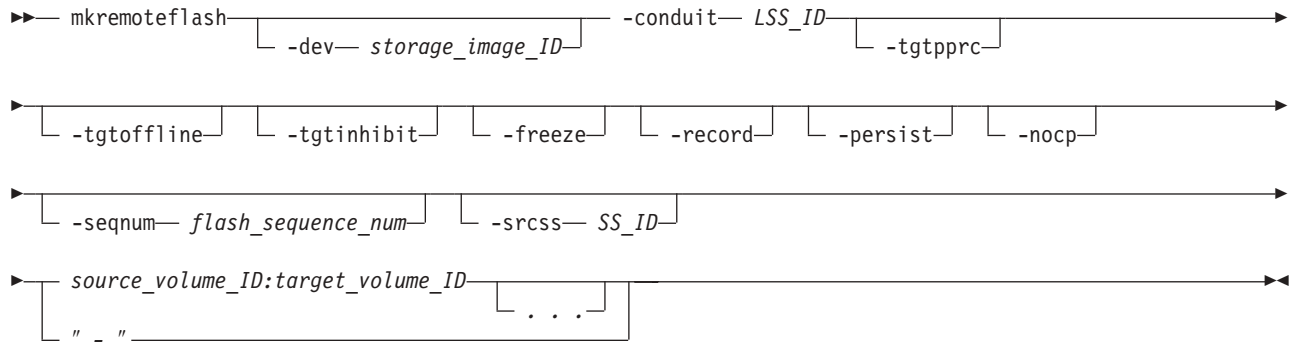
The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200 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 flags. When a pair is established with the -record and -persist flags, the pair initially synchronizes and then a record of all host writes to the source is maintained in the source volumes. When the resyncremoteflash command is issued on that pair, the new writes to the source are copied to the target. The specified flags in this command replace the flags in the existing relationship. In order to keep the initial -record and -persist flags, they must be specified using the resyncremoteflash command.

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes and you do not specify a value for the devid variable in your profile file.

> Example: IBM.1750-75FA120

-conduit *LSS_ID*
> (Required) Specifies 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 *source_volume_ID:target_volume_ID* 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 command accepts 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: IBM.1750-75FA120/00

-record
(Optional) Records the changed tracks on both volumes within a FlashCopy pair. Select this flag if you intend to use the resyncremoteflash command again with this pair. The -persist flag is automatically selected when this flag is selected.

-persist
(Optional) Retains the FlashCopy relationship after the background copy completes. The FlashCopy relationship between the source and the target volumes remains indefinitely until it is broken by a rmremoteflash command. This flag is automatically selected when the -record flag is selected. Select this flag along with the -record flag if you will be using this volume pair with the resyncremoteflash, reverseremoteflash, or setremoteflashrevertible commands.

-freeze
(Optional) 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. 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 flag.

-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. This flag applies only to count key data volumes.

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

-seqnum *flash_sequence_num*
(Optional) Associates the FlashCopy relations that are established with the specified sequence number. You can use this sequence number as an identifier for a relation or group of relations. Only the relations that are modified successfully by the resyncremoteflash command will get the specified sequence number, leaving the ones that fail with the previous one (if they were previously specified). The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

This parameter is not supported for machine type 2105.

Example: 0010

-srcss *SS_ID*
(Optional) Specifies 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 flag is used, all source volumes must be within the same logical subsystem.

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

Example: FF10

source_volume_ID:target_volume_ID . . . | -
(Required) Increments a remote FlashCopy relationship for the source and target volume pairs with the specified IDs. This command accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs, if the -dev flag is specified, 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 format of a volume ID is hexadecimal *″XYZZ″*, where *″XY″* is a logical subsystem (LSS) number (00 - FE), and *″ZZ″* is a volume number (00 - FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the resyncremoteflash command
```
dscli>resyncremoteflash
 -conduit IBM.1750-75FA150/10 IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
```

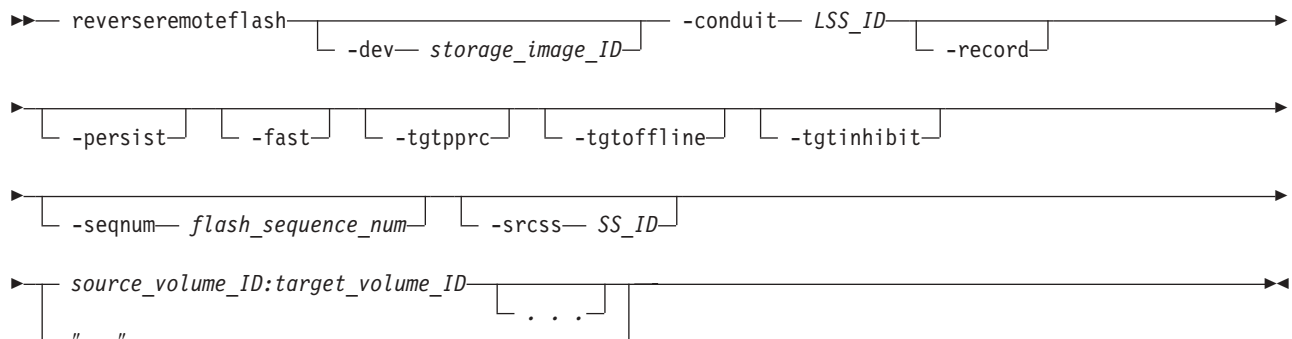**The resulting output**
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
 successfully incremented.
```

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

```
               ┌──────────────────┐     source_volume_ID:target_volume_ID ┌────────┐
►►─┬───────────────────┬──┬──────────────────────────────────────┬─┬──────┬─►◄
   └─ -srcss─ SS_ID ────┘  └─ " - " ───────────────────────────────┘ └ . . . ┘
```

Parameters

Note: All settings apply to all FlashCopy Pairs specified.

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes.
>
> Example: IBM.1750-75FA120

-conduit *LSS_ID*
> (Required) Specifies the source logical subsystem (LSS) of an existing remote mirror and copy (formerly PPRC) relationship that is to be used as a conduit 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 conduit LSS volumes serves as a primary volume. Accepts 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: IBM.1750-75FA120/00

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

-l (Optional) Displays the default detailed output plus Out-of-Sync Tracks and Date Created. You cannot use the -l and the -s flags 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, according to an internal algorithm.

-record
> (Optional) Displays the FlashCopy relationships that were established with the -record flag.

-persist
> (Optional) Displays the FlashCopy relationships that were established with the -persist flag.

-revertible
> (Optional) Displays the FlashCopy relationships that were established with the -revertible flag.

-cp
> (Optional) Displays the FlashCopy relationships that were established with the -cp flag.
>
> **Note:** When you issue this command, with the cp option on a remote FlashCopy relationship that was created with the persistent option, the

relationship will not be removed. Instead, the source volume is copied to the target volume. To display whether the relationship is deleted, issue the lsremoteflash command.

-seqnum *flash_sequence_number*
(Optional) Displays the FlashCopy relationships that are associated with the specified sequence number. The sequence number is a four digit hexadecimal number (0000 - FFFF). The default is 0000.2.

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 TotalStorage 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

source_volume_ID:target_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 source volume ID is specified.

Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal *XYZZ*, where *XY* is a logical subsystem (LSS) number (00 - FE), and *ZZ* is a volume number (00 - FF) that is contained by a logical subsystem.

You must 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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified volume ID pair: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the lsremoteflash command
```
dscli>lsremoteflash -l -fullid -dev IBM.1750-75FA120
-conduit IBM.1750-75FA150/10 IBM.1750-75FA120/0100:IBM.1750-75FA120/0200
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
 DS: IBM.1750-75FA120

ID  SrcLSS Sequence Num Active Copy Recording Persistent Revertible
 Source Write Enabled Target Write Enabled Background Copy
  OutOfSync Tracks  DateCreated  DateSynced
0100:0200 01 10  Disabled Disabled Disabled Disabled
 Enabled   Disabled  Disabled
  0    12/01/2003 02:20:00 12/01/2003 02:23:47
```

mkremoteflash

The mkremoteflash command initiates a remote copy from source volumes to target volumes through a remote mirror and copy (formerly PPRC) relationship.

Parameters

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes.

  Example: IBM.1750-75FA120

-conduit *LSS_ID*
  (Required) Specifies 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 *source_volume_ID:target_volume_ID* 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. Accepts 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: IBM.1750-75FA120/00

-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 flag applies only to CKD volumes.

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

-freeze

(Optional) 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 or by a unfreezeflash command. This command must be run from a new session that is connected directly to the storage image.

-record

(Optional) Records the changed tracks on both volumes within a FlashCopy pair. Select this flag when you establish an initial FlashCopy volume pair that you intend to use with the resyncremoteflash command. The -persist flag is automatically selected when this flag is selected.

-persist

(Optional) Retains the FlashCopy relationship after the background copy completes. The FlashCopy relationship between the source and the target volumes remains indefinitely until broken by a rmremoteflash command. This flag is automatically selected when the -record flag is selected. Select this flag along with the -record flag if you will be using this volume pair with the commands resyncremoteflash, reverseremoteflash, or setremoteflashrevertible.

-nocp

(Optional) Inhibits 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.

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relations that are established with the specified sequence number. This sequence number can be used as an identifier for a relation or group of relations. The sequence number is a four-digit hexadecimal number (0000–FFFF). The default is 0000.

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 TotalStorage Enterprise Storage Server versions 2.4.0 and 2.4.1. 3. When you specify *SS_IDs*, the source volumes are restricted to one LSS.

Example: FF10

source_volume_ID:target_volume_ID . . . | -

(Required) Establishes a remote FlashCopy relationship for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal *XYZZ*, where *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the mkremoteflash command

```
dscli>mkremoteflash -dev IBM.1750-75FA120
-conduit IBM.1750-75FA150/10 0100:0200
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
 DS: IBM.1750-75FA120

FlashCopy Pair ID 0100:0200 successfully initiated.
Use the lsremoteflash command to determine copy completion.
```

reverseremoteflash

The reverseremoteflash command restores an existing remote FlashCopy pair that was previously established with the -record and -persist flags. When a pair is established with the -record and -persist flags, the pair will initially synchronize and then a record will be kept of all host writes to the source. When this command is issued on that pair, the new data on the source will be overwritten with the previously saved data on the target. The pair will be permanently reversed, meaning the source is now the target and the target now the source. The flags specified in this command will replace the flags in the existing relationship. In order to keep the pair with the -record and -persist flags, they must be specified.

```
►►── reverseremoteflash ──────────────────────────────── -conduit─ LSS_ID ──────────────►
                       └─ -dev─ storage_image_ID ─┘                    └─ -record ─┘

►─────────────────────────────────────────────────────────────────────────────────────►
  └─ -persist ─┘  └─ -fast ─┘  └─ -tgtpprc ─┘  └─ -tgtoffline ─┘  └─ -tgtinhibit ─┘

►─────────────────────────────────────────────────────────────────────────────────────►
  └─ -seqnum─ flash_sequence_num ─┘  └─ -srcss─ SS_ID ─┘

►─ source_volume_ID:target_volume_ID ────────────────────────────────────────────────►◄
  │                                  └─ . . . ─┘
  └─ " - " ──────────────────────────┘
```

Parameters

-dev *storage_image_ID*

(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source and target volumes.

Example: IBM.1750-75FA120

-conduit *LSS_ID*

(Required) Specifies the source logical subsystem (LSS) of an existing remote mirror and copy (PPRC) relationship that is to be used as a conduit 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 conduit LSS volumes serves as a primary volume. Accepts 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: IBM.1750-75FA120/00

-record

(Optional) Records the changed tracks on both volumes within a FlashCopy pair. Select this flag when you establish an initial FlashCopy volume pair that you intend to use with the resyncremoteflash command. The -persist flag is automatically selected when this flag is selected.

-persist

(Optional) Retains the FlashCopy relationship after the background copy completes. The FlashCopy relationship between the source and the target volumes remains indefinitely until broken by a rmremoteflash command. This flag is automatically selected when the -record flag is selected. Select this flag along with the -record flag if you will be using this volume pair with the resyncremoteflash, reverseremoteflash, or setremoteflashrevertible commands.

-fast

(Optional) Specify this flag when the reverseremoteflash command will be issued without the background copy completing.

-tgtpprc

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

-tgtoffline

(Optional) Causes the reverseremoteflash command to be rejected if the target volume is online for host system access. This flag only applies to CKD volumes.

-tgtinhibit

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

-seqnum *flash_sequence_num*

(Optional) Associates the FlashCopy relations that are reversed with the specified sequence number. Only the relations that are successfully modified by the command will get the specified sequence number, leaving the ones that failed with the previous number (if previously specified). The sequence number is a four digit hexadecimal number (0000–FFFF). The default is 0000.

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 TotalStorage Enterprise Storage Server versions 2.4.0 and 2.4.1.3. When you specify *SS_IDs*, the source volumes are restricted to one LSS.

Example: FF10

source_volume_ID:target_volume_ID . . . | -

(Required) Reverses a remote FlashCopy relationship for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal *XYZZ*, where *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the reverseremoteflash command

```
dscli>reverseremoteflash -dev IBM.1750-75FA120
-conduit IBM.1750-75FA150/10 0100:0200
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

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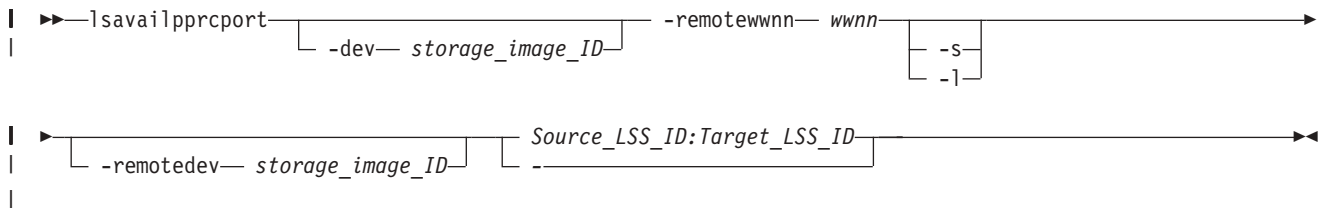
revertremoteflash

The revertremoteflash command overwrites new data with data saved at the last consistency formation. To use this command, you must first issue the mkremoteflash command with the -record and -persist flags. You must then issue the setremoteflashrevertible command against the pair.

```
►►─ revertremoteflash─┬─────────────────────────┬─ -conduit─ LSS_ID──────────────►
                      └─ -dev─ storage_image_ID─┘
```

```
  ►──┬──────────────────────────┬──┬─────────────┬──┬─source_volume_ID─────────┬──────────►◄
     └─ -seqnum─ flash_sequence_num ─┘  └─ -srcss─ SS_ID ─┘  │                  └─ . . . ─┘│
                                                            └─ " - " ──────────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source volume.
>
> Example: IBM.1750-75FA120

 -conduit *LSS_ID*
> (Required) Specifies the source logical subsystem (LSS) of an existing remote mirror and copy (formerly PPRC) relationship that is to be used as a conduit 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 conduit LSS volumes serves as a primary volume. Accepts 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: IBM.1750-75FA120/00

-seqnum *flash_sequence_num*
> (Optional) When a FlashCopy sequence number is specified, the revertremoteflash operation is performed only on those relations associated with the specified number. The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.
>
> 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 TotalStorage 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

source_volume_ID . . . | -
> (Required) Reverts a remote FlashCopy relationship for the source volume with the ID specified. The chosen FlashCopy pair is the one established or modified with the -record flag. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag is specified. You must separate multiple source volume IDs with spaces.
>
> The format of a volume ID is hexadecimal *XYZZ*, where *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00 - FF) that is contained by a logical subsystem.
>
> Alternatively, accepts input from stdin when the hyphen (-) is specified.
>
> Example of a fully qualified volume ID: IBM.1750-75FA120/0001
>
> Example of a shortened version: 0001

Example of multiple IDs: 0001 0003 0008

Example (1750)

Invoking the revertremoteflash command

```
dscli>revertremoteflash -dev IBM.1750-75FA120
-conduit IBM.1750-75FA150/10 0100
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair 0100:0200 successfully reverted to the previous consistency.
```

rmremoteflash

The rmremoteflash command removes a relationship between remote FlashCopy volume pairs. **Note**:

```
►►── rmremoteflash ─────────────────────────── -conduit─ LSS_ID ──────────────────────────►
                 └─ -dev─ storage_image_ID ─┘              └─ -quiet ─┘   └─ -tgtonly ─┘

►──────────────────────────────────────────────────────────────────────────────────────►
     └─ -cp ─┘  └─ -resettgtinhibit ─┘   └─ -seqnum─ flash_sequence_number ─┘   └─ -srcss─ SS_ID ─┘

►── source_volume_ID:target_volume_ID ──────────────────────────────────────────────────►◄
    └─ " - " ─────────────────────┘      └─ . . . ─┘
```
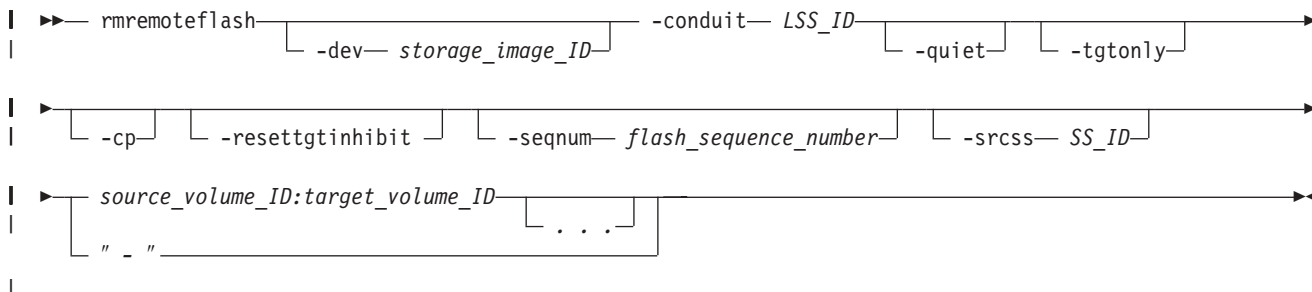
Parameters

Note:

- Invoking this command and using the **-cp** parameter on a FlashCopy relationship that was previously marked with -persist will not remove the relationship. Instead, the source volume is copied to the target volume.
- Invoking this command and using the **-resettgtinhibit** parameter does not withdraw the relationship, but resets the **-tgtinhibit** parameter option if it was previously set.
- All settings apply to all specified FlashCopy pairs.
- The **-seqnum** parameter is not supported for model 2105.
- When SS_IDs are specified, the source volumes are restricted to 1 LSS.

-dev *storage_image_ID*
  (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the source and target volumes.

  Example: IBM.1750-75FA120

-conduit *LSS_ID*
  (Required) Specifies the source logical subsystem (LSS) of an existing remote mirror and copy (formerly PPRC) relationship that is to be used as a conduit 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 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, where *XX* is a hexadecimal number in the range (00–FE).

Example: IBM.1750-75FA120/00

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

-tgtonly
(Optional) When you use this parameter, specify only the target volume of the remote FlashCopy pair to remove the relationship. In addition, the Copy Indicator for the target volume is reset.

Note: You can use this parameter only with fixed block volumes.

-cp
(Optional) Changes the FlashCopy relationship from No Copy to Copy and copies the remaining source volume tracks 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 is processed for all volume pairs where the source volume ID is identical to the source volume that is specified in the command.

-resettgtinhibit
(Optional) The **-resettgtinhibit** parameter resets the flag that does not allow host system write operations to the target ID while the FlashCopy relationship exists, if it was previously set.

Note: If this is the only specified parameter, the relationship is not withdrawn. Only the **-tgtinhibit** parameter is reset.

-seqnum *flash_sequence_num*
(Optional) When a FlashCopy sequence number is specified, the rmremoteflash operation is performed only on those relations that are associated with the specified number. The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

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 TotalStorage 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

source_volume_ID:target_volume_ID . . . | -
(Required) Removes remote FlashCopy relationships for the source and target volume pairs with the IDs that are specified. 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. When the **-tgtonly** parameter is used, enter volume IDs. Volume pair IDs cannot be used with the **-tgtonly** parameter.

The format of a volume ID is hexadecimal *XYZZ*, where *XY* is a logical subsystem (LSS) number (00 – FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the rmremoteflash command

```
dscli>rmremoteflash -dev IBM.1750-75FA120
-conduit IBM.1750-75FA150/10 0100:0200
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Are you sure you want to remove the FlashCopy pair 0100:0200? [y/n]: Y

Remove initiated successfully on FlashCopy pair 0100:0200.
Use the lsremoteflash command to determine if the relation is deleted.
```

setremoteflashrevertible

The setremoteflashrevertible command modifies a remote FlashCopy volume pair that is part of a Global Mirror relationship to revertible. This command must be run before the FlashCopy pair can be committed or reverted. Once a pair is revertible, the data can be committed to the target to form a new consistency, or reverted back to the last consistency.

```
►►── setremoteflashrevertible ──────────────────────── -conduit── LSS_ID ──────────────►
                            └─ -dev── storage_image_ID ─┘            └─ -tgtoffline ─┘

►──────────────────────────────────────────────────────────────────────────────────────►
    └─ -seqnum── flash_sequence_num ─┘  └─ -srcss── SS_ID ─┘

►── source_volume_ID:target_volume_ID ──────┬──────────────────────────────────────────►◄
    └─ " - " ────────────────────────────┘  └─ . . . ─┘
```

Parameters

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

-dev *storage_image_ID*
(Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source volume.

Example: IBM.1750-75FA120

-conduit *LSS_ID*

(Required) Specifies the source logical subsystem (LSS) of an existing remote mirror and copy (formerly PPRC) relationship that is to be used as a conduit 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 conduit LSS volumes serves as a primary volume. Accepts 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: IBM.1750-75FA120/00

-tgtoffline

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

-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 will get the specified sequence number, leaving the ones that failed with the previous number (if previously specified). The sequence number is a four-digit hexadecimal number (0000 - FFFF). The default is 0000.

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 TotalStorage Enterprise Storage Server versions 2.4.0 and 2.4.1.

Example: FF10

source_volume_ID:target_volume_ID . . . | -

(Required) Modifies the remote FlashCopy relationships for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag 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 format of a volume ID is hexadecimal *XYZZ*, where *XY* is a logical subsystem (LSS) number (00–FE), and *ZZ* is a volume number (00–FF) that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified FlashCopy pair ID: IBM.1750-75FA120/0001:IBM.1750-75FA120/0004

Example of a shortened version: 0001:0004

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

Example (1750)

Invoking the setremoteflashrevertible command

```
dscli>setremoteflashrevertible -dev IBM.1750-75FA120 0100:
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

FlashCopy pair 0100:0200 successfully modified to the revertible state.
```

Remote Mirror and Copy path commands

This section contains commands that are used to create and delete Remote Mirror and Copy (formerly PPRC) paths and to display Remote Mirror and Copy path information.

Use the following commands to create and delete Remote Mirror and Copy paths and to display Remote Mirror and Copy path information.

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 DS6000 supports only fibre channel ports. The Enterprise Storage Server (2105 machine type) supports ESCON ports.

```
►►──lsavailpprcport────────────────────────── -remotewwnn── wwnn ──────────────►
                     └─ -dev── storage_image_ID ─┘                    ├─ -s ─┤
                                                                      └─ -l ─┘

►──────────────────────────────── Source_LSS_ID:Target_LSS_ID ──────────────────►◄
    └─ -remotedev── storage_image_ID ─┘   └─ - ──────────────────────┘
```

Parameters

-dev *storage_image_ID*
   (Optional). Specifies the source volume storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the source logical subsystem.

   Example: IBM.1750-75FA120

-remotewwnn *wwnn*
   (Required). Specifies the worldwide node name (WWNN). The format is a 16-hexadecimal ID.

   Note: You want to use the WWNN that is associated with the storage image. Run the **lssi** or **showsi** command to obtain this number. If you use the WWNN that is associated with the storage unit, this command fails.

   WWNN example: 12341234000A000F

-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*
>(Optional). Specifies the target volume storage image that contains the queried I/O ports. This ID consists of manufacturer, type, and serial number. This parameter is required if you specify the -dev parameter.
>
>Example: IBM.1750-75FA120

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. 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'.
>
>Alternatively, accepts input from stdin when the dash (–) is specified.
>
>Example pair: 00:00
>
>Example of multiple pairs: 00:00 01:01 02:02

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lsavailpprcport** command using the **-l** parameter. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

Invoking the lsavailpprcport command

```
dscli>lsavailpprcport —l —dev IBM.1750-75FA120
 -remotedev IBM.1750-75FA150
—remotewwnn 12341234000A000F 01:01
```

The resulting output

ESCON port information displays for the 2105 machine type.

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

Report field descriptions

Local port
>Specifies the fully qualified unique Port ID on the local storage unit. 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

Specifies the fully qualified unique Port ID on the attached storage unit. 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, the value displayed in this column is **N/A** (not applicable).

Type Specifies 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

Specifies the Switch ID for ESCON Switch connections.

Note: For FCP and direct ESCON, the displayed value in this field is **N/A** (not applicable).

Switch port

Specifies 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, the value of this field is **N/A** (not applicable).

lspprcpath

The lspprcpath command displays a list of existing remote mirror and copy (formerly PPRC) path definitions.

```
►►──lspprcpath──┬──────────────────────────┬──┬─────────────────────────────┬──►◄
                └─ -dev─ storage_image_ID──┘  │  ┌─ Source_LSS_ID───┬──────┐ │
                                              ├─               └─ . . . ─┘ │
                                              └─ " - " ────────────────────┘
```
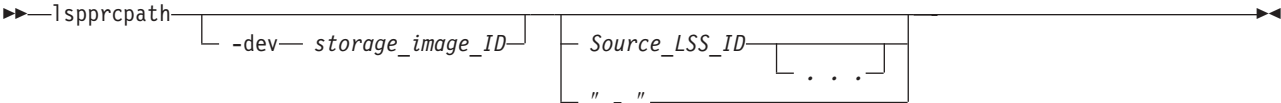
Parameters

-dev *storage_image_ID*

(Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the source LSS IDs and source port IDs.

Example: IBM.1750-75FA120

Source_LSS_ID . . . | -

(Required if –lss specified). Displays the remote mirror and copy paths that are defined for the specified source LSS IDs.

Accepts either a fully qualified LSS IDs, including the storage image ID, or a shortened version if the -dev flag is specified. The fully qualified LSS ID format is storage_image_id/xx, where 'xx' is a logical subsystem (LSS) hexadecimal number '00-FE'.

You must separate multiple LSS IDs with spaces.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example: 00

Example of multiple source LSS IDs: 00 01 02

Example (1750)

Invoking the lspprcpath command

```
dscli>lspprcpath -fullid -dev  IBM.1750
-75FA120 10
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Src   Tgt    State
 SS Port    Attached Port
IBM.1750-75FA120/10 IBM.1750-75FA150/10 Established
 0010 IBM.1750-75FA120/I0100 IBM.1750-75FA150/I0100
IBM.1750-75FA120/10 IBM.1750-75FA150/11 Established
 0011 IBM.1750-75FA120/I0100 IBM.1750-75FA150/I0100
IBM.1750-75FA120/10 IBM.1750-75FA150/12 Established
 0012 IBM.1750-75FA120/I0100 IBM.1750-75FA150/I0100
IBM.1750-75FA120/10 IBM.1750-75FA150/13 Established
 0013 IBM.1750-75FA120/I0100 IBM.1750-75FA150/I0100
```

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 TotalStorage Enterprise Storage Servers (2105, Model 800 and Model 750).

Parameters

Note:

1. The mkesconpprcpath command is applicable **only** for the IBM TotalStorage Enterprise Storage Server (2105, Model 800 and Model 750). Models 2107 and 1750 support only fiber 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). Specifies the source storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not fully qualify the source LSS ID.
>
> Example: IBM.2105-75FA120

-remotedev *storage_image_ID*
> (Optional). Specifies the remote storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not fully qualify the target LSS ID.
>
> Example: IBM.2105-75FA120

-srclss *Source_LSS_ID*
> (Required). Specifies 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). Specifies 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). Specifies 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*
> (Required). Specifies the worldwide node name. The format is a 16-hexadecimal ID.
>
> Example: 12341234000A000F

-tgtss *ss_ID*
> (Optional). Specifies 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.

Accepts only nonfully 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 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'. 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.

Accepts up to eight remote mirror and copy path port pair IDs. You must separate multiple port pair IDs with spaces.

Alternatively, accepts input from stdin when the dash (–) is specified.

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 (2105 use only)

Invoking the mkesconpprcpath command
```
dscli>mkesconpprcpath -dev IBM.2105-75FA120
-remotedev IBM.2105-75FA150
-srclss 01 -tgtlss -remotewwnn 12341234000A000F 01 I0100:I20 I0110:I21
```
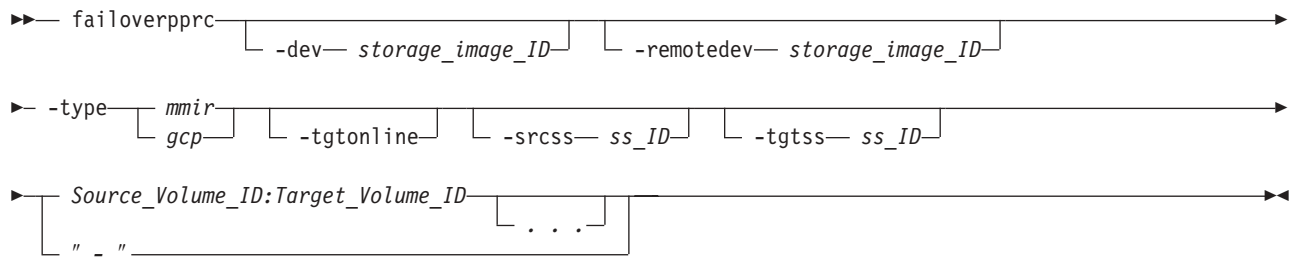
The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.2105-75FA120

PPRC path IBM.2105-75FA120/01:IBM.2105-75FA150/01 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. This is the only supported connectivity for machine types 2107 and 1750. Paths can be established between the following machine types: 2105:2105, 2107:2107, 2107:1750, 2107:2105, 1750:1750, 1750:2105.

```
►►─mkpprcpath─────────────────────────────────────────────────────────────────►
              └─ -dev─ storage_image_ID─┘  └─ -remotedev─ storage_image_ID─┘

►─ -remotewwnn─ wwnn─ -srclss─ source_LSS_ID──────────────── -tgtlss─ target_LSS_ID─────►
                                          └─ -srcss─ SS_ID─┘

►───────────────────────────────── source_port_ID:target_port_ID ───────────────────►◄
   └─ -tgtss─ SS_ID─┘  └─ -consistgrp─┘  └─ " - " ─────────────┘ └─ . . . ─┘
```

Parameters

-dev *storage_image_ID*
(Optional) Specifies the source storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified source port ID.

Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
(Optional) Specifies the ID of the secondary storage image, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified target port ID or if the -dev parameter is used.

Example: IBM.1750-75FA150

-remotewwnn *wwnn*
(Required) Specifies the worldwide node name of the secondary storage image. The format is a 16-hexadecimal ID.

Note: Use the worldwide node name that is associated with the storage image. Run the **lssi** or **showsi** command to obtain this number. If you use the WWNN that is associated with the storage unit, this command fails.

Example: 12341234000A000F

-srclss *source_LSS_ID*
(Required) Specifies 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 fully qualified LSS ID: IBM.1750-75FA120/00

Example of a shortened version: 00

-srcss *SS_ID*
(Optional) Specifies 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

-tgtlss *target_LSS_ID*

(Required) Specifies the target 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 -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).

Example of a fully qualified LSS ID: IBM.1750-75FA150/01

Example of a shortened version: 01

-tgtss *SS_ID*

(Optional) Specifies 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.

Normally, when an error occurs in a member of a remote mirror and copy volume pair, the storage unit places the volume in a suspended state. However, if the volume participates in a consistency group, it is placed in a long busy state.

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 includes the storage image ID, or use a shortened version without the storage image ID if the -dev and -remotedev parameters are 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.

Accepts up to eight remote mirror and copy path port pair IDs. You must separate multiple port pair IDs with spaces.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified remote mirror and copy path pair:
IBM.1750-75FA120/I1A10:IBM.1750-75FA150/I2A20

Example of the shortened version: I1A10:I2A20

Example of multiple pairs: I1A10:I2A20 I1A11:I2A21 I1A12:I2A22

Example (1750)

Invoking the mkpprcpath command

```
dscli>mkpprcpath -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150
-srclss 01 -tgtlss 01 —remotewwnn 12341234000A000F I0100:I0100
```
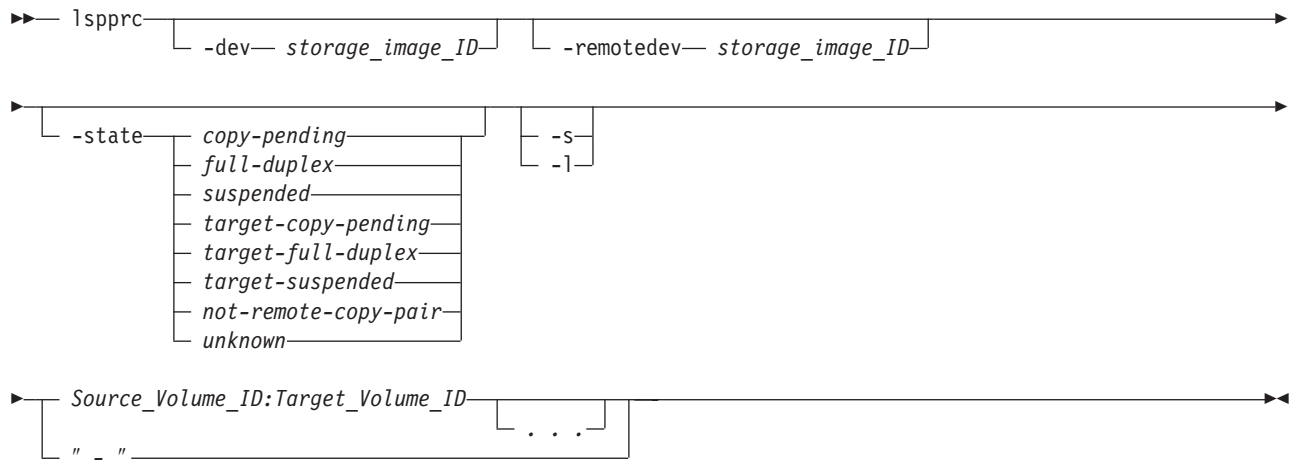
The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

PPRC path 01:01 successfully created.
```

rmpprcpath

The rmpprcpath deletes a remote mirror and copy (formerly PPRC) path.
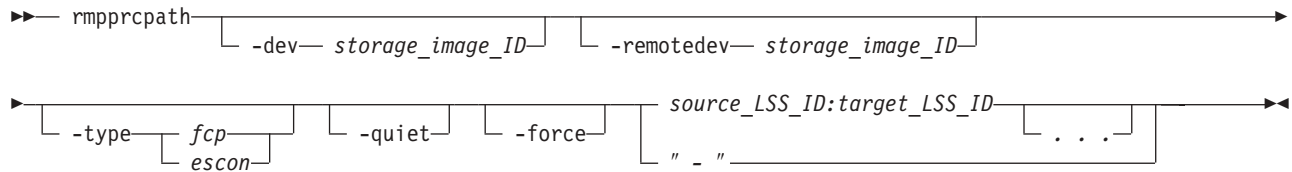
```
►►── rmpprcpath─────────────────────────────────────────────────────────────►
                   └─ -dev─ storage_image_ID ─┘   └─ -remotedev─ storage_image_ID ─┘

►──────────────────────────────────────── source_LSS_ID:target_LSS_ID ──────────────►◄
      └─ -type ─┬─ fcp ──┬─┘   └─ -quiet ─┘   └─ -force ─┘ └─ " - " ──────────────┘  └─ . . . ─┘
               └─ escon ─┘
```

Parameters

-dev *storage_image_ID*
  (Optional) Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified source LSS ID.

  Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
  (Optional) Specifies the target storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified target LSS ID or if the -dev flag is used.

  Example: IBM.1750-75FA150

-type *fcp | escon*
  (Optional) The type of the connection over which the path was created.

  fcp   Fibre-channel protocol

  escon   Enterprise Systems Connection (IBM S/390 and zSeries)

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

-force
  (Optional) Remove 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 will not be removed.

source_LSS_ID:target_LSS_ID . . . | -
  (Required) Specifies the remote mirror and copy path LSS pair ID. 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.

Removes a remote mirror and copy path relationship for the source and target LSSs. Accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the -dev flag is specified.

The fully qualified LSS ID format is storage_image_ID/XX, where ″XX″ is a hexadecimal number in the range (00 - FE).

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified pair: IBM.1750-75FA120/00:IBM.1750-75FA150/00

Example of a shortened version: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example (1750)

Invoking the rmpprcpath command

```
dscli>rmpprcpath -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150  01:01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Are you sure you want to delete PPRC path 01:01? [y/n]: Y

PPRC path 01:01 successfully deleted.
```

Remote Mirror and Copy pair commands

This section contains commands that are used to create, manage, and delete Remote Mirror and Copy (formerly PPRC) pairs and to display Remote Mirror and Copy pair information.

Use the following commands to create, manage, and delete Remote Mirror and Copy pairs and to display Remote Mirror and Copy pair information.

failbackpprc

You can issue the failbackpprc command against any remote mirror and copy volume that is in a primary suspended state. The command copies the required data from the source volume to the target volume in order to resume mirroring. The command is usually used after a failoverpprc command has been issued to restart mirroring either in the reverse direction (recovery site to production site) or original direction (production site to recovery site). However, this command also works if the target volume has been made simplex or is a secondary volume. The command performs a full or partial copy, as required.

```
►►─ failbackpprc ──────────────────────────────────────────────────────────►
                  └─ -dev─ storage_image_ID ─┘  └─ -remotedev─ storage_image_ID ─┘

►─ -type ─┬─ mmir ─┬──────────────────────────────────────────────────────►
          └─ gcp ──┘  └─ -srcss─ ss_ID ─┘  └─ -tgtss─ ss_ID ─┘

►─┬─ Source_Volume_ID:Target_Volume_ID ─┬─────────────────────────────────►◄
  │                                      └─ . . . ─┘
  └─ ″ - ″ ────────────────────────────────────────┘
```
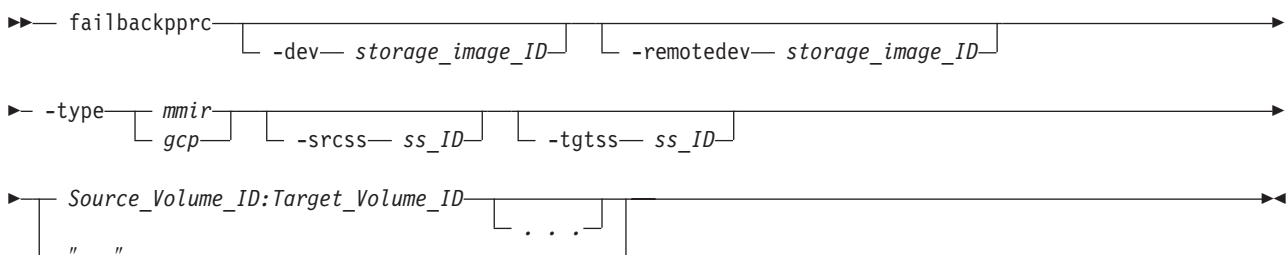
Parameters

Note: A metro mirror (synchronous) pair must be suspended before it can be reestablished as a Global Copy (extended distance) pair and vice versa. Also, when you specify 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). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not 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.

  Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
  (Optional). Specifies the target storage image ID, which includes manufacturer, type, and serial number. The -remotedev parameter identifies the remote storage unit that contains the target volume IDs that are defined by the Source_Volume_ID:Target_Volume_ID parameter. This flag is required if you do not specify a fully qualified target volume ID or if you use the -dev flag.

  Example: IBM.1750-75FA120

-type *mmir | gcp*
  (Required). Modify one or more existing 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 performed at a later time. The original order of updates is not strictly maintained.

-srcss *ss_ID*
  (Optional). Specifies 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. You can ignore this parameter for higher releases of the ESS, and for the 2107 and 1750.

  Note: The source and target volumes are restricted to one LSS for the source and one LSS for the target when you specify ss_IDs.

  Example: 0010

-tgtss *ss_ID*
  (Optional). Specifies 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. You can ignore this parameter for higher releases of the ESS, and for the 2107 and 1750.

Note: The source and target volumes are restricted to one LSS for the source and one LSS for the target when you specify ss_IDs.

Example: 0010

Source_Volume_ID:Target_Volume_ID . . . | -
(Required). This command is used to failback a remote mirror and copy volume relationship for the source and target volume pairs with the specified IDs. This command accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs if the -dev flag is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

A remote mirror and copy volume 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 format of a volume ID is hexadecimal 0*xxyzz*, where *x* is an address group number '0 - F', *xy* is a logical subsystem (LSS) number '00 - FE', and *zz* is a volume number 00 - FF that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified pair: IBM.1750-75FA120/0100:IBM.1750-75FA150/0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Example (1750)

Invoking the failbackpprc command

```
dscli>failbackpprc -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150
 0100:0100 0101:0101  0102:0102 0103:0103
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750.75FA120

PPRC pair IBM.1750-75FA120/0100:IBM.1750-75FA150/0100 successfully
  failed back.
PPRC pair IBM.1750-75FA120/0101:IBM.1750-75FA150/0101 successfully
  failed back.
PPRC pair IBM.1750-75FA120/0102:IBM.1750-75FA150/0102 successfully
 failed back.
PPRC pair IBM.1750-75FA120/0103:IBM.1750-75FA150/0103 successfully
 failed back.
```

failoverpprc
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. See ″Using the failoverpprc and failbackpprc commands″ scenario for further information.

```
►►── failoverpprc ──────────────────────────────────────────────────────────────►
                    └─ -dev── storage_image_ID ─┘   └─ -remotedev── storage_image_ID ─┘

►── -type ──┬─ mmir ─┬──────────────────────────────────────────────────────────►
            └─ gcp ──┘  └─ -tgtonline ─┘   └─ -srcss── ss_ID ─┘   └─ -tgtss── ss_ID ─┘

►──┬─ Source_Volume_ID:Target_Volume_ID ─┬──────────────────────────────────────►◄
   └─ " - " ──────────────────────────┘  └─ ... ─┘
```

Parameters

Note:

1. A Metro Mirror (synchronous) pair must be suspended before it can be reestablished by Global Copy (extended distance) and vice versa.
2. When you specify 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). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified source volume ID.

Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
(Optional). Specifies the target storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified target volume ID or if you use the -dev flag.

Example: IBM.1750-75FA120

-type *mmir | gcp*
(Required). Modifies one or more existing remote mirror and copy volume relationships as either Metro Mirror or Global Copy relationships.

mmir   Metro Mirror maintains the remote mirror and copy relationship in a consistent (synchronous) 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 performed at a later time. 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 S/390 or zSeries volumes. It does not apply to Open Systems volumes.

-srcss *ss_ID*
(Optional). Specifies 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

-tgtss *ss_ID*

(Optional). Specifies 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

source_volume_ID:target_volume_ID . . . | –

(Required) Changes the secondary device into a primary suspended device while leaving the primary device in its current state. This change causes the configuration to be symmetrical with both devices being primaries. You can issue the failbackpprc command (which cannot be issued until the failoverpprc command and process has completed) to resume mirroring in either direction.

This command accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs, if the -dev flag 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 format of a volume ID is hexadecimal 0x'xyzz'', where 'x' is an address group number '0-F', 'xy' is a logical subsystem (LSS) number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified pair: IBM.1750-75FA120/0100:IBM.1750-75FA150/0100

Example of a shortened version: 0100:0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Example (1750)

Invoking the failoverpprc command

```
dscli>failoverpprc -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150
 0100:0100 0101:0101  0102:0102 0103:0103
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

PPRC pair IBM.1750-75FA120/0100:IBM.1750-75FA150/0100 successfully
 suspended.
PPRC pair IBM.1750-75FA120/0101:IBM.1750-75FA150/0101 successfully
 suspended.
PPRC pair IBM.1750-75FA120/0102:IBM.1750-75FA150/0102 successfully
 suspended.
PPRC pair IBM.1750-75FA120/0103:IBM.1750-75FA150/0103 successfully
 suspended.
```

lspprc

The lspprc command displays a list of remote mirror and copy (formerly PPRC) volume relationships for a storage image, and status information for each remote mirror and copy volume relationship in the list.

```
►►── lspprc ─┬──────────────────────────┬─┬──────────────────────────────┬──►
             └─ -dev── storage_image_ID─┘ └─ -remotedev── storage_image_ID─┘

►─┬─────────────────────────────────────────────────┬────────────────────────►
  └─ -state ─┬─ copy-pending ───────┬─┬──────┬─┘
             ├─ full-duplex ────────┤ ├─ -s ─┤
             ├─ suspended ──────────┤ └─ -l ─┘
             ├─ target-copy-pending─┤
             ├─ target-full-duplex ─┤
             ├─ target-suspended ───┤
             ├─ not-remote-copy-pair┤
             └─ unknown ────────────┘

►─┬─ Source_Volume_ID:Target_Volume_ID ─┬──────┬────────────────────────────►◄
  └─ " - " ──────────────────────────────┘ └─ ... ─┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for the source and target volumes.
>
> Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
> (Optional). Specifies the target volume storage image ID, which consists of manufacturer, type, and serial number. This parameter is required if you specify the -dev flag.
>
> Example: IBM.1750-75FA120

-state *copy-pending* | *full-duplex* | *suspended* | *target-copy-pending* | *target-full-duplex* | *target-suspended* | *not-remote-copy-pair* | *unknown*
> (Optional). Identifies the state of the remote mirror and copy relationship.

> **copy pending**
>> Indicates that the relationship is copy pending. A Global Copy relationship is always copy pending.

> **full-duplex**
>> Indicates that the relationship is full duplex.

> **suspended**
>> Indicates that the relationship is suspended. The Reason attribute might indicate why the relationship is suspended.

> **target-copy-pending**
>> Indicates that the source volume is unknown or cannot be queried and the target state is copy pending.

> **target-full-duplex**
>> Indicates that the source volume is unknown or cannot be queried and the target state is full duplex.

target-suspended
> Indicates that the source volume is unknown or cannot be queried and the target state is suspended. The Reason attribute might indicate why the relationship is suspended.

not-remote-copy-pair
> Indicates that the relationship is not a remote copy pair.

unknown
> Indicates that the relationship state is unknown.

-s (Optional). Displays the remote mirror and copy volume pair IDs. You cannot use the -l and the -s parameters together.

-l (Optional). Displays the default output and the target read enabled, source cascade, target cascade, and suspended attributes. You cannot use the -l and the -s parameters together.

Source_Volume_ID:Target_Volume_ID . . . | –
> (Required) Displays the remote mirror and copy relationships for the source and target volume pairs with the specified IDs.

> 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 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 format of a volume ID is hexadecimal 0x'xyzz', where 'x' is an address group number '0-F', 'xy' is a logical subsystem (LSS) number '00-FE', and 'zz' is a volume number '00-FF' that is contained by a logical subsystem.

> Alternatively, accepts input from stdin when the dash (–) is specified.

> Example of a fully qualified remote mirror and copy pair ID: IBM.1750-75FA120/0100:IBM.1750-75FA130:0100

> Example of a shortened version: 0100:0100

> Example of multiple IDs: 0100:0100 0200:0200 0300:0300

Example

Note: The following tables represent the headers that are displayed on the output report that is associated with the **lspprc** command using the **-l** parameter. A separate example is not shown for the 1750 because the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

Invoking the lspprc command

```
dscli>lspprc -dev IBM.1750-75FA120 -l -remotedev IBM.1750-75FA150 0100:0100
0101:0101
```

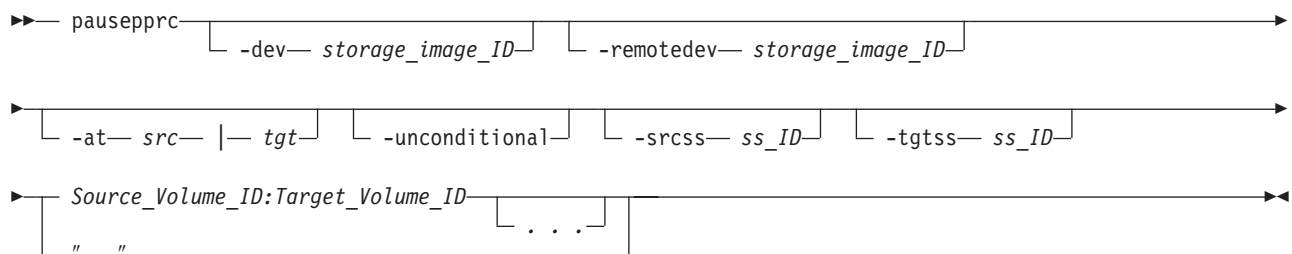**The resulting output**

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```

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 Sus pended	Source LSS	Timeout (secs)	Crit Mode	First Pass Status
Enabled	-	01	120	Disabled	False
Enabled	-	02	120	Disabled	False

Report field descriptions

ID   Specifies the source and target volume IDs of a PPRC volume relationship.

State   Displays the current PPRC volume relationship state. One of the following values is displayed:

Copy-Pending
Indicates that the relationship is copy pending. A Global Copy (Extended Distance) relationship is always copy pending.

Full-Duplex
Indicates that the relationship is full duplex.

Suspended
Indicates that the relationship is suspended. The Reason attribute might indicate why the relationship is suspended.

Target Copy Pending
Indicates that the source volume is unknown or cannot be queried and the target state is copy pending.

Target Full-Duplex
Indicates that the source volume is unknown or cannot be queried and the target state is full duplex.

Target Suspended
Indicates that the source volume is unknown or cannot be queried and the target state is suspended.

Not Remote Copy Pair
Indicates that the relationship is not remote copy pair.

Invalid-State

Indicates that the relationship state is invalid.

Reason

Indicates the reason the PPRC volume relationship is suspended.

Types   Indicates that the PPRC volume relationship is a Metro Mirror (synchronous) relationship, a Global Copy (extended distance) relationship, or the relationship type is unknown.

Out Of Sync Tracks

Indicates the number of tracks that are not synchronized for this FlashCopy relationship. The maximum value is dependent on the source volume size.

Tgt Read

Indicates that Read IO operations to the target volume are allowed.

Src Cascade

Indicates that the source volume of this relationship is enabled to also be a target volume of a different relationship.

Tgt Cascade

Indicates that the target volume of this relationship is enabled so that it is also a source volume for a different relationship.

Date Suspended

Indicates the date when this relationship was last suspended. The value can be displayed as a null (-).

SourceLSS

Indicates the Consistency Group LSS ID that is associated with the source volume of this PPRC volume relationship.

Timeout (secs)

Indicates the Consistency Group Long Busy Timeout setting for the LSS ID that is associated with the source volume of this PPRC volume relationship. The timeout value is either the default value of 120 seconds, or a user-specified value of 1 to 600 000 seconds.

Crit Mode

Indicates if the PPRC consistency group attribute Critical Heavy Mode is active for this PPRC volume relationship.

First Pass Status

Indicates the first pass Global Copy state of the source volume. The data is valid only when you query the primary box and the queried pair is a Global Copy pair.

mkpprc

The mkpprc command establishes a remote mirror and copy (formerly PPRC) relationship for a volume pair.

```
►►── mkpprc ──────────────────────────────────────────────────────── -type ──┬── mmir ──┬──►
              └─ -dev─ storage_image_ID ─┘  └─ -remotedev─ storage_image_ID ─┘         └── gcp ──┘

►──┬──────────────────────┬──┬────────────┬──┬─────────────┬──┬────────────┬──┬─────────────┬──►◄
   └─ -mode ─┬── full ──┬─┘  └─ -cascade ─┘  └─ -tgtonline ─┘  └─ -tgtread ─┘  └─ -critmode ─┘
             └── nocp ──┘
```

```
                                                                          
  ├──┬────────────┬──┬─────────────────┬──┬───────┬──┬──────────────┬──┬──────────────┬──▶
     └─ -suspend ─┘  └─ -resetreserve ─┘  └─ -wait┘  └─ -srcss─ ss_ID┘  └─ -tgtss─ ss_ID┘

  ▶──┬── Source_Volume_ID:Target_Volume_ID ──┬───────────────────────────────────────────◀
     │                               └─ ... ─┘
     └─ " - " ──────────────────────────────┘
```
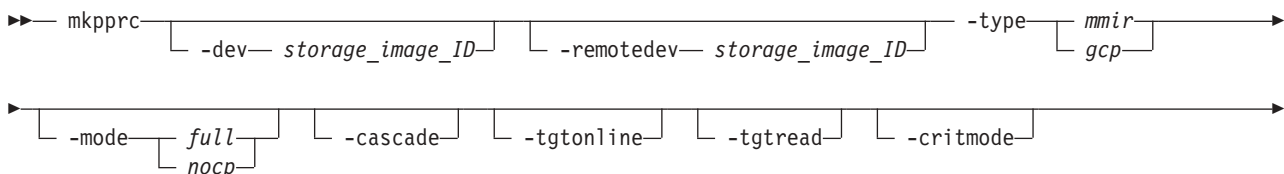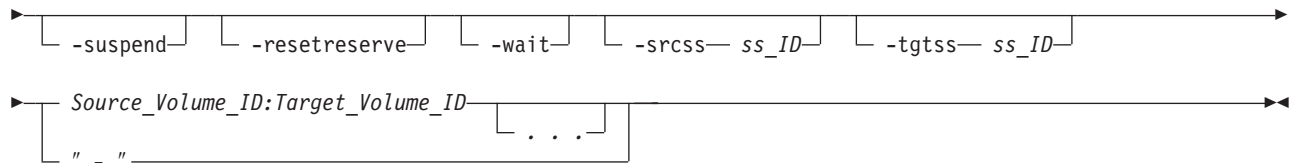
Parameters

Note:

- When you specify ssIDs, the source and target volumes are restricted to 1 LSS for the source and 1 LSS for the target.
- When you use the **-wait** parameter, you must wait until the original command completely processes before you can issue a new command.

  If you are running in single-shot mode, you can periodically issue the **lspprc** command to check the state, and then continue with new commands when the correct state is reached.

-dev *storage_image_ID*
: (Optional). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified source volume ID.

  Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
: (Optional). Specifies the target storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified target volume ID, or if the -dev option is selected.

  Example: IBM.1750-75FA120

-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 point in time. The original order of updates is not strictly maintained.

-mode *full* | *nocp*
: (Optional). Specifies the initial data copy mode for the remote mirror and copy volume relationships.

  full
  : Full mode copies the entire source volume to the target volume.

  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.

-tgtonline

(Optional). This parameter applies to S/390 or zSeries volumes. It does not apply to Open Systems volumes. Establishes a remote mirror and copy volume relationship, including when the target volume is online to host systems.

-tgtread

(Optional). This parameter applies to Open Systems volumes. It does not apply to IBM S/390 or zSeries volumes. 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.

-critmode

(Optional). This parameter protects the source volume from receiving new data. If the last path fails between the pairs, resulting in the inability to send information to the target, the source is protected. Current updates and subsequent attempts to update the source will fail, with a unit check on S/390 or a check condition on SCSI.

Note: This parameter can only be used with CKD volumes.

-suspend

(Optional). 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. Suspends the remote mirror and copy relationship when the task completes.

-resetreserve

(Optional - Open System volumes only). This option can only be used with Open System volumes. It 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 option is not specified and the volume on the secondary logical subsystem is reserved, the command fails.

-wait

(Optional). The wait option delays the command response until the PPRC 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 -type *gcp* or -mode *nocp*.

-srcss *ss_ID*

(Optional). Specifies 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

-tgtss *ss_ID*

(Optional). Specifies 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

Source_Volume_ID:Target_Volume_ID . . . | -
(Required). Establishes a remote mirror and copy volume relationship for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs or a shortened version without storage image IDs, if the -dev flag 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 format of a volume ID is hexadecimal 'xyzz', where 'x' is an address group number '0-F', 'xy' is a logical subsystem (LSS) number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified pair: IBM.1750-75FA120/0100:IBM.1750-75FA150/0100

Example of a shortened version: 0100:0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Additional processing tips

The following examples represent some CLI volume format options you might want to incorporate in your processing:

Handling multiple volumes
The following two examples are ways that this circumstance might be handled and both are correct. The first method might be fine if you were dealing with just a few volumes while the second allows you to handle hundreds or thousands of volumes more efficiently.
- `mkpprc -dev IBM.1750-13AB79A -remotedev IBM.1750-13AB76A –type mmir -mode full -tgtread 1000:1205 1001:1206 1002:1207 1003:1208 1004:1209 ....... and so on`
- `mkpprc -dev IBM.1750-13AB79A -remotedev IBM.1750-13AB76A –type mmir -mode full -tgtread 1000-1004:1205-1209`

Using the grouping method in your command
You can also use grouping, however, the order is critical when grouping is used and must be contiguous. The following shows how to code for grouping:
```
mkpprc -dev IBM.1750-13AB79A -remotedev IBM.1750-13AB76A –type mmir
-mode full -tgtread 1000-1004:1205-1209 1100-1104:1300-1304
```

Example (1750)

Invoking the mkpprc command
```
dscli>mkpprc -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150
0100:0100 -type mmir 0101:0101 0102:0102 0103:0103
```
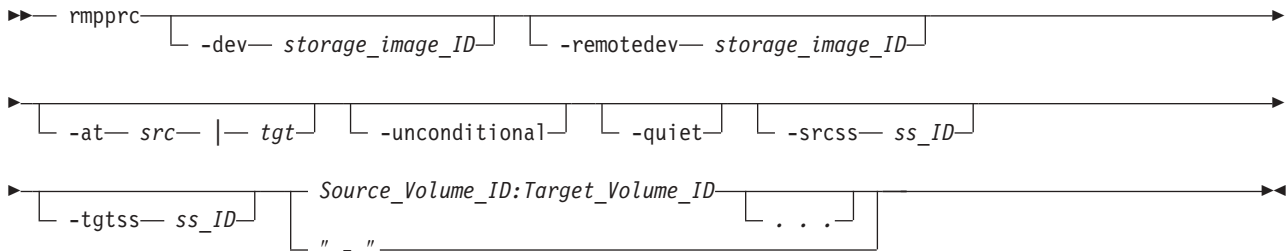
The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```

```
PPRC Pair IBM.1750-75FA120/0100:IBM.1750-75FA150/0100 successfully created.
PPRC Pair IBM.1750-75FA120/0101:IBM.1750-75FA150/0101 successfully created.
PPRC Pair IBM.1750-75FA120/0102:IBM.1750-75FA150/0102 successfully created.
PPRC Pair IBM.1750-75FA120/0103:IBM.1750-75FA150/0103 successfully created.
```

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.

```
►►── freezepprc──────────────────────────────────────────────────────────────────►
                    └─ -dev── storage_image_ID─┘  └─ -remotedev── storage_image_ID─┘

►──────────────────────────────── Source_LSS_ID:Target_LSS_ID──────────────────►◄
     └─ -srcss── ss_ID─┘  └─ -tgtss── ss_ID─┘                   └─ . . .─┘
                                            " - "
```

Parameters

Note: When specifying ssids, the command is limited to one LSS pair.

-dev *storage_image_ID*
> (Optional). Specifies the source storage image ID, which includes manufacturer,
> type, and serial number. This flag is required if you do not specify a fully
> qualified source LSS ID.

> Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
> (Optional). Specifies the target storage image ID, which includes manufacturer,
> type, and serial number. This flag is required if you do not specify a fully
> qualified target LSS ID or if the -dev flag is used.

> Example: IBM.1750-75FA120

-srcss *ss_ID*
> (Optional). Specifies 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

-tgtss *ss_ID*
> (Optional). Specifies 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

Source_LSS_ID:Target_LSS_ID . . . | -
> (Required). Freezes a consistency group for the source and target LSSs with

the IDs specified. Accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the -dev flag 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'.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a pair: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example (1750)

Invoking the freezepprc command
```
dscli>freezepprc -dev IBM.1750-75FA120
-remotedev IBM.1750-75FA150 01:01
```
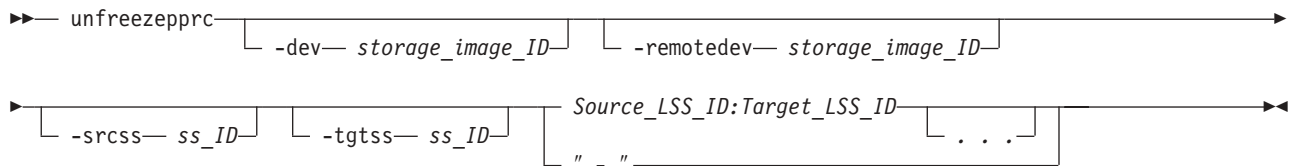
The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

PPRC consistency group 01:01 successfully created.
```

pausepprc
The pausepprc command pauses an existing remote mirror and copy volume pair relationship. Or, this command can be used to pause a single volume ID. To use 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 specifying ssids, the command is limited to one LSS pair.

-dev *storage_image_ID*
(Optional). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified source volume ID.

Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
  (Optional). Specifies the target storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified target volume ID.

  Example: IBM.1750-75FA120

-at *src | tgt*
  (Optional).

  src   Select the -at *source* option to initiate a suspend action from the source volume. After the task successfully runs, the source and target volumes are in the suspend state.

  The -at *source* 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   Select the -at *target* option to initiate 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 is well. For a suspend action that is issued to the target, the source can remain in the active state.

  The -at *target* option can also be used with single volumes. When you specify a single volume using this option, the volume is treated as a target and the source is treated as a null.

-unconditional
  (Optional). Use this flag to indicate that a source or target volume has been selected individually, and not as a pair. The -unconditional flag is valid only if the -at flag is selected. When you specify this flag, you can specify only the source volume ID if the -at *source* option is selected, or specify only the target volume ID if the -at *target* option is selected. Do not use volume pair IDs.

-srcss *ss_ID*
  (Optional). Specifies 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

-tgtss *ss_ID*
  (Optional). Specifies 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

Source_Volume_ID:Target_Volume_ID . . . | –
  (Required). Suspends a remote mirror and copy volume relationship for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

  Note: Provide a single volume ID instead of a volume pair if you use the -unconditional flag. Specifying pairs will result in a format error.

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 format of a volume ID is hexadecimal 0x'xyzz', where where 'x' is an address group number '0-F', 'xy' is a logical subsystem (LSS) number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a fully qualified pair: IBM.1750-75FA120/0100:IBM.1750-75FA150/0100

Example of a shortened version: 0100:0100

Example of multiple pairs: 0101:0101 0102:0102 0103:0103

Example (1750)

Invoking the pausepprc command

```
dscli>pausepprc -dev IBM.1750-75FA120
-remotedev IBM.1750-75FA150 0100:0100
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

PPRC pair IBM.1750-75FA120/0100:0103 successfully suspended.
```

resumepprc

The resumepprc command resumes a remote mirror and copy (formerly PPRC) relationship for a volume pair.
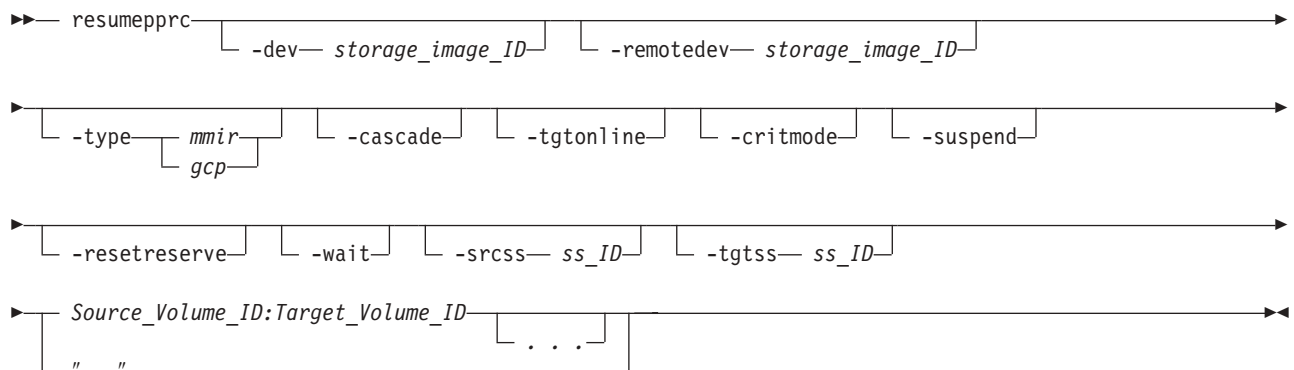
Parameters

Note:

- When you specify subsystem IDs, the source and target volumes are restricted to 1 LSS for the source and 1 LSS for the target.
- When you use the **-wait** parameter, periodicallt issuance of the **lspprc** command. This allows you to verify which of the states the pair has reached during processing.

-dev *storage_image_ID*

(Optional). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified source volume ID.

Example: IBM.1750-75FA120

-remotedev *storage_image_ID*

(Optional). Specifies the target storage image ID, which includes manufacturer, 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.

Example: IBM.1750-75FA120

-type *mmir | gcp*

(Optional). 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 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 processing 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 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). This parameter applies to S/390 or zSeries volumes. It does not apply to Open Systems volumes. It establishes a remote mirror and copy volume relationship, including when the target volume is online to host systems.

-critmode

(Optional). This parameter protects the source volume from receiving new data. If the last path fails between the pairs, resulting in the inability to send information to the target, the source is protected. Current updates and subsequent attempts to update the source will fail, with a unit check on S/390 or a check condition on SCSI.

Note: This parameter can only be used with CKD volumes.

-suspend

(Optional). 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 remote mirror and copy relationship is suspended when the task completes.

-resetreserve

(Optional). This option can only be used with fixed block volumes. It 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 option is not specified and the volume on the secondary logical subsystem is reserved, the command fails.

-wait

(Optional). The wait option delays the command response until the PPRC 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 -type *gcp* or -mode *nocp*.

-srcss *SS_ID*

(Optional). Specifies 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

-tgtss *SS_ID*

(Optional). Specifies 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

Source_Volume_ID:Target_Volume_ID . . . | -

(Required). Resumes a remote mirror and copy volume relationship for the source and target volume pairs with the specified IDs. 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 format of a volume ID is hexadecimal 0x'xyzz', where 'x' is an address group number '0-F', 'xy' is a logical subsystem (LSS) number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the resumepprc command

```
dscli>resumempprc -dev IBM.1750-75FA120
-remotedev IBM.1750-75FA150 0100:0100
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

PPRC pair IBM.1750-75FA120/0100:0103 successfully resumed.
```

rmpprc

The rmpprc command removes a remote mirror and copy (formerly PPRC) volume pair relationship. Or, this command can be used to remove 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). To use 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. The -uncondtional parameter must be specified when designating a single volume otherwise an error occurs and the command process fails.

```
►►── rmpprc ─────────────────────────────────────────────────────────────────►
              └─ -dev─ storage_image_ID ─┘   └─ -remotedev─ storage_image_ID ─┘

►──────────────────────────────────────────────────────────────────────────────►
    └─ -at─ src ─|─ tgt ─┘   └─ -unconditional ─┘   └─ -quiet ─┘   └─ -srcss─ ss_ID ─┘

►────────────────── Source_Volume_ID:Target_Volume_ID ──────────────────────────►◄
    └─ -tgtss─ ss_ID ─┘   └─ " - " ─┘                     └─ . . . ─┘
```

Parameters

Note: When you specify 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). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified source volume ID.
>
> Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
> (Optional). Specifies the target storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified target volume ID or if you use the -dev flag.
>
> Example: IBM.1750-75FA120

-at *src* | *tgt*
> (Optional).
>
> **src** Select the -at *source* 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 *target* 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 *target* option can also be used with single volumes but you must also specify the -unconditional parameter. When you specify a single volume using this option, the volume is treated as a target and the source is treated as a null.

-unconditional
> (Optional). Use this parameter to indicate that 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. When you specify this parameter, you can specify only the source volume ID if the -at *source* parameter is selected, or specify only the target volume ID if the -at *target* parameter is selected. Do not use volume pair IDs.

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

-srcss *ss_ID*
(Optional). Specifies 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

-tgtss *ss_ID*
(Optional). Specifies 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

Source_Volume_ID:Target_Volume_ID . . . | -
(Required). Removes a remote mirror and copy volume relationship for the source and target volume pairs with the IDs specified. Accepts fully qualified volume IDs, which includes storage image IDs, or a shortened version without storage image IDs if the -dev flag is specified. You must separate multiple remote mirror and copy pair IDs with spaces.

Note: Provide a single volume ID instead of a volume pair if you use the -unconditional flag. Specifying pairs will result in a format error.

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 format of a volume ID is hexadecimal 0x'xyzz', where 'x' is an address group number '0-F', 'xy' is a logical subsystem (LSS) number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by a logical subsystem.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example (1750)

Invoking the rmpprc command
```
dscli>rmpprc -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150 0100:0100
```
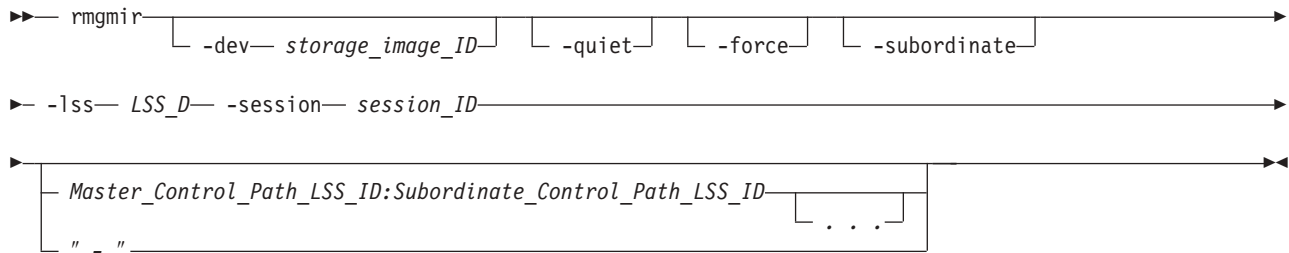
The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Are you sure you want to remove PPRC pair 0100:0100? [y/n]: Y

PPRC pair IBM.1750-75FA120/0100:0103 successfully removed.
```

unfreezepprc

The unfreezepprc command thaws an existing remote mirror and copy (formerly PPRC) consistency group. The command resets the queue full condition for the primary volume. All queued writes to the source volume are written.

```
►►── unfreezepprc ──────────────────────────────────────────────────────────────►
                    └─ -dev── storage_image_ID ─┘   └─ -remotedev── storage_image_ID ─┘

►─────────────────────────────────── Source_LSS_ID:Target_LSS_ID ──────────────────────►◄
    └─ -srcss── ss_ID ─┘  └─ -tgtss── ss_ID ─┘                       └─ . . . ─┘
                                                " - "
```

Parameters

Note:

1. This command affects all PPRC 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 ssids, the command is limited to one LSS pair.

-dev *storage_image_ID*
(Optional). Specifies the source storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified source LSS ID.

Example: IBM.1750-75FA120

-remotedev *storage_image_ID*
(Optional). Specifies the target storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified target LSS ID or if the -dev flag is used.

Example: IBM.1750-75FA120

-srcss *ss_ID*
(Optional). Specifies 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

-tgtss *ss_ID*
(Optional). Specifies 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

Source_LSS_ID:Target_LSS_ID . . . | -
(Required). Thaws a consistency group for the source and target LSSs with the IDs specified. Accepts fully qualified LSS IDs, which includes the storage image ID, or a shortened version without the storage image ID if the -dev flag 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'.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example pair: 00:00

Example of multiple pairs: 00:00 01:01 02:02

Example (1750)

Invoking the unfreezepprc command

```
dscli>unfreezepprc -dev IBM.1750-75FA120
-remotedev IBM.1750-75FA150 01:01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

PPRC Consistency Group ID 01:01 successfully thawed.
```

Global Mirror commands

This section contains commands that are used to create, manage, and delete Global Mirror relationships and to display Global Mirror information.

Use the following commands to create, manage, and delete Global Mirror relationships and to display Global Mirror information.

mkgmir

The mkgmir command starts Global Mirror for a session.
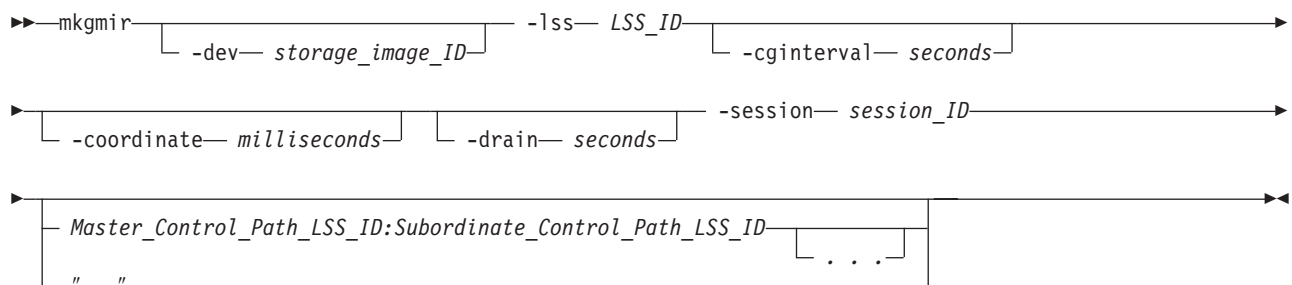
Parameters

-dev *storage_image_ID*
(Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified LSS ID, which includes a storage image ID.

Example: IBM.1750-75FA120

-lss *LSS_ID*
(Required). Specifies the master logical subsystem (LSS) that receives the

mkgmir 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.

Example of a fully qualified LSS ID: IBM.1750-75FA120/10

-cginterval *seconds*
(Optional). Specifies 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). Specifies 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). Specifies 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 drain time setting is required for a start action. If the drain time is not specified, the default drain time is 30 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). Starts or resumes Global Mirror for the specified session. A session ID is a Global Mirror session number that you assign in the '01 - FF' hexadecimal range or the 1 - 255 decimal range.

Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID *. . .* | -
(Optional). Specifies 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 which a PPRC path has been established. An LSS ID is two characters in the '00 - FE' hexadecimal range. 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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of one Global Mirror association with a single subordinate in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00

Example of multiple Global Mirror associations with two subordinates in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00 IBM.1750-75FA120/00: IBM.1750-75FA150/01

Example (1750)

Invoking the mkgmir command

```
dscli>mkgmir  -dev IBM.1750-75FA120 -lss 10
-session 01 IBM.1750-75FA120/00:IBM.1750-75FA150/00
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Global Mirror for session 01 successfully started.
```

pausegmir

The pausegmir command pauses Global Mirror for a session.
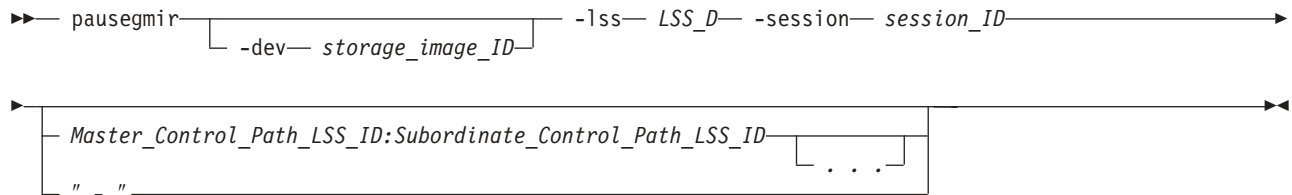
```
►►── pausegmir──────────────────────────────────── -lss── LSS_D── -session── session_ID────────────────►
                  └─ -dev── storage_image_ID─┘

►──────────────────────────────────────────────────────────────────────────────────────────────────◄
    ┌─ Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID─────┐
    │                                                      └─ . . .─┘
    └─ " - "──────────────────────────────────────────────────────────
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified LSS ID.
>
> Example: IBM.1750-75FA120

-lss *LSS_ID*
> (Required). Specifies 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.
>
> Example of a fully qualified LSS ID: IBM.1750-75FA120/10

-session *session_ID*
> (Required). Specifies 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 or the 1 - 255 decimal range.
>
> Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID *. . .* | -
> (Optional). Specifies one or more Global Mirror path associations. An Global Mirror (Asynchronous PPRC) 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 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 path association with a colon and no spaces. The master resource must be identical for all relationships.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of one Global Mirror association with a single subordinate in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00

Example of multiple Global Mirror associations with two subordinates in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00 IBM.1750-75FA120/00: IBM.1750-75FA150/01

Example (1750)

Invoking the pausegmir command

```
dscli>pausegmir -dev IBM.1750-75FA120 -lss 10
-session 01 IBM.1750-75FA120/00:IBM.1750-75FA150/00
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Global Mirror for session 01 successfully paused.
```

resumegmir

The resumegmir command resumes Global Mirror processing for a session.
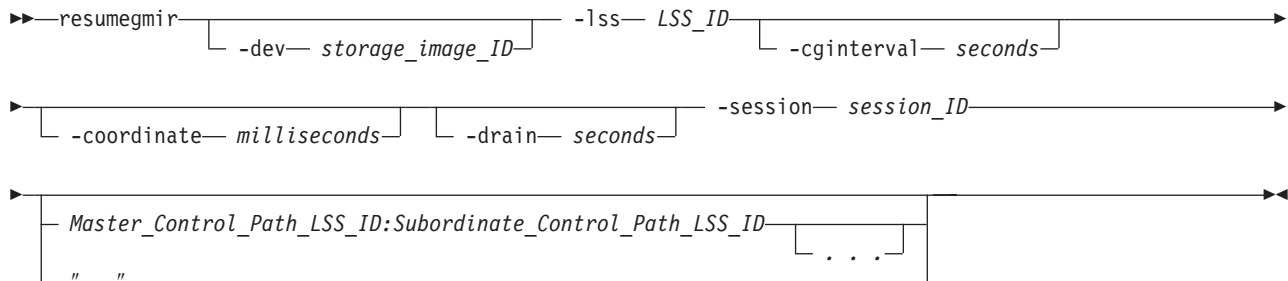
```
►►─resumegmir─────────────────────────────────── -lss─ LSS_ID ─────────────────────────►
              └─ -dev─ storage_image_ID ─┘                 └─ -cginterval─ seconds ─┘

►──────────────────────────────────────────── -session─ session_ID ──────────────────►
   └─ -coordinate─ milliseconds ─┘  └─ -drain─ seconds ─┘

►──┬─ Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID ─┬──────────────────►◄
   │                                                   └─ . . . ─┘ │
   └─ " - " ────────────────────────────────────────────────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified LSS ID.
>
> Example: IBM.1750-75FA120

-lss *ID*
> (Required). Specifies 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.1750-75FA120/10

-cginterval *seconds*
> (Optional). Specifies 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). Specifies 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. (Optional).

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). Specifies 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 drain time setting is required for a start action. If the drain time is not specified, the default drain time is 30 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). Starts or resumes Global Mirror for the specified session. A session ID is a Global Mirror session number that you assign in the '01 - FF' hexadecimal range or the 1 - 255 decimal range.

Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID . . . | -

(Optional). Specifies 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.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of one Global Mirror association with a single subordinate in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00

Example of multiple Global Mirror associations with two subordinates in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00
IBM.1750-75FA120/00: IBM.1750-75FA150/01

Example (1750)

Invoking the resumegmir command

```
dscli>resumegmir -dev IBM.1750-75FA120  -lss 10
-session 01 IBM.1750-75FA120/00:IBM.1750-75FA150/00
```
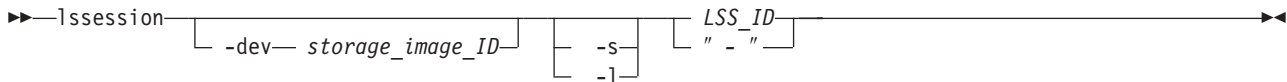
The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Global Mirror for session 01 successfully resumed.
```

rmgmir

The rmgmir command removes Global Mirror for the specified session. All of the volumes are removed from the session and the instance of the session no longer exists.

```
►►── rmgmir ──────────────────────────────────────────────────────────────────►
              └─ -dev── storage_image_ID ─┘  └─ -quiet ─┘  └─ -force ─┘  └─ -subordinate ─┘

►── -lss── LSS_D── -session── session_ID ────────────────────────────────────►

►──┬─ Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID ─┬──────────►◄
   │                                                   └─ . . . ─┘
   └─ " - " ─────────────────────────────────────────────────────┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified LSS ID.
>
> Example: IBM.1750-75FA120

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

-force
> (Optional). Forces the Global Mirror to stop regardless of the state of the Global Mirror associations.

-subordinate
> (Optional). Indicates that the -lss parameter specifies a subordinate LSS ID.

-lss *ID*
> (Required). Specifies the master logical subsystem (LSS) that is to receive the rmgmir 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.
>
> Example of a fully qualified LSS ID: IBM.1750-75FA120/10

-session *session_ID*
> (Required). Specifies the session ID for which the Global Mirror path association will be removed. A session ID is a Global Mirror session number you assign in the '01 - FF' hexadecimal or 1 - 255 decimal ranges.
>
> Example: 01

Master_Control_Path_LSS_ID:Subordinate_Control_Path_LSS_ID . . . | -
> (Optional). Specifies 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.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example of one Global Mirror association with a single subordinate in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00

Example of multiple Global Mirror associations with two subordinates in the configuration: IBM.1750-75FA120/00: IBM.1750-75FA150/00 IBM.1750-75FA120/00: IBM.1750-75FA150/01

Example (1750)

Invoking the rmgmir command

```
dscli>rmgmir -dev IBM.1750-75FA120 -lss 10
-session 01 IBM.1750-75FA120/00:IBM.1750-75FA150/00
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

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 detailed properties and performance metrics for a Global Mirror.

```
►►── showgmir ──────────────────────────────────────── Master_LSS_ID ──────────────────►◄
           └─ -dev ── storage_image_ID ─┘   └─ -metrics ─┘   └─ " - " ─┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified master logical subsystem (LSS) ID.
>
> Example: IBM.1750-75FA120

-metrics
> (Optional). Displays the logical subsystem ID and its performance statistics.

Master_LSS_ID | -
> (Required). Specifies the logical subsystem (LSS) that receives the showgmir 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. The LSS ID is two hexadecimal digits in the range '00 - FE'.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of a fully qualified LSS ID: IBM.1750-75FA120/10

Example (metrics not specified)

Note: The following tables represent the headers that are displayed on the output report that is associated with the **showgmir** command using the -fullid command flag. A separate example is not shown for the 1750 as the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

Invoking the showgmir command

```
dscli>showgmir -dev IBM.1750-75FA120  -fullid 10
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```

ID	Master Count	Master Session ID	Copy State	Fatal Reason	CG Interval	Global Mirror Interval	CG Drain Time	Current Time
IBM. 2107-75FA120 /10	1	01	Running	00	60	50	240	01/03 /2005 08:00:00 MST 0

CG Time	CG Failed Attempt	Succes-sful CG Percen-tage	Flash-Copy Sequ-ence Number	Master ID	Subor-dinate Count	Master SSID	Subor-dinate SSID
01/03 /2005 07:58:00 MST 0	0	100	10	IBM. 2107-75FA120	1	0010	0020

Report field definitions

ID
Specifies the LSS ID which consists of a Storage Image ID followed by two hexadecimal characters (00-FE) that identify a Global Mirror (Asynchronous PPRC) master LSS ID.

Master Count
Specifies the number of Global Mirror (Asynchronous PPRC) masters. This value could be null (-) if none exist.

Master Session ID
Identifies the session ID that you assigned, '01-FF' (1-255 decimal).

Copy State
Identifies the Global Mirror (Asynchronous PPRC) copy state. The value displayed is one of the following

Running
Running indicates that the PPRC copy is running.

Paused
Paused indicates that the PPRC copy is paused.

Fatal
Fatal indicates that the PPRC copy is failed.

Pause In Progress
Pause In Progress indicates that the PPRC copy is in the process of pausing.

Fatal Reason
Specifies a reason code for the failure.

CG Interval
Indicates the interval time between attempts to form a consistency group, up to 65 535 seconds.

Global Mirror Interval
Indicates the extended distance consistency maximum coordination interval, up to 65 535 milliseconds.

CG Drain Time
The CG 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 value is 65,535 seconds.

Current Time
Indicates the time stamp for 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:** Daylight Savings is set to 1 if the clock is to be automatically adjusted at applicable times between standard and daylight savings times. Set to 0 if the clock is not to be automatically adjusted for daylight savings time.

CG Time
Indicates the time recorded when the last successful Consistency Group was formed.

CG Failed Attempt
Indicates the number of unsuccessful attempts to form a Consistency Group since the last time a Consistency Group was formed.

Successful CG Percentage
Indicates the percentage of attempts to form a Consistency Group that was successful, from 0% to 100%.

FlashCopy Sequence Number
Specifies the FlashCopy sequence number associated with the current Consistency Group.

> **Note:** This value does not apply to a 2105 so a null (-) is displayed when a 2105 is associated with this reporting.

Master ID
Identifies the Global Mirror (Asynchronous PPRC) master Storage_Image_ID.

Subordinate Count
Specifies the count of subordinate associations. The master-subordinate association fields repeat according this count.

Master SSID
Identifies the SSID value that is associated with the master LSS ID.

Subordinate SSID
Identifies the SSID value that is associated with the subordinate LSS ID. This field repeats for each master-subordinate path association.

Note: The following tables represent the headers that are displayed on the output report that is associated with the **showgmir** command using the **-metrics**

parameter. A separate example is not shown for the 1750 as the information is the same for both. The only difference is the machine type designation, 2107 versus 1750.

Example (metrics specified)

Invoking the showgmir command

```
dscli>showgmir -dev IBM.1750-75FA120  -metrics 10
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```
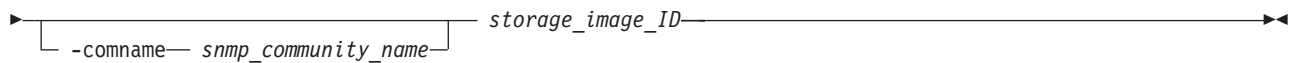
ID	Total Failed CG Count	Total Successful CG Count	Successful CG Percentage	Failed CG after Last Success	Last Successful CG Form Time	Coord. Time (milliseconds)	Interval Time (seconds)
IBM. 2107-75FA120 /10	2	3	40	2	01/13 /1970 13:08:37 PST	50	5

Max Drain Time (seconds)	First Failure Control Unit	First Failure LSS	First Failure Reason	First Failure Master State	Last Failure Control Unit	Last Failure LSS
240	IBM. 2107-75FA120	0x05	Long Busy	Error Recovery	IBM. 2107-75FA120	0x05

Last Failure Reason	Last Failure Master State	Previous Failure Control Unit	Previous Failure LSS	Previous Failure Reason	Previous Failure Master State
Long Busy	Error Recovery	IBM. 2107-75FA120	0x05	Long Busy	Error Recovery

Report field definitions

ID Identifies the LSS ID. This ID consists of an Storage_Image_ID followed by two hexadecimal characters (00-FE) that identify a Global Mirror (Asynchronous PPRC) master LSS ID.

Total Failed CG Count
  Specifies the total number of Consistency Groups that did not complete in the user specified drain time.

Total Successful CG Count
  Identifies the total number of Consistency Groups that completed before the user specified drain time.

Successful CG Percentage
  Identifies the percentage of attempts that were successful in forming a consistency group.

Failed CG after Last Success
> Specifies the total number of failed Consistency Groups after the last successful completion.

Last Successful CG Form Time
> Identifies the last successful Consistency Group completion time.

Coord. Time (milliseconds)
> Specifies the value in milliseconds that indicates the maximum amount of time Global Mirror will queue Primary/Host I/O to start forming a consistency group. Default is 50 milliseconds.

Interval Time (seconds)
> Specifies the value in seconds that indicates how long to wait between formation of Consistency groups.

Max Drain Time (seconds)
> Specifies the value in seconds that indicates the maximum amount of time that Global Mirror will allow for the consistent set of data to drain to the remote site.

First Failure Control Unit
> Identifies the Control Unit MTS that has caused the first failure of the consistency group formation.

First Failure LSS
> Identifies the LSS number that has caused the first failure of the consistency group formation.

First Failure Reason
> Specifies the error reason of the first failure of the consistency group formation attempt.

First Failure Master State
> Identifies the master state for the first Global Mirror failure.

Last Failure Control Unit
> Identifies the Control Unit MTS that has caused the last failure of the consistency group formation.

Last Failure LSS
> Identifies the LSS number that has caused the last failure of the consistency group formation.

Last Failure Reason
> Specifies the error reason of the last failure of the consistency group formation attempt.

Last Failure Master State
> Identifies the master state for the last Global Mirror failure.

Previous Failure Control Unit
> Identifies the Control Unit MTS that has caused the previous failure of the consistency group formation.

Previous Failure LSS
> Identifies the LSS number that has caused the previous failure of the consistency group formation.

Previous Failure Reason
> Specifies the error reason of the previous failure of the consistency group formation attempt.

Previous Failure Master State
> Specifies the master state for the previous Global Mirror failure.

Global Mirror session commands

This section contains commands that are used to create, modify, and delete Global Mirror sessions and to display Global Mirror session information.

Use the following commands to create, modify, and delete Global Mirror sessions and to display Global Mirror session information.

chsession

The chsession command allows you to modify a Global Mirror session.
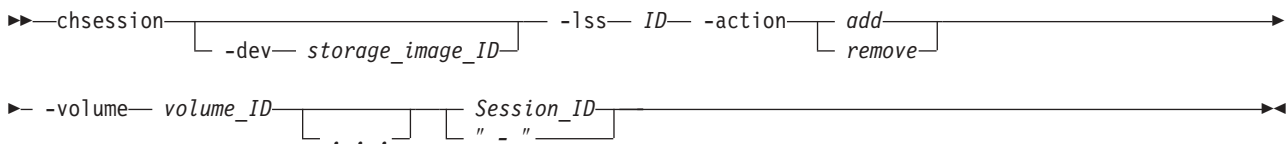
```
►►──chsession───────────────────────────── -lss─ ID── -action──┬─add────┬──────────────►
                  └─-dev── storage_image_ID─┘                   └─remove─┘

►── -volume── volume_ID──┬──────┬──┬─Session_ID─┬──────────────────────────────────►◄
                         └─. . .─┘  └─" - "──────┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the ID of the storage image containing the logical subsystem. The storage image ID includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified LSS ID.
>
> Example: IBM.1750-75FA120

-lss *ID*
> (Required). The logical subsystem (LSS) ID for the Global Mirror session. 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 flag is specified.
>
> Example of a fully qualified LSS ID: IBM.1750-75FA120/10

-action *add | remove*
> (Required).
>
> **add**   Specifies that volumes will be added to the session.
>
> **remove**
> > Specifies that volumes will be removed from the session.

-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.
>
> 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.
>
> Do not qualify the volume ID with the storage image ID. The volume ID format is hexadecimal 0x'xyzz', where 'x' is an address group number '0 - F', 'xy' is a logical subsystem number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by the logical subsystem.
>
> 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

Session_ID | -
> (Required). Modifies Global Mirror for this session ID. A session ID is a hexadecimal number in the range '01 - FF'.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of a session ID: 01

Example (1750)

Invoking the chsession command

```
dscli>chsession -dev IBM.1750-75FA120 -lss 10 -action add
-volume 0100-0101 01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Global Mirror session 01 successfully modified.
```

mksession

The mksession command opens a Global Mirror session.
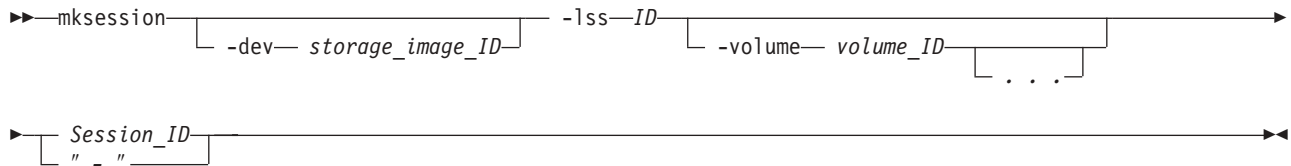
Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the logical subsystem.
>
> Example: IBM.1750-75FA120

-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 flag is specified.
>
> Example of a fully qualified LSS ID: IBM.1750-75FA120/10

-volume *volume_ID . . .*
> (Optional). 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.
>
> Do not qualify the volume ID with the storage image ID. The format for a volume ID is hexadecimal 0x'xyzz', where 'x' is an address group number '0 - F', 'xy' is a logical subsystem number '00 - FE', and 'zz' is a volume number '00 - FF' that is contained by the logical subsystem.

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

Session_ID | -
> (Required). Creates a Global Mirror for this session ID. A session ID is a hexadecimal number in the range '01 - FF'.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of a session ID: 01

Example (1750)

Invoking the mksession command

```
dscli>mksession -dev IBM.1750-75FA120 -lss 10 —volume 0100-010F 01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

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 regarding the volumes of each session in the list.

```
►►—lssession─────────────────────────────────────────────────────────────────◄◄
            └─ -dev— storage_image_ID ─┘  ┌─ -s ─┐  ┌─ LSS_ID ─┐
                                          └─ -l ─┘  └─ " - " ──┘
```

Parameters

-dev *storage_image_ID*
> (Optional). Specifies the storage image ID, which includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified ID for the logical subsystem.
>
> Example: IBM.1750-75FA120

-s (Optional). Displays the session IDs. You cannot use the -l and the -s flags together.

-l (Optional). Displays the default output. You cannot use the -l and the -s flags together.

LSS_ID
> (Required). The logical subsystem (LSS) ID for 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 flag is specified.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.
>
> Example of a fully qualified LSS ID: IBM.1750-75FA120/10

Example (1750)

Invoking the lssession command

```
dscli>lssession —fullid —dev IBM.1750-75FA120 01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 IBM DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

LSSID Session Status Volume VolumeStatus
PrimaryStatus SecondaryStatus FirstPassComplete True
IBM.1750-75FA120/10 01  Normal   IBM.1750-75FA120/1001 Active
PrimaryFullDuplex SecondarySimplex True
IBM.1750-75FA120/10 01 Normal   IBM.1750-75FA120/1002 Active
PrimaryFullDuplex SecondarySimplex True
IBM.1750-75FA120/10 01  Normal   IBM.1750-75FA120/1003 Active
PrimaryFullDuplex SecondarySimplex True
IBM.1750-75FA120/10 02  Normal   IBM.1750-75FA120/1011 Active
PrimaryFullDuplex SecondarySimplex True
IBM.1750-75FA120/10 02  Normal   IBM.1750-75FA120/1012 RemovePending
PrimarySimplex SecondarySimplex True
IBM.1750-75FA120/10 02  Normal   IBM.1750-75FA120/1013 JoinPending
PrimarySimplex SecondarySimplex False
```

rmsession

The rmsession command closes an existing Global Mirror session.

```
►►── rmsession── -dev── storage_image_ID── -lss── ID─────────────────────────────────────►◄
                                                  └─ -quiet─┘  └─ " - "──┘  └─ Session_ID─┘
```

Parameters

-dev *storage_image_ID*
(Optional). Specifies the ID of the storage image containing the logical subsystem. The storage image ID includes manufacturer, type, and serial number. This flag is required if you do not specify a fully qualified LSS ID.

Example: IBM.1750-75FA120

-lss *ID*
(Required). The logical subsystem (LSS) ID for the Global Mirror session. Accepts a fully qualified LSS ID, which includes the storage image ID, or shortened version without the storage image ID if the -dev flag is specified.

Example of a fully qualified LSS ID: IBM.1750-75FA120/10

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

Session_ID | -
(Required). Closes Global Mirror for this session ID. A session ID is a hexadecimal number in the range '01 - FF'.

Alternatively, accepts input from stdin when the dash (–) is specified.

Example of a session ID: 01

Example (1750)

Invoking the rmsession command

```
dscli>rmsession -dev IBM.1750-75FA120 -lss 10 01
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Are you sure you want to stop Global Mirror Session ID 01? y/n Y
Global Mirror Session ID 01 successfully stopped.
```

DS6000 remote support and notification commands

Use the following commands to configure settings for remote support for the DS6000.

Remote support can include outbound support (call home) or inbound support (remote service that is performed by an IBM service representative).

setplex

The setplex command allows you to modify the 1750 storage complex settings. You can associate a unique name with the 1750 which allows you to open a secure shell connection to a storage unit for remote support.

```
►►─ setplex ───────────────────────────────────────────────────────────────────►
              └─ -name─ storage_complex_name ─┘   └─ -desc─ storage_complex_description ─┘

►────────────────────────────────────────── storage_image_ID ──────────────────◄
    └─ -acct─ account ─┘   └─ -allowrssh ─┬─ enable ──┬─┘
                                          └─ disable ─┘
```

Parameters

-name *storage_complex_name*
> (Optional) Specifies the user defined name for the storage complex.

 -desc *storage_complex_description*
> (Optional) Specifies the user defined description for the storage complex.

 -acct *account*
> (Optional) Specifies the user defined account number.

 -allowrssh *enable* | *disable*
> (Optional) Specifies that a secure shell connection to the storage unit be opened.

storage_image_ID
> (Required) Specifies the storage image ID. A storage image consists of manufacturer, machine type, and serial number.

Example

Invoking the setplex command

```
dscli>setplex -name primary_1750 —desc "Production volumes"
 —acct "IBM Storage" -allowrssh enable IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Storage Plex primary_1750 successfully modified
```

showplex

The showplex command displays detailed properties of a 1750 storage complex. Detailed properties include your names, descriptions, and notification settings for the storage complex.

```
►►── showplex──┬─ storage_image_ID─┬──────────────────────────────────────────►◄
               └─ " - " ───────────┘
```

Parameters

storage_image_ID | -
> (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Invoking the showplex command

```
dscli>showplex IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

Name   1750 storage complex
desc  Descript
acct  00000000
allowrssh  Disabled
dialhome  Disabled
SNMP  Disabled
snmpinfo  9.11.123.123:500
snmpcomname    SNMP community
smtpserver  9.11.123.123:300
simdasdlevel   none
simdasdnotify  1
simmedialevel  none
simmedianotify  1
simsulevel    none
simsunotify   1
```

setdialhome

The setdialhome command activates the call home feature and sets one or more telephone numbers to dial when a problem occurs on the storage unit.

```
►►── setdialhome──┬──────────────────────────┬── storage_image_ID──────────────►◄
                  └─ -action──┬─ enable──┬────┘
                              └─ disable─┘
```

Parameters

Note: Ensure that you have enabled the setsnmp command and activated the **companyname**, **shipcountry** and **contactpriphone** parameters in the setcontactinfo command before attempting to use this command.

-action *enable | disable*
> (Optional) Enables or disables the call home feature.

storage_image_ID
> (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the setdialhome command
```
dscli>setdialhome -action enabled
 IBM.1750-75FA120
```

The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The dial home settings were successfully modified
```

setsmtp

The setsmtp command activates the e-mail notification feature, which sends notifications using e-mail when a problem occurs on a storage unit.

```
►►── setsmtp── -server── smtp_server_IP:port_number── storage_image_ID───────────────◄◄
```

Parameters

-server *smtp_server_IP:port_number . . .*
> (Required) Specifies the SMTP port and IP address where a message is sent in the event of a problem. You must separate the IP address and the port with a colon. Do not include white spaces.
>
> Example: 9.11.242.56:500

storage_image_ID
> (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the setsmtp command
```
dscli>setsmtp –server 9.11.242.12:500 IBM.1750-75FA120
```

The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The SMTP settings were successfully modified
```

setsnmp

The setsnmp command activates the Simple Network Management Protocol (SNMP) trap notification feature, which sends notifications using SNMP when a problem occurs on a storage unit. Use the command to set the SNMP addresses for the notifications.This command is only used with the DS6000.

```
►►── setsnmp─┬─────────────────────────┬─┬──────────────────────────┬──────────►
             └─ -action─┬─ enable──┬────┘ └─ -info── snmp_IP:port────┬────┘
                        └─ disable─┘                    └───  . . . ──┘
```

```
►──────┬───────────────────────────┬─── storage_image_ID ──────────────────────►◄
       └─ -comname── snmp_community_name ─┘
```

Parameters

-action *enable | disable*
> (Optional) Enables or disables the SNMP notification feature.

-info *snmp_IP:port . . .*
> (Optional) The SNMP port and IP address where a message is sent in the
> event of a problem. You must separate the IP address and the port with a
> colon. Multiple SNMP IP addresses and port pairs must be separated with
> commas. Do not include white spaces.
>
> Example: 9.11.242.56:500,9.11.242.79:501

-comname *snmp_community_name*
> (Optional) The SNMP community name.

storage_image_ID
> (Required) Accepts a fully qualified storage image ID. A storage image ID
> consists of manufacturer, machine type, and serial number.

Example

Invoking the setsnmp command

```
dscli>setsnmp —info 9.11.242.7:161 IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The SNMP settings were successfully modified
```

setsim

On zSeries hosts, data storage and data retrieval errors are recorded and can be
offloaded. A service information message (SIM) provides the error information. The
setsim command activates the SIM notification feature.

```
►►── setsmtp ─┬──────────────────────────────┬──┬──────────────────────────────────────┬──►
              └─ -dasdlevel ─┬─ acute ───┬──┘  └─ -dasdnotify── dasd_max_notifications ─┘
                            ├─ moderate ─┤
                            ├─ none ─────┤
                            ├─ serious ──┤
                            └─ service ──┘

►──┬──────────────────────────────┬──┬────────────────────────────────────────────┬──────►
   └─ -medialevel ─┬─ acute ───┬──┘  └─ -medianotify── media_max_notifications ─┘
                  ├─ moderate ─┤
                  ├─ none ─────┤
                  ├─ serious ──┤
                  └─ service ──┘
```

```
                                                              storage_image_ID
  ►──┬──────────────────────────────────┬──┬─────────────────────────────────┬──────────────────────►◄
     └─ -sulevel ─┬─ acute ────┬─────────┘  └─ -sunotify ─ su_max_notifications ─┘
                  ├─ moderate ─┤
                  ├─ none ─────┤
                  ├─ serious ──┤
                  └─ service ──┘
```
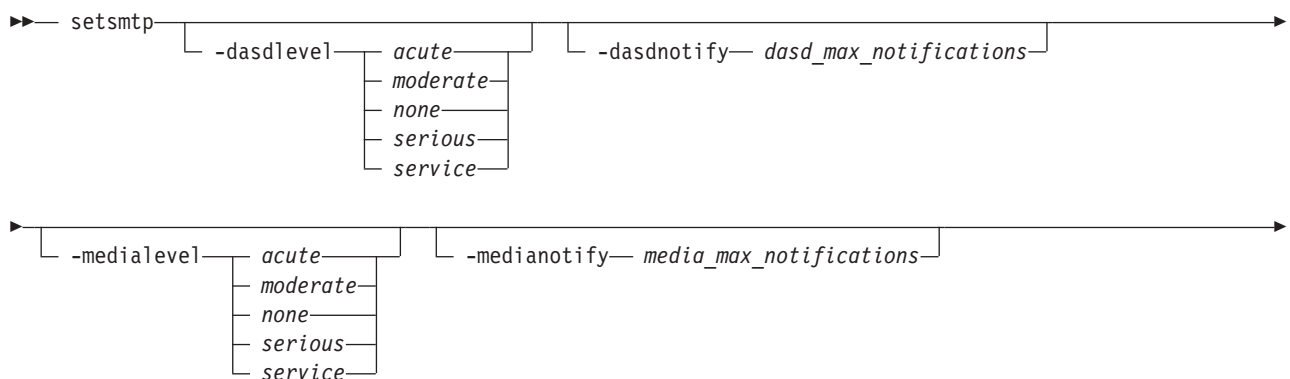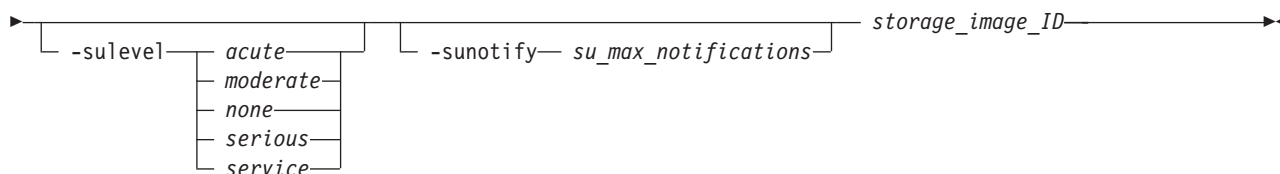
Parameters

-dasdlevel *acute | moderate | none | serious | service*
: (Optional) The reporting level for DASD service information messages.

-dasdnotify *dasd_max_notifications*
: (Optional) The maximum number of times that service information messages are offloaded for DASD service information messages. You can enter 0 to 5.

-medialevel *acute | moderate | none | serious | service*
: (Optional) The reporting level for media service information messages.

-medianotify *media_max_notifications*
: (Optional) The maximum number of times that service information messages are offloaded for media service information messages. You can enter 0 to 5.

-sulevel *acute | moderate | none | serious | service*
: (Optional) The reporting level for storage unit service information messages.

-sunotify *dasd_max_notifications*
: (Optional) The maximum number of times that service information messages are offloaded for storage unit service information messages. You can enter 0 to 5.

storage_image_ID
: (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the setsim command

```
dscli>setsim —dasdnotify 3 IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The SIM settings were successfully modified
```

setcontactinfo

The setcontactinfo command provides contact information for your storage system administrator. When you use any of the remote support features, this information is sent to IBM so that an IBM service representative can contact you.

```
►►── setcontactinfo ─┬──────────────────────────────┬──┬────────────────────────────────┬─────►
                     └─ -companyname─ company_name ─┘  └─ -companyaddr─ company_address ─┘

►─┬──────────────────────────────┬──┬──────────────────────────────┬──┬────────────────────┬─────►
  └─ -shipphone─ phone_number ─┘     └─ -shiploc─ building_location ─┘  └─ -shipcity─ city ─┘
```

```
├─┬───────────────────────────────┬─┬─────────────────────────────┬──────────────────►
  └─ -shipstate— state_or_province ┘ └─ -shippostalcode— postal_code ┘

├─┬──────────────────────┬─┬──────────────────────────┬──────────────────────────────►
  └─ -shipcountry— country ┘ └─ -contactname— contact_name ┘

├─┬─────────────────────────────────────────┬─┬──────────────────────────────────────────┬─►
  └─ -contactpriphone— primary_phone_number ┘ └─ -contactaldphone— alternate_phone_number ┘

├─┬──────────────────────────────────────┬────── storage_image_ID ──────────────────────►◄
  └─ -contactemail— primary_email_address ┘
```
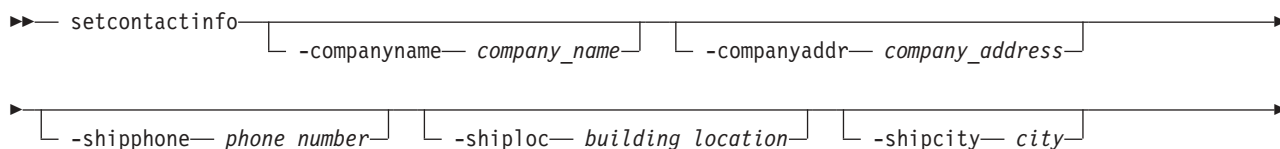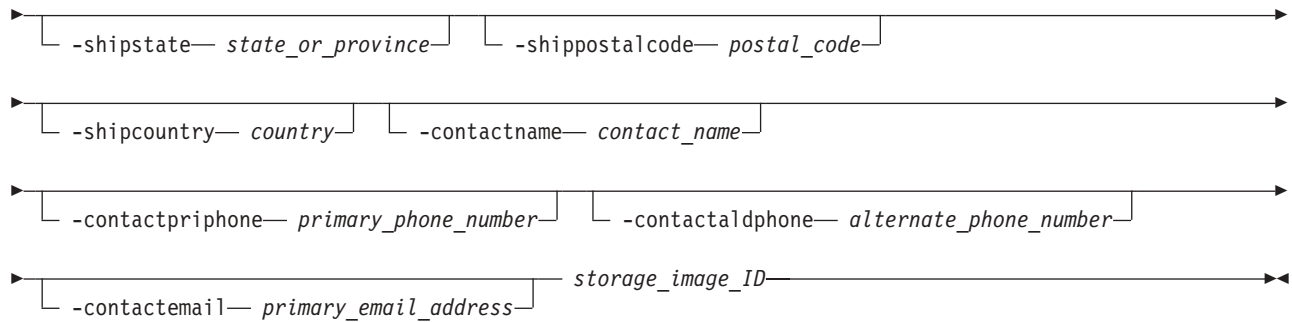
Parameters

-companyname *company_name*
> (Optional) The name of the company. (Required) This parameter is required if currently (at the time you issue the command) there is no information set.

-companyaddr *company_address*
> (Optional) The address of the company. Enclose the address in quotation marks.
>
> Example "9000 S. Rita Rd Tucson AZ 85744"

-shipphone *phone_number*
> (Optional) The telephone number for the person to contact regarding shipping parts.
>
> You can enter a country code, an area code, a telephone number, and an extension. Separate each code with a hyphen.

-shiploc *building_location*
> (Optional) The building location for shipping parts. Enclose the location in quotation marks.

-shipcity *city*
> (Optional) The city for shipping parts.
>
> Example: Tucson

-shipstate *state_or_province*
> (Optional) The state for shipping parts.
>
> Example: Arizona

-shippostalcode *postal_code*
> (Optional) The zip or postal code for shipping parts.

-shipcountry *country*
> (Optional) The country or region for shipping parts. (Required) This parameter is required if currently (at the time that you issue the command), there is no information set. See Table 4 on page 312 for a list of the ISO codes that you can use. This field also directs the Call Home e-mail records to the appropriate e-mail catcher for the geography of the machine.

-contactname *contact_name*
> (Optional) The name of the storage system administrator who can be contacted by IBM service personnel.

-contactpriphone *primary_phone_number*
> (Optional) The primary telephone number for IBM service personnel to use to

contact the storage system administrator. (Required) This parameter is required if currently (at the time that you issue the command), there is no information set.

You can enter a country or region code, an area code, a telephone number, and an extension. Separate each code with a hyphen.

-contactaltphone *primary_phone_number*
(Optional) The alternate telephone number for IBM service personnel to use to contact the storage system administrator.

You can enter a country or region code, an area code, a telephone number, and an extension. Separate each code with a hyphen.

-contactemail *primary_email_address*
(Optional) The e-mail address for IBM service personnel to use to contact the storage system administrator.

storage_image_ID -
(Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the setcontactinfo command

```
dscli>setcontactinfo —companyname IBM —companyaddr "9000 S. Rita Rd
Tucson Az 85744" —contactpriphone 1-520-7998001  IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The contact information settings were successfully modified
```

Table 4. Country and Region Codes

ISO Country or Region Code	Business Unit	Country or Region Name	State
AF	EMA	Afghanistan	
AL	EMA	Albania	
DZ	EMA	Algeria	
AS	APS	American Samoa	
AD	EMA	Andorra	
AO	EMA	Angola	
AI	LAG	Anguilla	
AQ	LAG	Antarctica	
AG	LAG	Antigua and Barbuda	
AR	LAG	Argentina	
AM	EMA	Armenia	
AW	LAG	Aruba	
AU	APS	Australia	
AT	EMA	Austria	
AZ	EMA	Azerbaijan	
BS	LAG	Bahamas	

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
BH	EMA	Bahrain	
BD	APS	Bangladesh	
BB	LAG	Barbados	
BY	EMA	Belarus	
BE	EMA	Belgium	
BZ	LAG	Belize	
BJ	EMA	Benin	
BM	LAG	Bermuda	
BT	APS	Bhutan	
BO	LAG	Bolivia	
BA	EMA	Bosnia and Herzegovina	
BW	EMA	Botswana	
BV	APS	Bouvet Island	
BR	LAG	Brazil	
IO	APS	British Indian Ocean	
BN	APS	Brunei Darussalam	
BG	EMA	Bulgaria	
BF	EMA	Burkina Faso	
BI	APS	Burundi	
KH	APS	Cambodia	
CM	EMA	Cameroon	
CA	CAN	Alberta	AB
CA	CAN	British Columbia	BC
CA	CAN	Manitoba	MB
CA	CAN	New Brunswick	NB
CA	CAN	Newfoundland	NL
CA	CAN	Nova Scotia	NS
CA	CAN	Northwest Territorie	NT
CA	CAN	Nunavut	NU
CA	CAN	Ontario	ON
CA	CAN	Prince Edward Island	PE
CA	CAN	Quebec	QC
CA	CAN	Saskatchewan	SK
CA	CAN	Yukon	YT
CV	EMA	Cape Verde	
KY	LAG	Cayman Islands	
CF	EMA	Central African Republic	
TD	EMA	Chad	
CL	LAG	Chile	

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
CN	APN	China/Hong Kong	
CX	APS	Christmas Islands	
CC	APS	Cocos (Keeling) Island	
CO	LAG	Colombia	
KM	APS	Comoros	
CD	EMA	Congo Democratic Republic	
CG	EME	Congo Peoples Republic	
CK	APS	Cook Islands	
CR	LAG	Costa Rica	
CI	EMA	Cote d'Ivoire (Ivory	
HR	EMA	Croatia	
CU	LAG	Cuba	
CY	EMA	Cyprus	
CZ	EMA	Czech Republic	
DK	EMA	Denmark	
DJ	EMA	Djibouti	
DM	LAG	Dominica	
DO	LAG	Dominican Republic	
EC	LAG	Ecuador	
EG	EMA	Egypt	
SV	LAG	El Salvador	
GQ	EMA	Equatorial Guinea	
ER	EMA	Eritrea	
EE	EMA	Estonia	
ET	EMA	Ethiopia	
FK	APS	Falkland Islands (Malvinas)	
FO	EMA	Faroe Islands	
FJ	APS	Fiji	
FI	EMA	Finland	
FR	EMA	France	
GF	LAG	French Guiana	
PF	APS	French Polynesia	
TF	APS	French Southern Territories	
GA	EMA	Gabon	
GM	EMA	Gambia	
GE	EMA	Georgia	
DE	EMA	Germany	
GH	EMA	Ghana	
GI	EMA	Gibraltar	

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
GR	EMA	Greece	
GL	EMA	Greenland	
GD	LAG	Grenada	
GP	LAG	Guadeloupe	
GU	APS	Guam	
GT	LAG	Guatemala	
GN	EMA	Guinea	
GW	APS	Guinea-Bissau	
GY	LAG	Guyana	
HT	LAG	Haiti	
HM	APS	Heard Island and McDonald Islands	
VA	EMA	Holy See (Vatican City State)	
HN	LAG	Honduras	
HK	APN	Hong Kong	
HU	EMA	Hungary	
IS	EMA	Iceland	
IN	APS	India	
ID	APS	Indonesia	
IR	EMA	Iran (Islamic Republic of)	
IQ	EMA	Iraq	
IE	EMA	Ireland	
IL	EMA	Israel	
IT	EMA	Italy	
JM	LAG	Jamaica	
JP	APN	Japan	
JO	EMA	Jordan	
KZ	EMA	Kazakhstan	
KE	EMA	Kenya	
KI	EMA	Kiribati	
KP	APN	Korea Democratic People's Republic of	
KR	APN	Korea Republic of	
KW	EMA	Kuwait	
KG	EMA	Kyrgyzstan	
LA	APN	Lao People's Democratic Republic	
LV	EMA	Latvia	
LB	EMA	Lebanon	
LS	EMA	Lesotho	
LR	EMA	Liberia	
LY	EMA	Libyan Arab Jamahiriya	

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
LI	EMA	Liechtenstein	
LT	EMA	Lithuania	
LU	EMA	Luxembourg	
MO	APS	Macau	
MK	EMA	Macedonia Former Yugoslav Republic of	
MG	APS	Madagascar	
MW	EMA	Malawi	
MY	APS	Malaysia	
MV	APS	Maldives	
ML	EMA	Mali	
MT	EMA	Malta	
MH	APS	Marshall Islands	
MQ	LAG	Martinique	
MR	EMA	Mauritania	
MU	LAG	Mauritius	
YT	APS	Mayotte	
MX	LAG	Mexico	
FM	APS	Micronesia Federated States of	
MD	EMA	Moldava Republic of	
MC	EMA	Monaco	
MN	APN	Mongolia	
MS	EMA	Montserrat	
MA	EMA	Morocco	
MZ	EMA	Mozambique	
MM	APS	Myanmar	
NA	EMA	Namibia	
NR	APS	Nauru	
NP	APS	Nepal	
NL	EMA	Netherlands	
AN	LAG	Netherlands Antilles	
NC	APS	New Caledonia	
NZ	APS	New Zealand	
NI	LAG	Nicaragua	
NE	EMA	Niger	
NG	EMA	Nigeria	
NU	EMA	Niue	
NF	EMA	Norfolk Island	
MP	APS	Northern Mariana Island	
NO	EMA	Norway	

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
OM	EMA	Oman	
PK	EMA	Pakistan	
PW	APS	Palau	
PS	EMA	Palestinian Territory	
PA	LAG	Panama	
PG	EMA	Papua New Guinea	
PY	LAG	Paraguay	
PE	LAG	Peru	
PH	APS	Philippines	
PN	APS	Pitcairn	
PL	EMA	Poland	
PT	EMA	Portugal	
PR	DOM	Puerto Rico	
QA	EMA	Qatar	
RE	EMA	Reunion	
RO	EMA	Romania	
RU	EMA	Russian Federation	
RW	EMA	Rwanda	
SH	EMA	Saint Helena	
KN	LAG	Saint Kitts and Nevis	
LC	APS	Saint Lucia	
PM	LAG	Staint Pierre and Miquelon	
VC	LAG	Saint Vincent and the Grenadines	
WS	APS	Samoa	
SM	EMA	San Marino	
ST	APS	Sao Tome and Principle, Democratic Republic of	
SA	EMA	Saudi Arabia	
SN	EMA	Senegal	
CS	EMA	Serbia and Nontenegro	
SC	EMA	Seychelles	
SL	EMA	Sierra Leone	
SG	APS	Singapore	
SK	EMA	Slovakia	
SI	EMA	Slovenia	
SB	APS	Solomon Islands	
SO	EMA	Somalia	
ZA	EMA	South Africa	
GS	APS	South Georgia and the South Sandwich Islands	

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
ES	EMA	Spain	
LK	APS	Sri Lanka	
SD	EMA	Sudan	
SR	APS	Suriname	
SJ	EMA	Svalbard and Jan Mayen Islands	
SZ	EMA	Swaziland	
SE	EMA	Sweden	
CH	EMA	Switzerland	
SY	EMA	Syrian Arab Republic	
TW	APS	Taiwan Province of	
TJ	EMA	Tajikistan	
TZ	EMA	Tanzania United Republic of	
TH	APS	Thailand	
TL	EMA	Timor-Leste (East Timor)	
TG	EMA	Togo	
TK	APS	Tokelau	
TO	APS	Tonga	
TT	LAG	Trinidad and Tobago, Republic of	
TN	EMA	Tunisia	
TR	EMA	Turkey	
TM	EMA	Turkmenistan	
TC	APS	Turks and Caicos Island	
TV	APS	Tuvalu	
UG	EMA	Uganda	
UA	EMA	Ukraine	
AE	EMA	United Arab Emirates	
GB	EMA	United Kingdom	
US	DOM	Alaska	AK
US	DOM	Alabama	AL
US	DOM	Arkansas	AR
US	DOM	Arizona	AZ
US	DOM	California	CA
US	DOM	Colorado	CO
US	DOM	Connecticut	CT
US	DOM	District of Columbia	DC
US	DOM	Delaware	DE
US	DOM	Florida	FL
US	DOM	Georgia	GA
US	DOM	Hawaii	HI

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
US	DOM	Iowa	IA
US	DOM	Idaho	ID
US	DOM	Illinois	IL
US	DOM	Indiana	IN
US	DOM	Kansas	KS
US	DOM	Kentucky	KY
US	DOM	Louisiana	LA
US	DOM	Massachusetts	MA
US	DOM	Maryland	MD
US	DOM	Maine	ME
US	DOM	Michigan	MI
US	DOM	Minnesota	MN
US	DOM	Missouri	MO
US	DOM	Mississippi	MS
US	DOM	Montana	MT
US	DOM	North Carolina	NC
US	DOM	North Dakota	ND
US	DOM	Nebraska	NE
US	DOM	New Hampshire	NH
US	DOM	New Jersey	NJ
US	DOM	New Mexico	NM
US	DOM	Nevada	NV
US	DOM	New York	NY
US	DOM	Ohio	OH
US	DOM	Oklahoma	OK
US	DOM	Oregon	OR
US	DOM	Pennsylvania	PA
US	DOM	Puerto Rico	PR
US	DOM	Rhode Island	RI
US	DOM	South Carolina	SC
US	DOM	South Dakota	SD
US	DOM	Tennessee	TN
US	DOM	Texas	TX
US	DOM	Utah	UT
US	DOM	Virginia	VA
US	DOM	Vermont	VT
US	DOM	Washington	WA
US	DOM	Wisconsin	WI
US	DOM	West Virginia	WV

Table 4. Country and Region Codes (continued)

ISO Country or Region Code	Business Unit	Country or Region Name	State
US	DOM	Wyoming	WY
UM	DOM	United States Minor	
UY	LAG	Uruguay	
UZ	EMA	Uzbekistan	
VU	APS	Vanuatu	
VE	LAG	Venezuela	
VN	APS	Viet Nam	
VG	LAG	Virgin Islands (British)	
VI	LAG	Virgin Islands (U.S.)	
WF	APS	Wallis and Futuna Island	
EH	EMA	Western Sahara	
YE	EMA	Yemen	
ZM	EMA	Zambia	
ZW	EMA	Zimbabwe	

showcontactinfo

The showcontactinfo command displays customer contact information for the storage image.

```
►►── showcontactinfo── storage_image_ID──────────────────────────────────►◄
```

Parameters

storage_image_ID -
    (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the showcontactinfo command

```
dscli>showcontactinfo IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

companyname  IBM
companyaddr  9000 S. Rita Rd Tucson Az 85744
shipphone  1-520-7998001-
shiploc Lab 2000
shipcity Tucson
shipstate AZ
shippostalcode  85744
shipcountry US
contactname John Doe
contactpriphone 1-520-7998001-
contactaltphone 1-520-7998002-
contactemail johndoe@us.ibm.com
```

testcallhome

The testcallhome command initiates a call home test by creating a test problem record.

```
►►──testcallhome──┬─ storage_image_ID ─┬─────────────────────────────►◄
                  └─ " - " ────────────┘
```

Parameters

storage_image_ID -
> (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.
>
> Alternatively, accepts input from stdin when the dash (–) is specified.

Example

Invoking the testcallhome command

```
dscli>testcallhome IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

A test problem record was successfully created.
```

DS6000 PE package commands

Use the following commands to create, copy, and save PE packages for the DS6000.

offloadss

The offloadss command copies state information from nodes to the destination directory on a management node.

```
►►──offloadss── -destdir── directory ──┬──────────┬── storage_image_ID ──►◄
                                       └─-noftp─┘
```

Parameters

-destdir *directory*
> (Required) Specifies the destination working directory on the management node. This command copies all state saves to this directory and erases all files in this directory after ftp transfer completion.

-noftp
> (Optional) Specifies that the ftp transfer to IBM be disabled. The default is that ftp transfer is enabled unless this parameter is specified.

storage_unit_ID
> (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the offloadss command

```
dscli>offloadss -destdir /etc/statesave IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The State Save was successfully offloaded to the management node
```

mkpe

The mkpe command creates and copies PE packages from DS6000 nodes to the destination directory on a management node.

```
►►──mkpe── -destdir──directory──────────────── storage_image_ID─────────────────────────────────►◄
                            └─-noftp─┘
```

Parameters

-destdir *directory*
   (Required) Specifies the destination working directory on the management console. This command creates and copies all PE packages to this directory and erases all files in this directory after the ftp transfer completes.

-noftp
   (Optional) Specifies that the ftp transfer to IBM be disabled. The default is that the ftp transfer is enabled until this parameter is specified.

storage_image_ID
   (Required) Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the mkpe command

```
dscli>mkpe -destdir /tmp/prepackage IBM.1750-75FA120
```

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120

The following files copied from 1750-75FA120:
  /tmp/prepackage/175051113AB15A.IBM.0.NOPMH.20050328223544.cl0.pe.zip
  /tmp/prepackage/175051113AB15A.IBM.0.NOPMH.20050328223807.cl1.pe.zip
The following files FTPed to IBM:
  175051113AB15A.IBM.0.NOPMH.20050328223544.cl0.pe.zip
  175051113AB15A.IBM.0.NOPMH.20050328223807.cl1.pe.zip

PE packages for storage image IBM.1750-75FA120: successfully generated.
```

DS6000 problem log command

Use the following command to list the problem logs for the DS6000.

closeproblem

The closeproblem command modifies the status of a problem in the problem log file to closed.

```
►►─closeproblem─┬──────────────────────────┬──┬────────┬──-node─ node_Num─problem_ID───────────────►◄
                └─-dev─ storage_image_ID─┘  └─-quiet─┘
```

Parameters

Note: You cannot specify a range of problem IDs.

-dev *storage_image_ID*
> (Optional) Specifies the storage image ID, which includes manufacturer, type, and serial number. This parameter is required if you do not specify a fully qualified ID for all ID values that take a storage image ID in the command input required for this command.

-quiet
> (Optional) Specifies that the confirmation prompt for this command be turned off.

-node *node_Num*
> (Requied) Specifies the ID of the node on which the problem record was created.
>
> The node number, along with the problem ID uniquely identifies a problem record.

problem_ID
> (Required) Specifies the problem entry to be closed. The format of the problem ID is yyyy-mm-dd-hh.mm.ss.µs

Example

Invoking the closeproblem command
```
dscli>closeproblem -dev IBM.1750-75FA121 -node 0 2004-01-01-12.30.00.000001
```

The resulting output
```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA121

Are you sure you want to close problem 2004-01-01-12.30.00.000001 ? y/n Y
Problem 2004-01-01-12.30.00 was successfully closed.
```

lsproblem

The lsproblem command lists problem logs.

```
►►─ lsproblem─┬─────┬─┬───────────────┬─┬─────────────┬─┬─────────────────────┬── storage_image_ID───────►◄
             ├─-s─┤ └─-from─ date─┘  └─-to─ date─┘  └─-state─┬─open───┬─┘
             └─-l─┘                                          └─closed─┘
```

Parameters

-s (Optional) Displays problem IDs. You cannot use the -l and the -s flags together.

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

-from *date*

(Optional) To print problem IDs for a range of dates, enter the start date for the range. For example, 06/11/2004.

-to *date*

(Optional) To print problem IDs for a range of dates, enter the end date for the range. For example, 08/24/2004.

-state *open | closed*

(Optional) The problem state that you want to print in the log.

storage_image_ID

(Required) Specifies a storage image ID. Accepts a fully qualified storage image ID. A storage image ID consists of manufacturer, machine type, and serial number.

Example

Invoking the lsproblem -l command

```
dscli>lsproblem -l IBM.1750-75FA120
```

Note: The following tables represent the headers that are displayed on the output report associated with the lsproblem command using the -l parameter.

The resulting output

```
Date/Time: Sun Aug 11 02:23:49 PST 2004 DS CLI Version: 5.0.0.0
DS: IBM.1750-75FA120
```

ID	Node	Type	Sev	Occur	State
2004-02-12 -01.23.45 .66666	0	H/W	Problem	1	Open

Frus	FruList	SRN	First time	Last time	Detec- tor
1		BE804900	2004-02-12- 01.23.45 .66666	2004-02-12- 01.23.45 .66666	SES

Report column definitions

ID   Specifies the identification number that is assigned to the problem.

Node   Specifies the node (0 or 1) on which the problem record is created. The node number, along with the Problem ID, uniquely identifies a problem record.

Type   Specifies the type of problem. One of the following choices is displayed:
- H/W
- S/W
- Test
- Heartbeat
- Data Loss

SEV   Specifies the severity of the problem. One of the following choices is displayed:

- Problem
- Event
- Attention
- Test
- Heartbeat

Occur Specifies the number of times that the problem occurs.

State Specifies the state of the problem as being open or closed.

FRUs Specifies the number of FRUs that are suspended for causing the problem.

FRUList

Specifies the list of FRUs that are candidates for replacement in order to solve the problem. This list also specifies the FRUs that have been replaced and identifies those that need to be replaced.

SRN Specifies the SRN (service reference number), also known as SRC, which is a 4-byte value.

Firsttime

Specifies the first timestamp of the problem.

Lasttime

Specifies the last timestamp of the problem.

Detector

Specifies the component type that found the problem. One of the following choices is displayed:
- Harvest
- RAS
- AH
- Bering
- SES

Chapter 5. CLI use case scenarios

These scenarios describe some typical configuration and configuration management tasks. You can use them as models for writing your own scripts.

The following tasks are illustrated:
- Determining the physical configuration characteristics of a storage unit.
- Determining the current logical storage and Copy Services configuration settings.
- Creating new logical storage and Copy Services configuration settings.
- Modifying or deleting logical storage and Copy Services configuration settings.

Determining physical resources

This scenario describes how to determine the physical resources within the storage complex.

Before you begin, you must have the command-line interface prompt and be connected to a configured storage complex.

A machine type 1750 storage unit supports one storage image.

A machine type 2107 storage unit can be configured to contain one or two storage images. The storage image partitioning is specified as part of the order for the system and is applied in the factory.

A machine type 2107 storage unit contains two processor complex (PC) enclosures. Each PC contains from one to three central electronic complex (CEC) enclosures. Each PC-CEC contains two internal interfaces that connect PC-CEC pairs and attach up to four I/O enclosures per interface to each PC-CEC. If a storage unit is partitioned into two storage images, then each storage image owns the I/O enclosure resources of one PC-CEC pair interface. Otherwise, the single storage unit owns the I/O enclosure resources installed on both PC-CEC pair interfaces.

Use the following CLI command sequence to determine if a machine type 2107 storage unit is partitioned into one or two storage images and to identify resources owned by a storage unit or image. In the case of a machine type 2107 partitioned into two storage images, the parameter *storage_image_ID* represents a single storage image.

1. Create a list of all storage units in the storage complex with the following command.

   dscli> `lssu`

   - Each storage unit is identified by a unique MTS identifier (manufacturer, machine type, serial number).
   - For storage units, the last character of the MTS will be zero.

2. Create a list of the storage images in the storage complex with the following command.

   dscli> `lssi`

   - The storage image ID is associated with the storage unit ID.
   - A machine type 1750 storage unit contains one storage image. The storage unit MTS and the storage image ID are identical.

- A machine type 2107 storage unit contains one or two storage images. The storage unit MTS and first storage image ID are identical (both end with the number ″0″). A second storage image ID differs from the first only in the last character, which is ″1″.

3. Create a list of I/O ports with the following command.

   dscli> lsioport -dev *storage_image_ID*

   - Each I/O port is associated with its parent HBA ID.
   - Each I/O port is associated with its parent I/O enclosure ID and with a PC enclosure (pair) interface set.
   - Use this information when selecting a complement of I/O ports to be used for host system access to volumes. When possible, select a combination of I/O ports that are associated with different PC interfaces, I/O enclosures and HBA FRUs in order to maximize access bandwidth.

4. Create a list of storage enclosures with the following command.

   dscli> lsstgencl *storage_image_ID ... storage_image_ID*

   - Each storage enclosure is associated with its parent storage unit ID and storage image ID.
   - Each storage enclosure is associated with a DA pair ID.

5. Create a list of array sites with the following command. Use this information when configuring arrays, ranks, extent pools, and volumes that will be accessed by a host system. When possible, select a combination of array sites that are associated with different DA pair IDs in order to maximize access bandwidth.

   dscli> lsarraysite -dev *storage_image_ID*

   - Each array site is associated with a storage image ID and DA pair ID.
   - Each array site is associated with its parent storage enclosure ID and DA pair ID.

Configuring new count key data storage

This scenario describes how to configure new count key data (CKD) storage within your storage image for a zSeries host system.

Before you begin, you must have the command-line interface prompt, and you must be connected to a storage image that will be used for zSeries host system storage.

The scenario first creates the CKD storage configurations, then configures the storage unit I/O ports for zSeries host system attachment. These two basic steps can be run in the reverse order, but it is better to create storage configurations first, thereby creating the media to back up nonstorage-related configuration data.

To configure new count key data storage, perform the following steps:

1. Create CKD extent pools. Each extent pool is defined with a rank group [0 | 1] and storage type [fb | ckd] attribute. The minimum requirement is to define one extent pool for each rank group and storage type attribute combination. This means that you must make a minimum of two extent pools for a DS6000 that only contains CKD storage, one CKD extent pool per rank group.

   You can make more than the minimum number of extent pools. For example, unique extent pools can be defined for each RAID type (5 or 10) that is configured in a DS6000. Or extent pools can be defined and named according to the host system attachments that access the volumes created from extent pool extents. There can be as many extent pools as rank groups.

Extent pools that are defined for rank group 0 or 1 are assigned an even- or odd-numbered extent pool ID, respectively. Even-numbered extent pools are managed by storage server ID 0. Odd-numbered extent pools are managed by storage server ID 1. Each rank group is assigned to one extent pool, therefore storage server workload is directly affected by the rank assignments to even- and odd-numbered extent pool IDs. It is best to evenly distribute rank and extent pool allocations in order to keep the storage server workloads balanced.

Extent pools can be defined before or after the arrays and rank groups are defined. If extent pools are defined before the arrays and rank groups are defined, then the new ranks can be directly assigned to existing extent pools. Otherwise, you must modify each rank to complete the extent pool ID assignment after extent pools have been defined.

Determine if the minimum set of extent pool objects exist. Identify the rank group (0 or 1) assignments for each extent pool object. Determine if additional extent pool object definitions are required. Create a list of the existing CKD extent pools with the following command.

dscli> lsextpool -dev *storage_image_ID* -stgtype ckd

Make two extent pools with the following commands. Assign a unique nickname to each extent pool.

dscli> mkextpool —dev *storage_image_ID* —rankgrp 0 -stgtype ckd *extent_pool_name*

dscli> mkextpool —dev *storage_image_ID* —rankgrp 1 -stgtype ckd *extent_pool_name*

Optionally, make additional CKD extent pools as necessary. For example:
- For each RAID type (5, 10)
- For each disk drive module size
- For each CKD volume type (3380, 3390)
- For each LCU address group

Identify the assigned extent pool ID for each new extent pool. Keep this list for the next steps in this scenario. Use the following command to create a list of extent pool IDs.

dscli> lsextpool —dev *storage_image_ID* -stgtype ckd

2. Create arrays and ranks. The disk drive modules (DDMs) are packaged into storage enclosure pairs.

A DS8000 contains at least one storage enclosure pair, with a minimum of 16 DDMs. A DS6000 contains at least one storage enclosure pair, with a minimum of eight DDMs. All of the DDMs that are installed in a storage enclosure pair have identical capacity, RPM, and interface characteristics.

The DDMs in a storage enclosure pair interface to a device adapter (DA) pair. A DS contains at least one DA pair. A DA pair interfaces with one to four storage enclosure pairs.

The DDMs of a storage enclosure pair are partitioned into array sites. A DS8000 array site consists of eight DDMs, four from each storage enclosure of a storage enclosure pair, two or four (eight DDM) array sites per storage enclosure pair. A DS6000 array site consists of four DDMs located in one storage enclosure of a storage enclosure pair, two to eight (four DDM) array sites per storage enclosure pair. All array sites of a storage enclosure pair have identical capacity, RPM, and interface characteristics, and interface to a common DA pair.

To begin, create a list of array site IDs and identify all of the array sites with the status ″unassigned″. Use the following command.

dscli>lsarraysite —dev *storage_image_ID* —state unassigned

- Identify the capacity, RPM, interface, and DA pair attributes for each array site.
- Decide on the RAID type for each array site.

Make one array from one or two of the array sites.

- For the DS6000, specify one or two array sites with identical capacity, RPM, interface, and DA pair attributes.
- For the DS8000, specify one array site.

The new array inherits the capacity, RPM, interface, and DA pair characteristics of its parent array site(s). The array status is "unassigned" until it is assigned to a rank.

Use the following command to make an array.

`dscli>mkarray —dev` *storage_image_ID* `—raidtype 5 | 10 —arsite` *arraysite_ID*

Identify the new array IDs and identify the arrays with status "unassigned" and a common RAID type (5 or 10). Use the following command.

`dscli>lsarray —dev` *storage_image_ID* `—state unassigned —raidtype 5 | 10`

Make one rank for each array and assign the rank to an extent pool ID. A rank is assigned to rank group 0 or 1 according to the rank group number of the assigned extent pool ID. If a rank is not assigned to an extent pool, then the rank group and configuration state attributes are "unassigned". Assign each "unassigned" array to a rank using the following command.

`dscli>mkrank —dev` *storage_image_ID* `-array` *array_ID* `-stgype ckd -extpool` *extentpool_ID*

3. Create logical control units (logical subsystems). The DS8000 has a 64K-256 volume address space (16K for the DS6000) that is partitioned into 255(64) logical subsystem (LSS) units, where each LSS contains 256 logical volume numbers. The 255(64) LSS units are assigned to one of 16(4) address groups, where each address group contains 16 LSSs, or 4K volume addresses.

   there are two volume data types, fixed block and count key data (CKD). An address group contains only one volume data type, either up to 4K fixed block volumes or 4K CKD volumes. When an address group contains CKD volumes, the address group LSSs are defined as logical control units (LCU).

   Typically, LCUs are created in groups of 16, beginning at LSS address X'x0'. The LCU logical subsystem objects must be defined before CKD logical volumes can be defined.

   To begin, create a list of the unassigned and available address groups using the following command.

   `>lsaddressgrp —dev` *storage_image_ID*

   Use the list to identify all of the defined address group objects (0-F).

   - If the list is empty, then all of the address groups are available to be defined (0-F or 0-3).
   - A defined address group with the storage type FB (fixed block) is not available to be defined.
   - A defined address group with the storage type CKD and with fewer than 16 LSSs is available for LCU definition.
   - If you are using an undefined address group to make new LCUs, then select the lowest numbered address group that is not defined.
   - If you are defining a new LCU in an existing CKD address group, then use the lslcu command to identify LCUs that are already defined in the target address group.

You also can create a list of the undefined LCUs in an existing CKD address group. Select the lowest numbered logical subsystem object that is not defined. Use the following command.

dscli>lslcu —dev *storage_image_ID*—addrgrp *address_group*

Make one or more LCUs (logical subsystems) using the following command.

dscli>mklcu —dev *storage_image_ID* -qty *quantity* -id *LCU_ID* -ss *ss_ID* -lcutype *type*

- -qty specifies the quantity of LCU IDs (1-64) to create, starting with the LCU ID that you specify with the -id flag.
- -id specifies the first LCU ID (00-FE) to create.
- -ss is a user-specified LCU identifier.
- -lcutype is an optional LCU type (the default LCU type is 3990 model 6).

4. Create CKD volumes. A DS6000 or DS8000 contains 64K possible logical volumes. The quantity of logical volumes that can be created is dependent on the machine type and model, installed raw storage capacity, the configured storage RAID type, and the size, or capacity of each volume that is created.

A logical volume consists of one or more data extents that are allocated from a single extent pool. Volume data type is inherited from the extent pool extent storage type (fixed block or CKD) characteristic. When a CKD volume is created, volume attributes are further defined as a base or alias volume type, 3390 or 3380 volume cylinder type, and volume capacity in cylinders. These volume attributes characterize the volume to the host system that will eventually access the volume. Each volume is assigned a volume ID, which is the volume address within the DS6000 or DS8000 64K address space. Host access to a volume is enabled when the volume ID is assigned to a volume group, however CKD volumes are automatically assigned to the volume group CKD FICON/ESCON All (ID 0).

To begin, create a list of CKD extent pool IDs. Determine the extent pool IDs that you will use as the source for the CKD logical volumes you will create.

Extent pool attributes determine the size and quantity of volumes that can be created. The extent pool ID (even or odd) indicates the storage server (0 or 1) affinity, which dictates that the LCU ID component of the volume ID must be even- or odd-numbered.

Use the following command to create a list of CKD extent pool IDs.

dscli> lsextpool —dev *storage_image_ID* -stgtype ckd

For each LCU, make 128 base CKD volume using the following command.

dscli> mkckdvol —dev *storage_image_ID* -extpool *extentpool_ID* —cap 3339 —name DS_1_vol_#h 0000-007F

- -extpool identifies a CKD extent pool containing available data extents.
- -cap specifies the capacity of 3339 cylinders.
- -name assigns a unique name to each volume, including a hexadecimal volume ID.
- Volume ID 0000-007F specifies 128 volumes, starting at CKD address group (0), LCU ID (00), and volume number (00). You must specify volume IDs that have not been previously defined as CKD or fixed block volumes.

For each LCU, make 128 alias volumes using the following command.

dscli> mkckdvol —dev *storage_image_ID* -extpool *extentpool_ID* —base 0000 —name DS_1_pav_#h 0080-00FF

- -extpool identifies the CKD extent pool that will register the alias volume IDs.

- -base specifies that all 128 alias volumes are assigned to existing base volume ID 0000. Base and alias volumes must be associated with a common LCU ID and a common extent pool ID.
- -name assigns a unique name to each alias volume, including a hexadecimal volume ID.
- Volume ID 0080-00FF specifies 128 alias volumes, starting at CKD address group (0), LCU ID (00), and volume number (80). You must specify volume IDs that have not been previously defined as CKD or FB volumes.

5. CKD volume groups are created by the system. The system creates the CKD FICON/ESCON All volume group ID (0) and assigns all CKD base and alias volumes to this volume group. This volume group ID (0) is assigned to I/O ESCON ports and to I/O fibre-channel ports that are configured for FICON I/O operations. The ESCON I/O ports are constrained to access Address Group 0 volume IDs (0000-0FFF).

6. Configure I/O ports. The DS8000 supports the ESCON and fibre-channel I/O adapter card types. The DS6000 supports only the fibre-channel I/O adapter card type.

   For DS8000, I/O adapter cards are installed in I/O enclosures, each containing up to four I/O adapter cards. For DS6000, one or two I/O adapter cards are installed in each of the two CEC assemblies.

   Each ESCON I/O adapter card contains two I/O ports. Each fibre-channel I/O adapter card contains four I/O ports.

   The system automatically creates one I/O port object to represent each I/O adapter card I/O port. The default fibre-channel I/O port object settings enable SCSI-FCP ″identified″ access to fixed block volumes. No user action is necessary for ESCON I/O port setup.

   A minimum of four I/O ports should be configured for FICON I/O operations. Select ports with physical locations on different I/O adapter cards. If possible, the I/O adapter cards should be located in different I/O enclosures.

   Identify the port ID values that are to be configured for CKD volume access. Create a list of the existing fibre-channel I/O ports with the following command.

   dscli>lsioport -dev *storage_image_ID* -type fc

   Configure the I/O ports to enable the FICON topology using the following command.

   dscli>setioport —dev *storage_image_ID* —topology ficon port_*ID1 ID2...IDn*

   The I/O ports will be automatically set offline and returned to the online state after configuration changes are applied.

Configuring new fixed block storage

This scenario describes how to configure new fixed block storage within a storage unit.

Before you begin, you must have the command-line interface prompt, and you must be connected to a storage unit that will be used for open systems host system storage.

This scenario first creates the fixed block storage configurations and then configures the storage unit SCSI host ports to enable access to fixed block storage. You can run these two basic steps in the reverse order, but it is better to create storage configurations first, thereby creating the media to back up configuration data that is not related to the storage configuration.

Complete the following steps:

1. Create fixed block extent pools. Each extent pool is defined with the rank group [0 | 1] and storage type [fb | ckd] attribute values. The minimum requirement is to define one extent pool for each rank group and storage type attribute value combination. This means that you must make a minimum of two extent pools for a storage image that contains fixed block storage, one fixed block extent pool per rank group.

   You can create more than the minimum number of extent pools. For example, you can define unique extent pools for each RAID type (5 or 10) that is configured in a storage image. Or, you can define and name extent pools according to the host system attachments that access the volumes that are created from extent pool extents. You can have the same number of extent pools as ranks.

   Extent pools that are defined for rank group 0 or 1 will be assigned an even- or odd-numbered extent pool ID, respectively. Even-numbered extent pools are managed by storage server ID 0. Odd-numbered extent pools are managed by storage server ID 1. Each rank is assigned to one extent pool, therefore storage server workload is affected by the rank assignments to even- and odd-numbered extent pool IDs. It is better to evenly distribute rank and extent pool allocations in order to keep the storage server workloads balanced.

   You can define extent pool objects before or after you define the storage image arrays and ranks are defined. If extent pools are defined before the arrays and ranks, then the new ranks can be assigned to existing extent pools. Otherwise, you must modify each rank object to complete the extent pool ID assignment after extent pools have been defined. Create a list of the existing extent pools with the following command.

   dscli> lsextpool -dev *storage_image_ID* -stgtype fb

   - Returns a list of fixed block extent pools.

   - Use this list to determine if the minimum set of extent pools exist. Identify the rank group (0 or 1) assignments for each extent pool. Determine if additional extent pools are required.

   Create a fixed block extent pool for rank group 0 with the following command. Repeat this step to create a fixed block extent pool for rank group 1. Assign a unique name to each extent pool.

   dscli> mkextpool -dev *storage_image_ID* -rankgrp 0 -stgtype fb
   extent_pool_name

   Create a list of fixed block extent pools using the following command. Use the list to identify the assigned extent pool ID for each new extent pool.

   dscli> lsextpool -dev *storage_image_ID* -stgtype fb

2. Create arrays and ranks. The machine type 1750 contains at least one storage enclosure, with a minimum of four DDMs.

   The DDMs interface to a device adapter (DA) pair. A storage image contains at least one DA pair.

   The DDMs of a storage enclosure are partitioned into array sites. A machine type 1750 array site consists of four DDMs in one storage enclosure of a storage enclosure pair, with two to eight (four DDM) array sites per storage enclosure pair. All array sites of a storage enclosure pair have identical capacity, rpm, and interface characteristics, and interface to a common DA pair.

   Create a list of array site IDs for all installed array sites with the status "unassigned" using the following command. Use the list to identify unassigned array site capacity, rpm, and device adapter (DA) pair attributes. Determine the RAID type for each array site.

```
dscli> lsarraysite -dev storage_image_ID -state unassigned
```

Create one array from one site with the status ″unassigned″ using the following command. Repeat until all "unassigned" array sites have been assigned to an array.

```
dscli> mkarray -dev storage_image_ID -raidtype 5 | 10 S1
```

The new array site ″S1″ inherits the capacity, rpm, interface, and DA pair characteristics of its parent array site. The status of the array is "unassigned" until it is assigned to a rank.

Create a list of arrays with the status "unassigned" and the RAID type 5 or 10 using the following command. Use the list to identify the new array IDs.

```
dscli> lsarray -dev storage_image_ID -state unassigned -raidtype 5 | 10
```

Assign a rank to rank group 0 or 1 according to the rank group number of the assigned extent pool ID using the following command. Repeat until all "unassigned" array objects have been assigned to a rank object.

```
dscli> mkrank -dev storage_image_ID -array ID -stgype fb -extpool ID
```

If a rank is not assigned to an extent pool, then the rank group and configuration state attributes are "unassigned".

3. Create fixed block volumes. A storage image contains 64 K possible logical volumes. The quantity of logical volumes that you can create in a storage image is dependent on the machine type and model, installed raw storage capacity, the configured storage RAID type, and the size or capacity of each volume that is created.

   A logical volume consists of one or more data extents that are allocated from a single extent pool. Volume data type is inherited from the extent pool extent storage type (fixed block or CKD) characteristic. When a fixed block volume is created, volume attributes are further defined as a standard storage image, OS400-protected, or OS400-unprotected volume type and volume capacity in bytes (512-byte logical blocks). These volume attributes characterize the volume to the host system that will access the volume. Each volume is assigned a volume ID, which is the volume address within the storage image 64 KB address space. Host access to a volume is enabled when the volume ID is assigned to a volume group object.

   Create a list of fixed block extent pool IDs using the following command.

   ```
   dscli> lsextpool -dev storage_image_ID -stgtype fb
   ```

   Determine which extent pool IDs will be used as the source for the fixed block logical volumes to be created. Extent pool attributes determine the size and quantity of volumes that can be created. The extent pool ID (even/odd) indicates the storage server (0|1) affinity, which dictates that the LSS ID component of the volume ID must be an even or an odd number.

   Create a list of unassigned address groups using the following command.

   ```
   dscli> lsaddressgrp -dev ID
   ```

   • Determine the defined address group objects (0 - F). If the returned list is empty, then all address group objects are available to be defined (0 - 3).

   • Address groups with storage type CKD are not available for the definition of fixed block volumes. Address groups with storage type ″FB″ and number of defined LSSs less than 16 are available for new fixed block volume ID definition.

   • If an undefined address group will be used when making new fixed block volumes, select the lowest numbered address group that is not defined.

- If you are adding new fixed block volumes to an existing fixed block address group, use the lslss command to identify LSSs that are already defined in the target address group.

Create 256 fixed block volumes for the specified LSS using the following command. Specify a volume ID that has not been previously defined as a fixed block or CKD volume. Repeat this step for all of the required logical volumes for each LSS.

dscli> mkfbvol -dev *ID* -extpool *ID* -cap 8.6 -name *DS_1_vol#h* -volgrp *volume_group_ID* 1000-10FF

- All volumes will have the same type and capacity attributes.
- -extpool identifies a fixed block extent pool containing available data extents.
- -cap (capacity) is 8.6 GB.
- -name assigns a unique name to the volume. The volume name parameter can include a wild card (#d or #h) that inserts a decimal/hexadecimal volume ID value into a volume name, thereby making volume names unique when multiple volumes are created by one command execution.
- -volgrp assigns the new fixed block volumes to an existing volume group ID.
- Volume ID 1000-10FF 256 volumes, starting at a fixed address group (1), LSS ID (10), and volume number (00). A volume ID is four hexadecimal characters in the format ″llxx″, where *ll* specifies an LSS ID (00 - FE) and *xx* specifies an LSS volume number (00 - FF). A volume ID must be compatible with the extent pool ID that is the specified source for volume data extents. That is, if an extent pool ID is associated with rank group 0/1, then the volume LCU ID must be an even/odd numbered value, respectively.

4. Create fixed block volume groups. A volume group identifies the set of fixed block logical volumes that are accessible by one or more SCSI host system ports. If you make volume groups prior to making fixed block volumes, then the mkfbvol command -volgrp parameter can be used to assign new fixed block volumes to a target volume group ID. Otherwise, if you make fixed block volumes prior to making volume groups, then use the mkvolgrp command and the -volume parameter to assign volumes to a new volume group ID, or use the chvolgrp command and the -volume parameter to assign volumes to an existing volume group ID.

SCSI host system access is constrained to the "identified" access mode. For "identified" access mode, a volume group ID is assigned to a SCSI host port. Only those SCSI host ports that are "registered" to a volume group ID are allowed to access the set of logical volumes contained by the volume group.

Logical volumes can be assigned to a volume group when the volume group is created, or the logical volumes can be added (or removed) at a later time. The volume group type determines the maximum number of volumes that can be assigned to a volume group, either a maximum of 256 volumes or a maximum of 64 K volumes. The volume group type must be selected according to the addressing capability of the SCSI host system that will use the volume group.

Create a fixed block volume group using the following command. Repeat this command for each volume group that you want to create.

dscli> mkvolgrp -dev *ID* -volume *ID1,ID2,... volume_group_name*

- Use the -type scsi256 flag if the volume group is constrained to 256 volume IDs. Otherwise, a volume group may contain up to 64 K volumes. Use the -type 0s400mask flag if the volume group is constrained to fixed block volume types OS400-protected or OS400-unprotected. Otherwise, the volume group is constrained to the fixed block volume type 2107.

- The volume group name should describe the SCSI host system ports that will access volumes using this volume group ID. A SCSI host port can access one and only one volume group ID. Multiple SCSI host ports can register to access the same volume group ID. In this case, all host ports have shared access to the set of volumes contained by the volume group ID.

Create a list of the assigned volume group IDs using the following command.

dscli> `lsvolgrp -dev` *ID*

If the SCSI host ports have not yet been configured, save the volume group ID for use when you create the SCSI host port. If the fixed block volumes have not yet been defined, save the volume group ID for use when you create fixed block volumes. If the SCSI host ports were configured prior to the volume groups, use the chhostconnect command to modify each SCSI host port that is configured for SCSI host system access. Add the volume group ID to enable host system access to storage image fixed block volumes.

5. Configure fibre-channel I/O ports. The storage image supports the fibre-channel host bus adapter (HBA) card type. For machine type 2107, HBA cards are installed in I/O enclosures, each containing up to four HBA cards. For machine type 1750, one or two HBA cards are installed in each of the two CEC assemblies. Each fibre-channel HBA card contains four I/O ports. The storage image microcode automatically creates one I/O port object to represent each HBA card I/O port. The default fibre-channel I/O port object settings enable SCSI-FCP "identified" access to fixed block volumes. You might need to modify the I/O port object settings to enable SCSI FC-AL access to FB volumes.

Create a list of fibre-channel port IDs using the following command.

dscli> `lsioport -dev` *ID* `-type fc`

Determine which I/O port IDs will be used to access the fixed block volumes. Configure a minimum of four storage image I/O ports for SCSI host I/O operations. Select ports with physical locations on different host bus adapter (HBA) cards. If possible, locate the HBA cards in different I/O enclosures. Identify the port IDs that you want to configure for SCSI host access.

Set the specified I/O ports to enable the FC-AL topology using the following command. I/O ports will be automatically set offline and returned to the online state after configuration changes are applied.

dscli> `setioport -dev` *ID* `-topology fc-al` *port_ID1 ID2...IDn*

6. Create SCSI host port connections. The storage unit supports the "identified" access mode for SCSI host attachments, which requires that all SCSI host ports be identified to a storage image. This is accomplished by creating a SCSI host port object for each SCSI host port that will access storage image fixed block volumes. A SCSI host port object contains attributes that identify the SCSI host system type, the port profile, the port WWPN, the volume group ID that the port will access, and an array of storage image I/O port IDs that the host port will log into for volume access, or an attribute to indicate that all I/O ports can be used for volume access. Object attributes also include a host port description and port nickname.

Create SCSI host ports using the following command. Create one SCSI host port for each port that will access storage image volumes.

dscli> `mkhostconnect -wwname` *wwpn* `-profile # -volgrp` *ID* `-ioport* *ID,ID,ID,ID host_name*

The command specifies the worldwide port name, the fibre-channel communication profile, the volume group ID that this host port is allowed to access, the storage image I/O ports that this port can log in to, and your name for the SCSI host system.

Modifying fixed block volume groups

This scenario describes how to modify fixed block storage within a storage unit.

To modify fixed block volume groups, you must have the command-line interface prompt, and you must be connected to a storage unit that will be used for open systems host system storage.

Adding volumes to a volume group and removing volumes from a volume group are typical storage management tasks. The volumes that are added to a volume group can be "unassigned" to a volume group, or they can be volumes that are assigned to a volume group but you want to move them to a different volume group. In either case, you are responsible for managing how the volumes are allocated to volume groups and how the volumes are reserved for future allocation. It is better that you maintain "unassigned" volumes in a volume group that is not accessible by any host system, thereby controlling the accessibility of volumes that are reserved for future allocation.

You can assign a fixed block volume to multiple volume groups. This might be necessary for some host system applications. However, damage to volume data can occur if a volume is accessed by different host systems using different file management systems. To assign a fixed block volume to multiple volume groups, perform the following steps:

1. Find the fixed block volumes that are to be assigned to a volume group using the following command.

   dscli> `lsfbvol -dev` *ID* `-type` *2107* | *os400-protected* | *os400-unprotected* `-extpool` *ID*

   The command creates a list of all volumes of the specified volume type within the specified extent pool. It includes only the volumes that are contained by the specified storage image.

2. Retrieve the current volume group volume map using the following command.

   dscli> `showvolgrp -dev` *ID volume_group_ID*

   The command creates a list of volumes that are assigned to the target volume group.

3. Modify the volume group using the following command.

   dscli> `chvolgrp -dev` *ID* `-action add` | `remove` | `replace -volume` *ID,ID,...,ID volume_group_ID*

   You can add or remove volume IDs to the list in order to add or remove volumes. This command applies the updated volume ID list.

Removing fixed block or count key data storage

This scenario describes how to remove fixed block or count key data (CKD) storage from a storage unit.

To remove fixed block or count key data storage, you must have the command-line interface prompt, and you must be connected to a storage unit that contains configured storage.

To remove storage, first remove host access to the storage and then remove the storage in order to restore the physical resource to an "equivalent to new" state. At that point, array sites are in the "unassigned" state and can be redefined to make new fixed block or CKD storage. To remove fixed block or count key data storage, perform the following steps:

1. Remove host access to the volumes that will be removed.

   Create a list of host ports that are associated with the specified port group number using the following commands:

   dscli> `lshostconnect -dev` *ID* `-portgrp` #

   Remove the volume group assignment from the host port using the following command. Repeat this step for each host port.

   dscli> `chhostconnect -dev` *ID* `-volgrp` *host_connection_ID*

   Remove the volume group assignments from all of the host ports that are associated with the specified port group using the following command:

   dscli> `managehostconnect -dev` *ID* `-volgrp` *port_grp_number*

   Remove the host ports that are associated with the storage volumes to be removed using the following command:

   dscli> `rmhostconnect -dev` *ID host_connection_ID*

2. Remove the volume groups if all assigned fixed block volumes are to be removed using one of the following commands:

Option	Description
lsvolgrp -dev *ID*	Returns a list of volume groups and their characteristics.
showvolgrp -dev *ID Volume_group_ID*	Returns a list of volumes that are assigned to the target volume group.

   You can save the list of volume IDs by using the **lsfbvol** and **lsckdvol** commands.

   Unassign volumes from a volume group using the following command. This step is not necessary for CKD volumes because they are automatically assigned or unassigned to the FICON/ESCON-All volume group ID (0).

   dscli> `chvolgrp -dev` *ID* `-action remove -volume` *ID1,ID2,...*
   volume_group_ID

   Remove the volume groups as a means to remove volume access by host systems using the following command:

   dscli> `rmvolgrp -dev`*ID volume_group_ID...volume_group_ID*

3. Remove fixed block volumes, which will enable ranks, arrays and extent pool objects to be removed.

   Create a list of fixed block volume IDs that are candidates for removal using the following command. Use the command filters to develop a list of candidate volume IDs, or use lists of volume IDs that are derived from volume group storage maps.

   dscli> `lsfbvol -dev` *ID* `-type` *2107* | *os400-protected* | *os400-unprotected*
   `-extpool` *ID* `-lss` *ID*

   In order to enable ranks, arrays, and extent pools to be removed, delete the specified volumes using the following command. An LSS is automatically removed when the last volume contained by the LSS is removed.

   dscli> `rmfbvol -dev` *ID* `-quiet` *volume_ID...volume_ID*

4. Remove CKD volumes, which will enable ranks, arrays and extent pool objects to be removed.

   Create a list of CKD volume IDs that are candidates for removal using the following command. Use the command filters to develop a list of candidate volume IDs, or use lists of volume IDs that are derived from volume group storage maps.

   dscli> `lsckdvol -dev` *ID* `-type` *3380* | *3390* `-extpool` *ID* `-lcu` *ID*

In order to enable ranks, arrays, and extent pools to be removed, delete volumes using the following command:

dscli> `rmckdvol -dev` *ID* `-quiet` *volume_ID...volume_ID*

In order to enable address groups to be redefined for fixed block volumes, delete LCUs using the following command:

dscli> `rmlcu -dev` *ID* `-quiet` *LCU_ID...LCU_ID*

5. Remove ranks that have zero rank extents allocated to volumes.

   Create a list of rank IDs that are candidates for removal using the following command. Use the command filters to develop a list of candidate rank IDs.

   dscli> `lsrank -dev` *ID* `-grp` *0* | *1* `-type` *5* | *10* `-extpool` *ID* `-stgtype` *fb* | *ckd*

   Ranks that have used zero extents are eligible to be removed. If used extents are greater than or less than zero, the rank segments are currently assigned to existing volumes.

   In order to enable arrays and extent pools to be removed, delete ranks using the following command:

   dscli> `rmrank -dev` *ID* `-quiet` *rank_ID...rank_ID*

6. Remove arrays that are not assigned to a rank.

   Create a list of arrays that are not assigned to an existing rank ID using the following command:

   dscli> `lsarray -dev` *storage_image_ID* `-state` *unassigned*

   In order to enable array sites to be redefined as new arrays, delete arrays using the following command:

   dscli> `rmarray -dev` *storage_image_ID* `-quiet` *array_ID ... array_ID*

7. Remove extent pools that do not contain assigned ranks.

   Create a list of extent pools using the following command. Extent pool IDs that indicate zero assigned ranks are eligible to be removed. If assigned ranks are greater than or less than zero, then an extent pool contains assigned storage volumes.

   dscli> `lsextpool -dev` *storage_image_ID* `-stgtype` *fb* | *ckd* `-rankgrp` *0* | *1*

   Delete extent pool IDs that do not contain assigned rank IDs using the following command:

   dscli> `rmextpool -dev` *storage_image_ID* `-quiet` *extentpool_ID...extentpool_ID*

Array sites are now in the "unassigned" state and can be redefined to make new fixed block or CKD storage resource.

Using the failoverpprc and failbackpprc commands

This scenario describes how to use the failoverpprc and failbackpprc DS CLI commands. It does not cover all situations or functions for which these commands can be used. The example uses 4 multiple pairs and it is presumed that your volume relationships are set up as site A to site B or A-->B.

The use of the these two DS CLI commands is associated with recovering data from a planned or unplanned outage of data processing. The failoverpprc command is generally used first and it must complete its process before you can use the failbackpprc command.

To perform the failoverppc process, you must issue the command against your volumes in the order in which you have them. In other words, if you have your original remote mirror and copy pairs set up as A --> B, you must issue the failoverpprc with your volumes in A:B order.

Note: This process differs from the way that was was done on a 2105 whether using the ESS CLI commands or the Specialist.

The following is a description of what these two commands accomplish.

failoverpprc

This command changes the secondary device into a primary suspended device while leaving the primary device in its current state. After you issue this command, the configuration is symmetrical with both devices being primaries. You can issue the failbackpprc command to resume mirroring in either direction.

failbackpprc

This command can be issued against any remote mirror and copy volume that is in a primary suspended state. The command copies the required data from the source volume to the target volume in order to resume mirroring. The command is usually used after a failoverpprc command has been issued to restart mirroring either in the reverse direction (recovery site to production site) or original direction (production site to recovery site). However, this command also works if the target volume has been made simplex or is a secondary volume. The command performs a full or partial copy as required.

1. Issue your failoverpprc with your volumes in A:B order. Your command could look like this:

```
dscli>failoverpprc -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150
 0100:0100 0101:0101  0102:0102 0103:0103
```

2. Wait for the command to fully process. B is in a primary suspended state.

3. Issue the failbackpprc command so that B becomes your primary and A becomes your new secondary. Your command could look like this:

```
dscli>failbackpprc -dev IBM.1750-75FA120 -remotedev IBM.1750-75FA150
 0100:0100 0101:0101  0102:0102 0103:0103
```

4. Start your applications on your server at Site B. To get back to your original pairings, proceed as follows after site A is recovered.

5. Issue the failoverpprc command to failover B:A. This makes A primary suspended.

6. Wait for the command to fully complete.

7. Issue the failbackpprc command to failback B:A. This restores your pairs back to their original relationships.

Processing Remote FlashCopy (inband) transactions

This scenario describes how to successfully process remote FlashCopy (formerly known as inband FlashCopy) transactions. These can only be processed using the DS CLI Remote FlashCopy commands. These types of transactions cannot be managed through the GUI.

You must be logged into the DS CLI application in interactive command mode.

Remote FlashCopy commands are issued to a source volume of a remote mirror and copy volume pair on a local storage unit and sent across paths (acting as a

conduit) to a remote storage unit to enable a FlashCopy pair to be established at the remote site. This eliminates the need for a network connection to the remote site solely for the management of FlashCopy. The following steps are based on an example that uses the sites LSS 22 and LSS2A.

1. Establish a remote mirror and copy path between LSS 22 and LSS 2A. You must know which volumes are available for use before you can issue the command to establish the path.

   a. Issue the following command: `lsavailpprcport -dev IBM.2107-1300861 -remotedev IBM.2107-1300861 -remotewwnn 5005076303FFC03D 22:2A`

   The following report is generated.

```
Date/Time: February 7, 2005 4:24:13 PM IST IBM DSCLI Version: 0.0.0.0 DS:
IBM.2107-1300861
```

Local port	Attached port	Type
I0030	I0031	FCP
I0031	I0030	FCP
I0100	I0101	FCP
I0101	I0100	FCP

   b. Issue the following command: `mkpprcpath -dev IBM.2107-1300861 -remotedev IBM.2107-1300861 -remotewwnn 5005076303FFC03D -srclss 22 -tgtlss 2A I0030:I0031 I0100:I0101`

   The following confirmation is displayed if your command input is correct.

```
Date/Time: February 7, 2005 4:25:04 PM IST IBM DSCLI Version: 0.0.0.0 DS:
 IBM.2107-1300861
CMUC00149I mkpprcpath: Remote Mirror and Copy path 22:2A successfully
 established.
```

2. Establish a PPRC Pair (2200 to 2A00) by issuing the following command: `mkpprc -dev IBM.2107-1300861 -remotedev IBM.2107-1300861 -type mmir 2200:2A00`

   The following confirmation is displayed if your command input is correct.

```
Date/Time: February 7, 2005 4:25:33 PM IST IBM DSCLI Version: 0.0.0.0 DS:
 IBM.2107-1300861
CMUC00153I mkpprc: Remote Mirror and Copy volume pair relationship
 2200:2A00 successfully created.
```

3. Use LSS 22 on the Local site as a conduit LSS for new Remote Flash Copy relations on the remote storage unit, that will use volume 2A00 as their source. The target can be any other volume on the remote storage unit (in this example 2A01). Issue the following command: `mkremoteflash -dev IBM.2107-1300861 -conduit IBM.2107-1300861/22 -record 2A00:2A01`

   The following confirmation is displayed if your command input is correct.

```
Date/Time: February 7, 2005 4:28:11 PM IST IBM DSCLI Version: 0.0.0.0
 DS: IBM.2107-1300861
CMUC00173I mkremoteflash: Remote FlashCopy volume pair 2A00:2A01 successfully
created. Use the lsremoteflash command to determine copy completion.
```

4. Issue the resyncremoteflash command since the relation (2A00:2A01) was created with the -record option. Issue the following command: `resyncremoteflash -dev IBM.2107-1300861 -conduit IBM.2107-1300861/22 -record 2A00:2A01`

   The following confirmation is displayed if your command input is correct.

```
CMUC00175I resyncremoteflash: Remote FlashCopy volume pair 2A00:2A01
successfully resynched. Use the lsremoteflash command to determine copy
 completion.
```

5. Verify the transaction has processed as you intended by issuing the following command: `lsremoteflash -dev IBM.2107-1300861 -conduit IBM.2107-1300861/22 2A00:2A01`

The following report is displayed if your command input is correct.

Date/Time: February 7, 2005 4:29:42 PM IST IBM DSCLI Version: 0.0.0.0 DS:
IBM.2107-1300861

ID	SrcLSS	Sequence Num	ActiveCopy	Recording
2A00:2A01	2A	0	Disabled	Enabled

Persistent	Revertible	SourceWrite Enabled	TargetWrite Enabled	Background Copy
Enabled	Disabled	Disabled	Disabled	Enabled

Chapter 6. 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. This section also provides information about how the DS CLI manages OpenVMS messages.

The user interfaces and the supporting software issue three types of messages:

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 instance, 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.

OpenVMS messages and exit codes

On OpenVMS host systems, the DS CLI application provides additional system messages in the OpenVMS message format. For example, **%facility-level-identification, text**

Each DS CLI message is also communicated by OpenVMS system services. This ensures that messages appear on the screen and in batch logs according to OpenVMS standards. This allows the OpenVMS command **SET MESSAGE** and customer-written tools which scan for such messages to work correctly. The following mapping between DS CLI and OpenVMS messages applies:

* The facility is IBMDSCLI.
* The level is I (Informational), W (Warning), or E (Error), according to the DS CLI severity level.
* The identification is the DS CLI message identifier.
* The text is a is a generic text, identifying the DS CLI message.

After displaying the OpenVMS message, the normal DS CLI message is displayed unchanged. This ensures that the DS CLI messages are identical across platforms and that you can reference the DS CLI documentation.

When you exit the DS CLI, it provides a condition code according to OpenVMS standards instead of the normal DS CLI exit value. The following rules apply:

* A *single-shot* DS CLI command returns the condition code of the DS CLI message for this command. If there are multiple messages, the code with the highest severity is displayed.

- The DS CLI in *interactive* mode always returns the OpenVMS generic success status: %X00000001.
- The DS CLI in *script* mode returns either the OpenVMS generic success code or cancels the script while returning the highest severity code of the failed command.

This ensures that the DCL symbol $STATUS contains a value that can be evaluated by OpenVMS utilities as usual.

Framework messages

The framework is the basic software that supports your user interface. There might be times when messages specific to the framework are displayed.

This section provides you a list of the typical Framework messages. Framework message identifiers are prefixed by the letters ″CMMC″.

CMMCI9001E Command *command_name* resulted in an internal server error (error number *return_code*). View the log file for details.
Explanation

An unexpected value was returned for this command.

Action

Run the command again. If the problem persists, contact your service representative.

CMMCI9002I Command *command_name* halted.
Explanation

The command **command_name** was unexpectedly halted.

Action

Perform the following actions to resolve the problem.
1. View the cluster log to determine if other errors might be causing this error.
2. Run the command again.
3. If the problem persists, contact your service representative.

CMMCI9003W No *object_name* instances found in the system.
Explanation

You attempted to list all instances of **object_name**. No instances were found.

Action

No action is required.

CMMCI9004E Cannot modify *object_type object_name* because it does not exist.

Explanation

You are attempting to modify the attributes for the **object_type** named **object_name**, but **object_name** does not exist.

Action

Make sure that the object with the attributes that you are modifying exists.

CMMCI9005I There is nothing to modify.

Explanation

You are attempting to modify the attributes for an object, but the values that you specified are already defined for that object.

Action

If you must modify the attributes for an object, run the command again. Ensure that you are specifying different attribute values.

CMMCI9006E No *class_type* instances *object_name* found that match criteria: *criteria*.

Explanation

You are attempting to list all occurrences of an object, but no instances of the object that meet your search criteria were found.

Action

If the search criteria that you specified was correct, no action is required. Otherwise, attempt to list all occurrences of the object again by specifying different search criteria.

CMMCI9007E *object_type object_name* does not exist.

Explanation

You are attempting to run a command on an object that does not exist.

Action

Ensure that you are running this command on an existing object.

CMMCI9008I Unsupported command *command_name* completed successfully.

Explanation

The command **command_name** is not a supported command. However, the command did complete successfully.

Action

No action is required.

CMMCI9009E The unsupported *command_name* command failed with a value *return_code*

Explanation

The command **command_name** is not a supported command. The command did not complete successfully.

Action

Make sure that you are running only supported commands.

CMMCI9010E The command did not complete successfully.

Explanation

The command did not complete successfully.

Action

Verify that you are using the correct syntax. Then run the command again.

CMMCI9013E Command: *command_name* was not found.

Explanation

You attempted to run a command that does not exist.

Action

Make sure that you run valid administrative command-line interface commands. Enter ″help″ for a list of available commands.

CMMCI9014E The parameter -*parameter_name* is not valid.

Explanation

You attempted to run a command, but the parameter that you specified is not valid.

Action

Run the command again, specifying valid parameters. Enter ″help **command_name**″ for a list of valid parameters.

CMMCI9015E The value *value* for parameter -*parameter_name* is not formatted correctly.

Explanation

The parameter that you specified is not formatted correctly.

Action

Run the command again, specifying parameter values that are formatted correctly. Enter ″help **command_name**″ for a list of valid parameters.

CMMCI9016E Missing parameter name after -.

Explanation

You specified a dash, but you did not specify a parameter name after the dash.

Action

Run the command again using correct parameters. Enter ″help **command_name**″ for a list of valid parameters.

CMMCI9017E Parameter *parameter_name* is already specified.

Explanation

You are attempting to specify the same parameter twice on a single command.

Action

Run the command again, specifying the parameter only once. Enter ″help **command_name**″ for a list of valid parameters.

CMMCI9018E Parameter *parameter_name* is missing a required value.

Explanation

The parameter **parameter_name** requires a value.

Action

Run the command again, specifying valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and values.

CMMCI9019E The value for *parameter_name*: *value* is not valid.

Explanation

The value that you specified for the listed parameter name is not valid.

Action

Run the command again, specifying valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and values.

CMMCI9021E Command *command_name* is not formatted correctly.

Explanation

The command that you specified is not formatted correctly.

Action

Run the command again, making sure that it is formatted correctly. Enter ″help **command_name**″ for the correct format.

CMMCI9022E Missing required parameter: *parameter_name.*

Explanation

The parameter **parameter_name** is required.

Action

Run the command again, specifying all required parameters. Enter ″help **command_name**″ for a list of valid parameters and values.

CMMCI9023E *parameter_name* is mutually exclusive of *parameter_name*

Explanation

You specified two parameters that cannot be used together. You cannot specify both parameters on a single command.

Action

Run the command again, specifying only one of the parameters.

CMMCI9024E *value* exceeds the maximum allowable value of *maximum_value* for the parameter *command_name*

Explanation

The value that you specified is greater than the maximum value that is allowed for this parameter.

Action

Run the command again, specifying valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9025E *value* does not meet the minimum allowable value of *minimum_value* for the parameter *parameter_name*

Explanation

The value that you specified is less than the minimum value that is allowed for this parameter.

Action

Run the command again, specifying valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9026E Unmatched *character_value* characters.

Explanation

There are unmatched **character_value** characters in the command that you specified.

Action

Run the command again, making sure that you specify matching **character_value** characters, such as matching quotation marks. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9027E `Invalid value for` *parameter_name*`. The length exceeds` *maximum_length* `characters.`

Explanation

The length of the value that you specified for this parameter exceeds the maximum length for this value.

Action

Run the command again, making sure that the length of the value that you specify for this parameter is not greater than the maximum length. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9028E `The value` *value* `specified for parameter` *parameter_value* `is not valid.`

Explanation

The value that you specified for this parameter is not valid for this parameter.

Action

Run the command again, making sure that you specify valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9029E *object_type* *object_name* `does not exist.`

Explanation

You specified the object **object_type** with the name **object_name**, but it does not exist.

Action

Run the command again, making sure that you specify an existing object. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9030E `Value` *value* `cannot be accepted with any other value for the -`*parameter_name* `parameter.`

Explanation

You specified multiple values for the parameter **parameter_name**. However, if you specify the parameter value of **value**, it must be the only value that is specified for this parameter.

Action

Run the command again, making sure that you specify valid parameter values. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9031E The help page for command *command_name* does not exist.

Explanation

You requested help for the command **command_name**, but no help exists for this command.

Action

Make sure that you are requesting help for a valid command. Enter ″help″ for a list of available commands.

CMMCI9032E You must specify parameter *parameter_name* if you specify parameter *parameter_name*

Explanation

If you specify one of these parameters on a command, you must specify both parameters.

Action

Run the command again, making sure that you specify both parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9033E File *file_name* does not exist.

Explanation

The file name that you specified does not exist.

Action

Run the command again, making sure that you specify a valid file name.

CMMCI9034E Parameter *parameter_name* cannot be used in the same command as parameter *parameter_name*.

Explanation

These two parameters cannot be used together. You cannot specify both of them in the same command.

Action

Run the command again, making sure that you specify only one of these parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9035E *object_type object_name* `already exists.`

Explanation

You are attempting to create an object of type **object_type** by the name **object_name**, but it already exists.

Action

Make sure that this is the object that you are trying to create. If so, no action is required. If not, run the command again using a new object name.

CMMCI9036E `The value` *value* `for parameter -`*parameter_name* `is already specified.`

Explanation

You are attempting to specify the same parameter twice in a single command.

Action

Run the command again, specifying the parameter only once. Enter ″help **command_name**″ for a list of valid parameters.

CMMCI9037E `Multiple targets not allowed for command` *command_name*

Explanation

You cannot specify multiple targets for this command.

Action

Run the command again, specifying a single target. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9038E `You cannot specify multiple` *value*`s when using the` *parameter_name* `parameter.`

Explanation

You specified multiple values for the parameter **parameter_name**. You can specify only a single value for this parameter.

Action

Run the command again, making sure that you specify valid parameter values. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9039E `The value` *value* `for` *parameter_name* `is not valid. It contains unsupported characters.`

Explanation

You specified a value for this parameter that contains unsupported characters.

Action

Run the command again, making sure that you specify valid parameter values.
Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9040E The value *value* for the parameter *parameter_name* is not valid. It contains unsupported characters.

Explanation

You specified an object name that contains unsupported characters.

Action

Run the command again, making sure that you specify a valid object name. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9041E The value for *parameter_name* is not valid. You must specify either *value1* or *value2*.

Explanation

You specified a value for this parameter that is not valid. You must specify either **value1** or **value2**.

Action

Run the command again, making sure that you specify valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9042E The value for the parameter -*parameter_name* cannot contain a *value*.

Explanation

You specified a value for this parameter that is not valid.

Action

Run the command again, making sure that you specify valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9043E Number of entries (*entries*) is exceeded for the -*parameter_name* parameter.

Explanation

You specified too many values for this parameter.

Action

Run the command again, making sure that you specify valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9044E Entry *entry_value* exceeds the length limit (*entry_limit*) for one item for the -*parameter_name* parameter.

Explanation

The length of the value that you specified for this parameter is too long.

Action

Run the command again, making sure that you specify valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9045E The value for -*parameter_name* must be *operator* the current setting of *value*.

Explanation

The value that you specified for the listed operator is not valid. The **operator** explains how **value** must be changed.

Action

Run the command again, making sure that you specify valid values for all parameters. Enter ″help **command_name**″ for a list of valid parameters and parameter values.

CMMCI9046E Unrecognized syntax error in command *command_name*

Explanation

There is a syntax error in the command that you specified.

Action

Run the command again, making sure that you use a valid syntax. Enter ″help **command_name**″ for the syntax to use.

CMMCI9047E Cannot run *command_name* as a command within the *application_name* application. Tip: Enter ″**help** *command_name*″ for more information.

Explanation

You cannot specify the command **command_name** within this application.

Action

Enter ″help **command_name**″ for more information about using this command.

CMMCI9048E The date provided: *date_value* is invalid. Tip: Correct format for the date field is YYYY-MM-DD

Explanation

The value that you entered for the date specifier is invalid.

Action

The format of the date field is YYYY-MM-DD. Check that the value that you entered follows this format and is a valid date.

CMMCI9049E You must specify one flag from the following group when issuing this command: *param_group*.

Explanation

It is required that one of the parameters that is specified in the grouping is provided for this command.

Action

Restate the command with the correct list of required parameters.

CMMCI9050E The ″-″ option is not valid in interactive mode. Tip: If you intended to use this as a value substitution indicator, you must enter the value.

Explanation

Using the operator to instruct the process to read from stdin while in interactive mode is illegal.

Action

Do not use the stdin read operator. Provide the actual value instead.

CLI messages

Command-line interface messages are displayed whenever you process a DS CLI command. Command-line message identifiers are prefixed by the letters ″CMMC″.

CMUC00000I *COMMAND_INFO* Extent pool *VALUE_0* successfully created.

Explanation

The extent pool has been created successfully.

Action

None.

CMUC00001I *COMMAND_INFO* Extent pool *VALUE_0* successfully modified.

Explanation

The extent pool has been modified successfully.

Action

None.

CMUC00002W *COMMAND_INFO* **Are you sure you want to delete extent pool** *EXTENT_POOL_ID***? [y/n]:**
Explanation

You are being asked to confirm that you want to delete the extent pool.

Action

Enter **Y** to delete the extent pool. Enter **N** to cancel the operation.

CMUC00003I *COMMAND_INFO* **Extent pool** *VALUE_0* **successfully deleted.**
Explanation

The extent pool has been deleted successfully.

Action

None.

CMUC00004I *COMMAND_INFO* **Array** *VALUE_0* **successfully created.**
Explanation

The array has been created successfully.

Action

None.

CMUC00005W *COMMAND_INFO* **Are you sure you want to delete array** *ARRAY_ID***? [y/n]:**
Explanation

You are being asked to confirm that you want to delete the array.

Action

Enter **Y** to delete the array. Enter **N** to cancel the operation.

CMUC00006I *COMMAND_INFO* **Array** *VALUE_0* **successfully deleted.**
Explanation

The array has been deleted successfully.

Action

None.

CMUC00007I *COMMAND_INFO* **Rank** *VALUE_0* **successfully created.**
Explanation

The rank has been created successfully.

Action

None.

CMUC00008I *COMMAND_INFO* **Rank** *VALUE_0* **successfully modified.**

Explanation

The rank has been modified successfully.

Action

None.

CMUC00009W *COMMAND_INFO* **Are you sure you want to delete rank** *RANK_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to delete the rank.

Action

Enter **Y** to delete the rank. Enter **N** to cancel the operation.

CMUC00010I *COMMAND_INFO* **Rank** *VALUE_0* **successfully deleted. NOTE: The rank might still be visible to queries until reformatting completes.**

Explanation

The rank has been deleted successfully. However, device reformatting can take up to several hours to complete, depending on the size of the devices. The rank might still be visible in queries until reformatting completes.

Action

None.

CMUC00011I *COMMAND_INFO* **I/O Port** *VALUE_0* **successfully configured.**

Explanation

The I/O port has been configured successfully.

Action

None.

CMUC00012I *COMMAND_INFO* **Host connection** *VALUE_0* **successfully created.**

Explanation

The host connection has been created successfully.

Action

None.

CMUC00013I *COMMAND_INFO* **Host connection** *VALUE_0* **successfully modified.**

Explanation

The host connection has been modified successfully.

Action

None.

CMUC00014W *COMMAND_INFO* **Are you sure you want to delete host connection** *HOST_CONNECT_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to delete the host connection.

Action

Enter **Y** to delete the host connection. Enter **N** to cancel the operation.

CMUC00015I *COMMAND_INFO* **Host connection** *VALUE_0* **successfully deleted.**

Explanation

The host connection has been deleted successfully.

Action

None.

CMUC00016I *COMMAND_INFO* **Port group number** *PORT_GROUP* **successfully modified.**

Explanation

The port group has been modified successfully.

Action

None.

CMUC00017I *COMMAND_INFO* **LCU** *VALUE_0* **successfully created.**

Explanation

The logical control unit has been created successfully.

Action

None.

CMUC00018I *COMMAND_INFO* **LCU** *VALUE_0* **successfully modified.**
Explanation

The logical control unit has been modified successfully.

Action

None.

CMUC00019W *COMMAND_INFO* **Are you sure you want to delete LCU** *LCU_ID***? [y/n]:**
Explanation

You are being asked to confirm that you want to delete the logical control unit.

Action

Enter **Y** to delete the logical control unit. Enter **N** to cancel the operation.

CMUC00020I *COMMAND_INFO* **LCU** *VALUE_0* **successfully deleted.**
Explanation

The logical control unit has been deleted successfully.

Action

None.

CMUC00021I *COMMAND_INFO* **CKD Volume** *VALUE_0* **successfully created.**
Explanation

The count-key-data volume has been created successfully.

Action

None.

CMUC00022I *COMMAND_INFO* **CKD Volume** *VALUE_0* **successfully modified.**
Explanation

The count-key-data volume has been modified successfully.

Action

None.

CMUC00023W *COMMAND_INFO* **Are you sure you want to delete CKD volume** *VOLUME_ID***? [y/n]:**
Explanation

You are being asked to confirm that you want to delete the count-key-data volume.

Action

Enter **Y** to delete the volume. Enter **N** to cancel the operation.

CMUC00024I *COMMAND_INFO* `CKD volume` *VALUE_0* `successfully deleted.`
Explanation

The count-key-data volume has been deleted successfully.

Action

None.

CMUC00025I *COMMAND_INFO* `FB volume` *VALUE_0* `successfully created.`
Explanation

The fixed block volume has been created successfully.

Action

None.

CMUC00026I *COMMAND_INFO* `FB volume` *VALUE_0* `successfully modified.`
Explanation

The fixed block volume has been modified successfully.

Action

None.

CMUC00027W *COMMAND_INFO* `Are you sure you want to delete FB volume`
*VOLUME_ID***? [y/n]:**
Explanation

You are being asked to confirm that you want to delete the fixed block volume.

Action

Enter **Y** to delete the volume. Enter **N** to cancel the operation.

CMUC00028I *COMMAND_INFO* `FB volume` *VALUE_0* `successfully deleted.`
Explanation

The fixed block volume has been deleted successfully.

Action

None.

CMUC00029I *COMMAND_INFO* LSS *VALUE_0* successfully modified.

Explanation

The logical subsystem has been modified successfully.

Action

None.

CMUC00030I *COMMAND_INFO* Volume group *VALUE_0* successfully created.

Explanation

The volume group has been created successfully.

Action

None.

CMUC00031I *COMMAND_INFO* Volume group *VALUE_0* successfully modified.

Explanation

The volume group has been modified successfully.

Action

None.

CMUC00032W *COMMAND_INFO* Are you sure you want to delete volume group *VOLGRP_ID*? [y/n]:

Explanation

You are being asked to confirm that you want to delete the volume group.

Action

Enter **Y** to delete the volume group. Enter **N** to cancel the operation.

CMUC00033I *COMMAND_INFO* Volume group *VALUE_0* successfully deleted.

Explanation

The volume group has been deleted successfully.

Action

None.

CMUC00034W *COMMAND_INFO* **Data can be lost. You have requested an operation that discards a portion of the volume. Are you sure that you want to delete tracks** *START* **to** *END* **on volume** *VOLUME_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to delete pinned data.

Action

Enter **Y** to delete the data. Enter **N** to cancel the operation.

CMUC00035I *COMMAND_INFO* **Pinned tracks** *START* **to** *END* **on volume** *VOLUME_ID* **successfully deleted.**

Explanation

The pinned track data on the volume has been deleted successfully.

Action

None.

CMUC00036W *COMMAND_INFO* **Are you sure you want to reset the access state for volume** *VOLUME_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to restore access to the volume by resetting the volume access state.

Action

Enter **Y** to restore access to the volume. Enter **N** to cancel the operation.

CMUC00037I *COMMAND_INFO* **Access state for volume** *VOLUME_ID* **successfully reset.**

Explanation

Access to the volume has been restored successfully. The access state has been reset.

Action

None.

CMUC00038W *COMMAND_INFO* **Are you sure you want to clear volume** *VOLUME_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to clear the Copy Services relationships for the base volume.

Action

Enter **Y** to clear the volume. Enter **N** to cancel the operation.

CMUC00039I *COMMAND_INFO* `No FlashCopy or Remote Mirror and Copy relationships exist for volume` *VOLUME_ID*`. The volume is clear.`

Explanation

No Copy Services relationships can be found for this volume. No action can be taken because the volume is already clear.

Action

None.

CMUC00040I *COMMAND_INFO* `Storage complex` *VALUE_0* `successfully modified.`

Explanation

The storage complex has been modified successfully.

Action

None.

CMUC00041I *COMMAND_INFO* `Storage unit` *VALUE_0* `successfully modified.`

Explanation

The storage unit has been modified successfully.

Action

None.

CMUC00042I *COMMAND_INFO* `Storage image` *VALUE_0* `successfully modified.`

Explanation

The storage image has been modified successfully.

Action

None.

CMUC00043I *COMMAND_INFO* `Environment variable successfully set.`

Explanation

The command-line interface environment variable has been set successfully.

Action

None.

CMUC00044E *COMMAND_INFO* **Unknown error returned by management console server.**

Explanation

The management console server reports a failure for unknown reasons.

Action

Verify that the correct versions of the management console server software and the command-line interface are installed. If the problem persists, contact IBM technical support for assistance.

CMUC00045E *COMMAND_INFO ERROR_CODE* **Unknown error code returned by management console server.**

Explanation

The management console server returns an unknown error code.

Action

Contact IBM technical support for assistance.

CMUC00046E *COMMAND_INFO* **Failure returned by management console server.**

Explanation

The management console server reports that the operation fails.

Action

Specify the command and the parameters properly, and then resubmit the command. Verify that the correct versions of the management console server software and the command-line interface are installed. If the problem persists, contact IBM technical support for assistance.

CMUC00047E *COMMAND_INFO* **Resource *VALUE_0* does not exist.**

Explanation

The resource that is specified as a command parameter cannot be found.

Action

Correctly specify the resource, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00048E *COMMAND_INFO* `Array site` *VALUE_0* `does not exist.`
Explanation

You are attempting to list, show, or create an array, but the array site that is specified as a command parameter cannot be found.

Action

Correctly specify the array site, or resubmit the command with another array site ID.

Tip: Enter ″help **command_name**″ for more information.

CMUC00049E *COMMAND_INFO* `Array ID` *VALUE_0* `does not exist.`
Explanation

The array that is specified as a command parameter cannot be found.

Action

Correctly specify the array ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00050E *COMMAND_INFO* `Rank ID` *VALUE_0* `does not exist.`
Explanation

You are attempting to list, show, change, or remove a rank, but the rank that is specified as a command parameter cannot be found.

Action

Correctly specify the rank ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00051E *COMMAND_INFO* `Extent pool` *VALUE_0* `does not exist.`
Explanation

The extent pool that is specified as a command parameter cannot be found.

Action

Specify the correct extent pool ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00052E *COMMAND_INFO* `Storage image` *VALUE_0* `does not exist.`
Explanation

The storage image that is specified as a command parameter (for example, -dev) cannot be found.

Action

Specify a valid storage image, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00053E *COMMAND_INFO* **I/O port** *VALUE_0* **does not exist.**
Explanation

The I/O port that is specified as a command parameter cannot be found.

Action

Specify the correct I/O port ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00054E *COMMAND_INFO* **LSS** *VALUE_0* **does not exist.**
Explanation

The logical subsystem ID that is specified as a command parameter cannot be found.

Action

Specify the correct logical subsystem ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00055E *COMMAND_INFO* **Storage image ID** *VALUE_0* **does not exist.**
Explanation

The storage image ID that is specified as a command parameter cannot be found.

Action

Specify the correct storage image ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00056E *COMMAND_INFO* **Storage image** *VALUE_0* **does not exist.**
Explanation

You attempting to list a storage image, but the storage image ID that is specified as a command parameter cannot be found.

Action

Specify the correct storage image ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00057E *COMMAND_INFO* `Volume group` *VALUE_0* `does not exist.`

Explanation

The volume group ID that is specified as a command parameter cannot be found.

Action

Specify the correct volume group ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00058E *COMMAND_INFO* `Volume` *VALUE_0* `does not exist.`

Explanation

The volume ID that is specified as a command parameter cannot be found.

Action

Specify the correct volume ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00059E *COMMAND_INFO* `Storage complex` *VALUE_0* `does not exist.`

Explanation

The storage complex that is specified as a command parameter cannot be found.

Action

Specify the correct storage complex, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00060E *COMMAND_INFO* `Enclosure` *VALUE_0* `does not exist.`

Explanation

The enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00061E *COMMAND_INFO* `CEC enclosure` *VALUE_0* `does not exist.`

Explanation

The computer electronic complex (CEC) enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct CEC enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00062E *COMMAND_INFO* `Storage management console enclosure` *VALUE_0* `does not exist.`

Explanation

The management console enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct management console enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00063E *COMMAND_INFO* `I/O enclosure` *VALUE_0* `does not exist.`

Explanation

The input/output (I/O) enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct I/O enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00064E *COMMAND_INFO* `Processor complex enclosure` *VALUE_0* `does not exist.`

Explanation

The processor complex enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct processor complex enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00065E *COMMAND_INFO* `Frame enclosure` *VALUE_0* `does not exist.`

Explanation

The frame enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct frame enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00066E *COMMAND_INFO* `Storage enclosure` *VALUE_0* `does not exist.`
Explanation

The storage enclosure that is specified as a command parameter cannot be found.

Action

Specify the correct storage enclosure, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00067E *COMMAND_INFO* `FRU` *VALUE_0* `does not exist.`
Explanation

The field-replaceable unit (FRU) that is specified as a command parameter cannot be found.

Action

Specify the correct FRU, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00068E *COMMAND_INFO* `Host connection` *VALUE_0* `does not exist.`
Explanation

The host connection that is specified as a command parameter cannot be found.

Action

Specify the correct host connection, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00069E *COMMAND_INFO* `Invalid storage image ID` *VALUE_0*`.`
Explanation

The format of the specified storage image ID is incorrect.

Action

Specify the storage image ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00070E *COMMAND_INFO* `Inconsistent storage image ID` *VALUE_0*`.`
Explanation

Two or more different storage image IDs are specified in a single command.

Action

Specify only one storage image ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00071E *COMMAND_INFO* `Invalid ID` *VALUE_0*`.`
Explanation

The format of the specified ID is incorrect.

Action

Specify the ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00072E *COMMAND_INFO* `Invalid array site ID` *VALUE_0*`.`
Explanation

The format of the array site ID is incorrect.

Action

Specify the array site ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00073E *COMMAND_INFO* `Invalid array ID` *VALUE_0*`.`
Explanation

The format of the array ID is incorrect.

Action

Specify the array ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00074E *COMMAND_INFO* `Invalid Rank ID` *VALUE_0*`.`
Explanation

The format of the rank ID is incorrect.

Action

Specify the rank ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00075E *COMMAND_INFO* `Invalid extent pool ID` *VALUE_0*.
Explanation

The format of the extent pool ID is incorrect.

Action

Specify the extent pool ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00076E *COMMAND_INFO* `Invalid address group` *VALUE_0*.
Explanation

The format of the specified address group is incorrect.

Action

Specify the address group in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00077E *COMMAND_INFO* `Invalid storage image ID` *VALUE_0*.
Explanation

The format of the specified storage image ID is incorrect.

Action

Specify the storage image ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00078E *COMMAND_INFO* `Invalid I/O port` *VALUE_0*.
Explanation

The format of the specified input/output (I/O) port is incorrect.

Action

Specify the I/O port in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00079E *COMMAND_INFO* `Invalid LSS` *VALUE_0*.
Explanation

The format of the specified logical subsystem is incorrect.

Action

Specify the logical subsystem in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00080E *COMMAND_INFO* `Invalid storage unit ID` *VALUE_0*.
Explanation

The format of the specified storage unit ID is incorrect.

Action

Specify the storage unit ID in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00081E *COMMAND_INFO* `Invalid storage server ID` *VALUE_0*.
Explanation

The format of the specified storage server ID is incorrect. Each storage image contains two storage servers: 00 and 01. You must specify a fully qualified server ID.

Example: IBM.2107-1300321/00

Action

Specify a fully qualified storage server ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00082E *COMMAND_INFO* `Invalid volume group` *VALUE_0*.
Explanation

The format of the specified volume group ID is incorrect.

Action

Specify the volume group in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00083E *COMMAND_INFO* `Invalid volume` *VALUE_0*.
Explanation

The format of the specified volume ID is incorrect.

Action

Specify the volume in the correct format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00084E *COMMAND_INFO* **The specified parameter** *VALUE_0* **is out of range.**

Explanation

The specified parameter value is not within acceptable limits.

Action

Specify the parameter within range, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00085E *COMMAND_INFO* **The specified parameter** *VALUE_0* **is invalid.**

Explanation

The specified parameter value is invalid.

Action

Specify a valid parameter value, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00086E *COMMAND_INFO* **Invalid topology** *TOPOLOGY* **specified for I/O port** *PORT***.**

Explanation

The specified port topology is invalid.

Action

Specify a valid port topology, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00087E *COMMAND_INFO* **The specified LCU** *VALUE_0* **is invalid.**

Explanation

The specified logical control unit is invalid.

Action

Specify a valid, existing logical control unit, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00088E *COMMAND_INFO* `The specified LCU` *VALUE_0* `already exists.`
Explanation

The specified logical control unit already exists. A new ID is required.

Action

Specify a logical control unit ID that is not currently in use, and then resubmit the command.

CMUC00089E *COMMAND_INFO* `The specified ID` *VALUE_0* `is not an LCU.`
Explanation

The specified ID exists, but it is not a logical control unit. A logical control unit is required for this operation.

Action

Specify a logical control unit, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00090E *COMMAND_INFO* `The specified ID` *VALUE_0* `is not an LSS.`
Explanation

The specified ID exists, but it is not a logical subsystem. A logical subsystem is required for this operation.

Action

Specify a logical subsystem, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00091E *COMMAND_INFO* `The specified SSID` *VALUE_0* `is invalid.`
Explanation

The format of the specified subsystem ID is invalid.

Action

Specify the subsystem ID in the proper format, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00092E *COMMAND_INFO* `The specified volume ID` *VALUE_0* `already exists.`
Explanation

The specified volume exists.

Action

Use a volume ID not currently in use, and then resubmit the command.

CMUC00093E *COMMAND_INFO* **The specified volume** *VALUE_0* **is not type CKD.**

Explanation

The specified volume is a fixed block volume. The volume type must be count-key-data for this operation.

Action

Specify a count-key-data volume, and then resubmit the command.

Tip: Enter "help **command_name**" for more information.

CMUC00094E *COMMAND_INFO* **The specified volume** *VALUE_0* **is not of type FB.**

Explanation

The specified volume is a count-key-data volume. The volume type must be fixed block for this operation.

Action

Specify a fixed block volume, and then resubmit the command.

Tip: Enter "help **command_name**" for more information.

CMUC00095E *COMMAND_INFO* **No storage image ID is specified.**
Explanation

A storage image ID must be specified in your profile or by using the **-dev** flag with the command.

Action

Specify a storage image ID, and then resubmit the command.

Tip: Enter "help **command_name**" for more information.

CMUC00096E *COMMAND_INFO* **No remote storage image ID is specified.**
Explanation

The command requires a remote storage image ID as a parameter. No remote storage image ID is specified.

Action

Include a remote storage image ID, and then resubmit the command.

Tip: Enter "help **command_name**" for more information.

CMUC00097E *COMMAND_INFO* A single storage image ID is specified. A pair of storage image IDs is required for this command.

Explanation

The command requires a pair of storage image IDs as a parameter. However, a single storage image ID is specified.

Action

Specify a pair of storage image IDs, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00098E *COMMAND_INFO* A pair of storage image IDs is specified. A single storage image ID is required for this command.

Explanation

The command issued requires a single storage image ID as a parameter. However, a pair of storage image IDs is specified.

Action

Specify a single storage image ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00099E *COMMAND_INFO* A single subsystem ID *VALUE_0* is specified. A pair of subsystem IDs is required for this command.

Explanation

The command requires a pair of subsystem IDs as a parameter. A subsystem ID pair consists of two subsystem IDs that are separated by a colon, with no spaces.

Action

Specify a pair of subsystem IDs, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00100E *COMMAND_INFO* A pair of subsystem IDs *VALUE_0* is specified. A single subsystem ID is required for this command.

Explanation

The command requires a single subsystem ID as a parameter.

Action

Specify a single subsystem ID, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00101E *COMMAND_INFO* FlashCopy pairs *VALUE_0* are persistent. The -wait option cannot be specified for persistent pairs.
Explanation

The FlashCopy pairs were established as persistent, with the intention of retaining the relationship after the copy completes. This definition overrides the **-wait** option.

Action

Resubmit the command without the **-wait** option.

Tip: Enter ″help **command_name**″ for more information.

CMUC00102E *COMMAND_INFO* The -cp option must be used in conjunction with the -wait option.
Explanation

You must include a **-cp** flag and value when the **-wait** option is used with this command.

Action

Resubmit the command, specifying both **-cp** and **-wait** flags and values, or omit the **-wait** option.

Tip: Enter ″help **command_name**″ for more information.

CMUC00103E *COMMAND_INFO* When specifying the -range parameter, the starting and ending volume IDs must be on the same storage image.
Explanation

The **-range** parameter initiates a query that displays volume relationships that exist for source or target volumes within the specified volume ID range. The range is meaningless unless it is specified for volumes that are on the same storage image.

Action

Specify volumes on the same storage image, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00104E *COMMAND_INFO* The specified options for this command are incompatible or invalid: *VALUE_0*
Explanation

You are attempting to establish or change a path. Two or more of the options that have been supplied are incompatible, or at least one of the options is invalid.

Action

Specify compatible and valid options, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00105E *COMMAND_INFO* **The following parameters are incompatible:** *VALUE_0*.

Explanation

Two or more of the command parameters are incompatible.

Action

Specify only compatible parameters, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00106E *COMMAND_INFO* **The parameter value** *VALUE_0* **is larger than the maximum allowable value:** *VALUE_1*.

Explanation

The parameter that has been supplied is larger than the maximum value that is allowed.

Action

Specify a value equal to or lower than the maximum value that is allowed, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00107E *COMMAND_INFO* **The parameter value** *VALUE_0* **is smaller than the minimum allowable value:** *VALUE_1*.

Explanation

The parameter that has been supplied is smaller than the minimum value that is allowed.

Action

Specify a value equal to or higher than the minimum value that is allowed, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00108E *COMMAND_INFO* **The Remote Mirror and Copy volume pair must be in full-duplex mode before the host server can read from target volumes.**

Explanation

The No Target Read **-notgthread** option has been specified, and the pair is not in full-duplex mode. For the host server to read the volume, the Remote Mirror and Copy volume pair must be in full-duplex mode.

Action

Place the pair in full-duplex mode, and then resubmit the command. You can use the **-mode full** option to place the Remote Mirror and Copy volume pair in full-duplex mode.

Tip: Enter ″help **command_name**″ for more information.

CMUC00109E *COMMAND_INFO* `The -uconditional flag is invalid unless it is used in conjunction with the -at parameter.`
Explanation

The **-uconditional** flag indicates that a source or target volume has been selected individually, and not as a pair. It is valid only if the **-at** option specifies a source or a target.

Action

Specify both **-uconditional** and **-at** flags, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00110E *COMMAND_INFO* `No matching candidate connection found.`
Explanation

The candidate Remote Mirror and Copy path between source and target ports cannot be established because one or both of the physical connections cannot be found.

Action

Specify existing source and target ports, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00111E *COMMAND_INFO* `One or more of the specified volumes is not within the specified LSS.`
Explanation

This command requires a logical subsystem ID and one or more volume IDs. The volumes must be members of the specified logical subsystem. One or more of the volumes are not members of the specified logical subsystem.

Action

Specify only volumes within the specified logical subsystem, and then resubmit the command.

CMUC00112E *COMMAND_INFO* `Port candidate` *VALUE_0* `is not available for an ESCON connection.`

Explanation

You are attempting to create a path between source and target logical subsystems on an IBM model 2105 storage unit over an ESCON connection. The specified port is not available for an ESCON connection. This might be because the port does not exist, because it is not identified as an ESCON port, or because it is already in use.

Action

Use the **lsavailpprcport** command to list available ports and their types. Specify an available ESCON port, and then resubmit the command.

CMUC00113E *COMMAND_INFO* `Record` *VALUE_1* `already exists in password file` *FILE_NAME*`.`

Explanation

You are attempting to add a password record in the password file. However, the specified user name already exists in the file.

Action

Specify a user name that is not currently in use, and then resubmit the command. If you want to change the record specified, issue the **managepwfile** command with the **-action change** flag.

CMUC00114E *COMMAND_INFO* `Record` *VALUE_1* `does not exist in password file` *FILE_NAME*`.`

Explanation

You are attempting to change or remove a record in the password file. However, the file contains no record for the specified user name and management console.

Action

Specify a valid record, and then resubmit the command. If you want to add a new record, issue the **managepwfile** command with the **-action add** flag.

CMUC00115E *COMMAND_INFO* `User account file` *VALUE_0* `not found.`

Explanation

You are attempting to change or remove a user. The specified user account file cannot be found. This might be because the file name is incorrect, or because you lack necessary permissions.

Action

Ensure that you have appropriate permissions. Specify the correct user account file name, and then resubmit the command.

CMUC00116E *COMMAND_INFO* **User account file** *FILE_NAME* **is used for another user.**

Explanation

You are attempting to create a user. The specified user account file is in use for another user. A different file name must be specified.

Action

Specify another file name, and then resubmit the command.

CMUC00117E *COMMAND_INFO* **Unable to create password file** *FILE_NAME*.
Explanation

You are attempting to create a password file. The system is unable to create the file. This might be because you lack necessary permissions or have exceeded a quota.

Action

Ensure that you have appropriate file creation permissions or alter the quota, and then resubmit the command.

CMUC00118E *COMMAND_INFO* **Unable to update password file** *FILE_NAME*.
Explanation

You are attempting to update a password file. The system is unable to update the file. This might be because you lack necessary permissions or have exceeded a quota.

Action

Ensure that you have appropriate file permissions or alter the quota, and then resubmit the command.

CMUC00119E *COMMAND_INFO* **Invalid password format.**
Explanation

The format of the specified password is invalid.

- A password must be a minimum of six alphanumeric characters (a - z, A - Z, or 0 - 9) in length.
- A password must contain at least one numeric character (0 - 9).
- The initial character of the password cannot be numeric.
- Passwords are case-sensitive.

Action

Use an appropriately formatted password, and then resubmit the command.

CMUC00120E *COMMAND_INFO* `Invalid password.`

Explanation

The specified password is incorrect.

Action

Use the correct password, and then resubmit the command.

CMUC00121E *COMMAND_INFO* `Invalid account file` *VALUE_0* `for user` *USERNAME.*

Explanation

You are attempting to change or remove a user. The user and account file name do not match.

Action

Use the correct user name and account file name combination, and then resubmit the command.

CMUC00122E *COMMAND_INFO* `Invalid admin user.`

Explanation

You are attempting to show a user. Your user name is not a member of the admin group, and lacks sufficient privileges to use this command.

Action

Resubmit the command as a user who is a member of the admin group.

CMUC00123E *COMMAND_INFO* `Unable to create user account` *USERNAME.*

Explanation

You are attempting to create a new user on the management console server. The task fails.

Action

Ensure that the management console server is available and that you have proper privileges to create a user account. You must be a member of the admin group to use this command. Resubmit the command.

CMUC00124E *COMMAND_INFO* `Unable to assign user` *USERNAME* `to group` *GROUP.*

Explanation

You are attempting to create a new user on the management console server. The user cannot be assigned to the specified group.

Action

Ensure that the group exists. If the problem persists, contact IBM technical support for assistance.

CMUC00125E *COMMAND_INFO* `Unable to modify user group to` *NEW_GROUP*`.`
Explanation

You are attempting to change a user's group to a new group. The user's group cannot be modified to the specified group.

Action

Ensure that the group exists. If the problem persists, contact IBM technical support for assistance.

CMUC00126E *COMMAND_INFO* `Unable to modify password.`
Explanation

You are attempting to change a user's password. The password cannot be changed to the specified password.

- A password must be a minimum of six alphanumeric characters (a - z, A - Z, or 0 - 9) in length.
- A password must contain at least one numeric character (0 - 9).
- The initial character of the password cannot be numeric.
- Passwords are case-sensitive.

Action

Correctly specify the new password. If the problem persists, contact IBM technical support for assistance.

CMUC00127E *COMMAND_INFO* `Unable to delete user account` *USERNAME* `on the management console server.`
Explanation

You are attempting to delete a user on the management console server. The task fails.

Action

Ensure that you have appropriate privileges. You must be a member of the admin group to use this command. If the problem persists, contact IBM technical support for assistance.

CMUC00128E *COMMAND_INFO* `Unable to find a Remote Mirror and Copy path for the specified logical subsystems.`
Explanation

The paths cannot be deleted for the specified logical subsystems. No paths can be found.

Action

Ensure that the correct logical subsystems are specified, and then resubmit the task.

CMUC00129E *COMMAND_INFO* `All source volumes must be within the same logical subsystem.`

Explanation

The **-srcss** flag is specified with the command. This flag requires that all source volumes are contained within the same logical subsystem. Not all of the source volumes specified are contained within the same logical subsystem.

Action

Specify source volumes that are all contained within the same logical subsystem, and then resubmit the command. Issue separate commands for volumes that are contained within different logical subsystems.

CMUC00130E *COMMAND_INFO* `All target volumes must be within the same logical subsystem.`

Explanation

The **-tgtss** flag is specified with the command. This flag requires that all target volumes are contained within the same logical subsystem. Not all of the target volumes specified are contained within the same logical subsystem.

Action

Specify target volumes that are all contained within the same logical subsystem, and then resubmit the command. Issue separate commands for volumes that are contained within different logical subsystems.

CMUC00131E *COMMAND_INFO* `Operation failure`

Explanation

The **lshostvol** command fails for one of the following reasons:
- The CLI installation did not complete successfully.
- A platform-dependent external command is being invoked unsuccessfully.
- You lack sufficient privileges.

Action

Check the CLI installation log for errors and reinstall if necessary. Ensure that you have the appropriate privileges to perform the task. If the problem persists, contact IBM technical support for assistance.

CMUC00132E *COMMAND_INFO* `Command interrupted. Resubmit the command.`

Explanation

The **lshostvol** command was interrupted for an unknown reason.

Action

Resubmit the command. If the problem persists, contact IBM technical support for assistance.

CMUC00133I *COMMAND_INFO* `User` *USERNAME* `successfully created.`
Explanation

The user has been created successfully.

Action

None.

CMUC00134I *COMMAND_INFO* `User` *USERNAME* `successfully modified.`
Explanation

The user has been modified successfully.

Action

None.

CMUC00135W *COMMAND_INFO* `Are you sure you want to delete user` *USERNAME*`? [y/n]:`
Explanation

You are being asked to confirm that you want to delete the user.

Action

Enter **Y** to delete the user. Enter **N** to cancel the operation.

CMUC00136I *COMMAND_INFO* `User` *USERNAME* `successfully deleted.`
Explanation

The user has been deleted successfully.

Action

None.

CMUC00137I *COMMAND_INFO* `FlashCopy pair` *VALUE_0* `successfully created.`
Explanation

The FlashCopy pair has been created successfully.

Action

None.

CMUC00138I *COMMAND_INFO* `Background copy for FlashCopy pair` *VALUE_0* `successful.`

Explanation

The command has been invoked with the **-wait** flag. The background copy for the specified pair ran successfully.

Action

None.

CMUC00139E *COMMAND_INFO* `FlashCopy pair` *VALUE_0* `cannot be created.`

Explanation

The FlashCopy pair cannot be created.

Action

Contact IBM technical support for assistance.

CMUC00140I *COMMAND_INFO* `FlashCopy pair` *VALUE_0* `successfully removed.`

Explanation

The command has been invoked without the **-cp** flag. The specified FlashCopy pair has been removed successfully.

Action

None.

CMUC00141I *COMMAND_INFO* `Background copy for FlashCopy pair` *VALUE_0* `ended successfully. Relationship successfully removed.`

Explanation

The command has been invoked with the **-cp** and **-wait** flags. The background copy for the specified pair ended successfully, and the relationship has been removed.

Action

None.

CMUC00142I *COMMAND_INFO* `Background copy process for FlashCopy pair` *PAIR_ID* `successfully started. The relationship will be removed when the copy ends.`

Explanation

The **-cp** flag has been used, and the FlashCopy pair is not persistent. The background copy process for the FlashCopy pair has started successfully. The FlashCopy volume pair relationship will be withdrawn when the copy process completes.

Action

None.

CMUC00143I *COMMAND_INFO* **Background copy process for FlashCopy pair *PAIR_ID* successfully started. The persistent relationship will not be removed.**

Explanation

The **-cp** flag has been used, and the FlashCopy pair is persistent. The background copy process for the FlashCopy pair has started successfully. The FlashCopy volume pair relationship will continue when the copy process completes.

Action

None.

CMUC00144W *COMMAND_INFO* **Are you sure you want to remove the FlashCopy pair *PAIR_ID*? [y/n]:**

Explanation

You are being asked to confirm that you want to remove the FlashCopy pair that is specified in the rmflash command.

Action

Enter **Y** to delete the pair. Enter **N** to cancel the operation.

CMUC00145I *COMMAND_INFO* **Session *SESSION_ID* opened successfully.**

Explanation

The Global Mirror session has opened successfully.

Action

None.

CMUC00146I *COMMAND_INFO* **Session *SESSION_ID* closed successfully.**

Explanation

The Global Mirror session has closed successfully.

Action

None.

CMUC00147I *COMMAND_INFO* **Session *SESSION_ID* successfully modified.**

Explanation

The Global Mirror session has been modified successfully.

Action

None.

CMUC00148W *COMMAND_INFO* **Are you sure you want to close session** *SESSION_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to close the session that you specified.

Action

Enter **Y** to close the session. Enter **N** to cancel the operation.

CMUC00149I *COMMAND_INFO* **Remote Mirror and Copy path** *TARGET_LSS* **successfully established.**

Explanation

The Remote Mirror and Copy path between source and target logical subsystems has been established successfully.

Action

None.

CMUC00150I *COMMAND_INFO* **Remote Mirror and Copy path** *VALUE_0* **successfully removed.**

Explanation

The Remote Mirror and Copy path between source and target logical subsystems has been removed successfully.

Action

None.

CMUC00151I *COMMAND_INFO* **Remote Mirror and Copy path** *VALUE_0* **successfully modified.**

Explanation

The Remote Mirror and Copy path between source and target logical subsystems has been modified successfully.

Action

None.

CMUC00152W *COMMAND_INFO* **Are you sure you want to remove the Remote Mirror and Copy path** *PATH_ID***? [y/n]:**

Explanation

You are being asked to confirm that you want to remove the Remote Mirror and Copy path that you specified.

Action

Enter **Y** to remove the path. Enter **N** to cancel the operation.

CMUC00153I *COMMAND_INFO* **Remote Mirror and Copy volume pair relationship** *VALUE_0* **successfully created.**

Explanation

The Remote Mirror and Copy volume pair relationship has been created successfully.

Action

None.

CMUC00154I *COMMAND_INFO* **Remote Mirror and Copy volume pair** *VALUE_0* **relationship successfully created and in full-duplex state.**

Explanation

The command has been invoked with the **-wait** flag. The Remote Mirror and Copy volume pair relationship has been created successfully and is now in full-duplex state.

Action

None.

CMUC00155I *COMMAND_INFO* **Remote Mirror and Copy volume pair** *VALUE_0* **relationship successfully withdrawn.**

Explanation

The Remote Mirror and Copy source and target pair relationship has been withdrawn successfully.

Action

None.

CMUC00156I *COMMAND_INFO* **Remote Mirror and Copy volume pair** *VALUE_0* **relationship successfully modified.**

Explanation

The Remote Mirror and Copy source and target volume pair relationship has been modified successfully.

Action

None.

CMUC00157I *COMMAND_INFO* Remote Mirror and Copy volume pair *VALUE_0* relationship successfully paused.

Explanation

The Remote Mirror and Copy source and target volume pair relationship has paused successfully.

Action

None.

CMUC00158I *COMMAND_INFO* Remote Mirror and Copy volume pair *VALUE_0* relationship successfully resumed. This message is being returned before the copy completes.

Explanation

The Remote Mirror and Copy source and target volume pair relationship has resumed successfully. An asynchronous copy from source to target began, but this message is being returned before the copy completes.

Action

None.

CMUC00159I *COMMAND_INFO* Remote Mirror and Copy volume pair *VALUE_0* relationship successfully resumed and completed. All data has been copied to the target. The relationship is now in full-duplex mode.

Explanation

The Remote Mirror and Copy source and target volume pair relationship resumed successfully and completed. The **-wait** flag was specified when the command was issued, and the command has now completed successfully.

Action

None.

CMUC00160W *COMMAND_INFO* Are you sure you want to delete the Remote Mirror and Copy volume pair relationship *PAIR_ID*? [y/n]:

Explanation

You are being asked to confirm that you want to delete the Remote Mirror and Copy volume pair relationship that you specified.

Action

Enter **Y** to delete the Remote Mirror and Copy volume pair relationship. Enter **N** to cancel the operation.

CMUC00161W *COMMAND_INFO* `Remote Mirror and Copy consistency group` *VALUE_0* `successfully created.`

Explanation

The Remote Mirror and Copy consistency group was created successfully.

Action

None.

CMUC00162I *COMMAND_INFO* `Global Mirror for session` *SESSION_ID* `successfully started.`

Explanation

Global Mirror for the session started successfully.

Action

None.

CMUC00163I *COMMAND_INFO* `Global Mirror for session` *SESSION_ID* `successfully paused.`

Explanation

Global Mirror for the session has paused successfully.

Action

None.

CMUC00164I *COMMAND_INFO* `Global Mirror for session` *SESSION_ID* `successfully resumed.`

Explanation

Global Mirror for the session has resumed successfully.

Action

None.

CMUC00165I *COMMAND_INFO* `Global Mirror for session` *SESSION_ID* `successfully stopped.`

Explanation

Global Mirror for the session has been stopped successfully.

Action

None.

CMUC00166W *COMMAND_INFO* `Are you sure you want to stop the Global Mirror session` *SESSION_ID*`? [y/n]:`

Explanation

You are being asked to confirm that you want to stop the specified Global Mirror session.

Action

Enter **Y** to stop the Global Mirror session. Enter **N** to cancel the operation.

CMUC00167I *COMMAND_INFO* `FlashCopy volume pair` *PAIR_ID* `successfully made revertible.`

Explanation

The FlashCopy volume pair that is part of an Global Mirror relationship has been modified to **revertible**. The source data can now be **committed** to the target, or the source data can be **reverted** to the data image that is currently on the target.

Action

None.

CMUC00168I *COMMAND_INFO* `FlashCopy volume pair` *PAIR_ID* `successfully resynchronized.`

Explanation

Incremental changes to the FlashCopy source volume data have been written successfully to the target volume.

Action

None.

CMUC00169I *COMMAND_INFO* `FlashCopy volume pair` *PAIR_ID* `successfully reversed.`

Explanation

The original FlashCopy source volume has been made the target volume. The original FlashCopy target volume has been made the source volume. Any uncommitted incremental changes to the original source volume data have been overwritten with older data from the new source volume.

Action

None.

CMUC00170I *COMMAND_INFO* `FlashCopy volume pair` *PAIR_ID* `successfully committed.`

Explanation

Changes to the FlashCopy source volume data have been committed to the target volume.

Action

None.

CMUC00171I *COMMAND_INFO* `FlashCopy volume pair` *PAIR_ID* `successfully reverted.`

Explanation

All new writes to the source volume since the last time source data was committed to the target volume have been discarded.

Action

None.

CMUC00172I *COMMAND_INFO* `FlashCopy consistency group for logical subsystem` *PAIR_ID* `successfully reset.`

Explanation

A **mkflash -freeze** or **resyncflash -freeze** command has been invoked previously against this consistency group. The **unfreezeflash** command successfully reset the consistency group.

Action

None.

CMUC00173I *COMMAND_INFO* `Remote FlashCopy volume pair` *PAIR_ID* `successfully created. Use the lsremoteflash command to determine copy completion.`

Explanation

The remote FlashCopy relationship has been created and started successfully, but this message is being returned before the copy completes. Use the **lsremoteflash** command to determine if the copy has completed.

Action

None.

CMUC00174I *COMMAND_INFO* `Remote FlashCopy pair` *PAIR_ID* `successfully made revertible.`

Explanation

The remote FlashCopy volume pair has been modified to **revertible**. The source data can now be **committed** to the target, or the source data can be **reverted** to the data image that is currently on the target.

Action

None.

CMUC00175I *COMMAND_INFO* `Remote FlashCopy volume pair` *PAIR_ID* `successfully resynchronized. Use the` `lsremoteflash` `command to determine copy completion.`

Explanation

The remote FlashCopy relationship resynchronization operation started successfully, but this message is being returned before the copy completes. Use the **lsremoteflash** command to determine if the copy has completed.

Action

None.

CMUC00176I *COMMAND_INFO* `Remote FlashCopy volume pair` *PAIR_ID* `successfully committed.`

Explanation

The remote FlashCopy relationship has been committed. The target data is an identical image of the source data at the time the commit command was issued.

Action

None.

CMUC00177I *COMMAND_INFO* `Remote FlashCopy volume pair` *PAIR_ID* `successfully reverted.`

Explanation

All new writes to the source volume since the last time data was committed to the target volume are being discarded.

Action

None.

CMUC00178I *COMMAND_INFO* `Remote FlashCopy volume pair` *PAIR_ID* `successfully reversed.`

Explanation

The original remote FlashCopy source volume has been made the target volume. The original remote FlashCopy target volume has been made the source volume. Any uncommitted incremental changes to the original source volume data are being overwritten with older data from the new source volume.

Action

None.

CMUC00179I *COMMAND_INFO* `Are you sure you want to remove the remote FlashCopy pair` *PAIR_ID*`? [y/n]:`

Explanation

You are being asked to confirm that you want to remove the remote FlashCopy pair relationship.

Action

Enter **Y** to delete the remote FlashCopy volume pair relationship. Enter **N** to cancel the operation.

CMUC00180I *COMMAND_INFO* `Removal of the remote FlashCopy volume pair` *PAIR_ID* `has been initiated successfully. Use the lsremoteflash command to determine when the relationship is deleted.`

Explanation

The deletion of the remote FlashCopy relationship has been started, but this message is being returned before the process completes. You must use the **lsremoteflash** command to determine if the removal has completed.

Action

None.

CMUC00181E *COMMAND_INFO* `A user name must be specified.`

Explanation

This command requires a user name. You can specify the user name with the **-user** command-line flag or in the password file.

Action

Specify a valid user name, and then resubmit the command.

Tip: Enter ″help **command_name**″ for more information.

CMUC00182E *COMMAND_INFO* `No management console IP address is specified.`

Explanation

No command can be issued until you have specified the IP address of the management console. This IP address establishes communication between the command-line interface client and the management console server.

Action

Specify a valid IP address for the management console, and then resubmit the command. Specify the IP address in your user profile or by using appropriate options on some commands.

Tip: Enter ″help **command_name**″ for more information.

CMUC00183E *COMMAND_INFO* `Invalid management console IP address:` *VALUE_0.*

Explanation

An invalid IP address for the management console is specified in the user profile or with command flags.

Action

Specify a valid IP address for the management console, and then resubmit the command. You can specify the IP address in your user profile or by using appropriate options on some commands.

Tip: Enter ″help **command_name**″ for more information.

CMUC00184E *COMMAND_INFO* `Management console server connections cannot be changed during an interactive or script session.`
Explanation

The current CLI session is either in interactive mode or script mode, and the command specifies a new management console server address. The command is rejected because changing the management console server connection is not permitted.

Action

Open a different session to issue commands to the new management console server.

CMUC00185E `Unable to access CLI user profile file` *FILE_NAME.*
Explanation

The CLI is unable to read your user profile for one of the following reasons:
- The file does not exist.
- The file is in the wrong location.
- The file is corrupted.

- You lack sufficient privileges on the profile directory or file.

Action

Ensure that the file exists in the proper location, and that you have access privileges.

CMUC00186E User profile file *FILE_NAME.* not found.
Explanation

The specified profile file cannot be found.

Action

Ensure that the file exists in the proper location.

CMUC00187E Unable to access CLI user password file *FILE_NAME.*
Explanation

The CLI is unable to find your user password file for one of the following reasons:
- The file does not exist.
- The file is in the wrong location.
- The file is improperly named.
- You lack sufficient privileges on the password directory or file.

Action

Ensure that the file exists in the proper location, and that you have access privileges.

CMUC00188E Unable to read CLI user password file *FILE_NAME.*
Explanation

The CLI is unable to read your user password file for one of the following reasons:
- The file does not exist.
- The file is in the wrong location.
- The file is improperly named.
- The file is corrupted.
- You lack sufficient privileges on the password directory or file.

Action

Ensure that the file exists in the proper location, and that you have access privileges.

CMUC00189E Internal error: *VALUE_0.*
Explanation

The CLI reports an internal error.

Action

Contact IBM technical support for assistance.

CMUC00190E *VALUE_0*: `Authentication failure: invalid password`
Explanation

Authentication fails because the password is incorrect.

Action

Provide a valid password, and then resubmit the task.

CMUC00191E *VALUE_0*: `Authentication failure: invalid user name`
Explanation

Authentication fails because the specified user account does not exist.

Action

Provide a valid user name, and then resubmit the task.

CMUC00192E *VALUE_0*: `Authentication failure: the user account is locked.`
Explanation

Authentication fails because the specified user account has been locked by the system administrator or because the wrong password was entered three times in succession. Your system administrator can unlock the account with the **chuser** command.

Action

Contact your system administrator.

CMUC00193E *VALUE_0*: `Authentication failure: unable to access account database.`
Explanation

Authentication fails because the user account database cannot be accessed. The system administrator might be performing maintenance or other activities.

Action

Contact your system administrator.

CMUC00194E *VALUE_0*: Authentication failure: unable to authenticate on Enterprise Storage Server.

Explanation

You are attempting to authenticate on an Enterprise Storage Server (2105). Authentication fails for an unknown reason. Additional information is unavailable from the ESS.

Action

Ensure that you are providing the correct user name and password for the ESS. Contact your system administrator. If the problem persists, contact IBM technical support for assistance.

CMUC00195I *COMMAND_INFO* Security properties successfully set.

Explanation

The security properties have been set successfully.

Action

None.

CMUC00196I *COMMAND_INFO* Remote Mirror and Copy pair *PAIR_ID* successfully reversed.

Explanation

The source and target volume have been reversed. The secondary volume at the recovery site is now the primary volume.

Action

None.

CMUC00197I *COMMAND_INFO* Remote Mirror and Copy pair *PAIR_ID* successfully failed back.

Explanation

The source and target volumes have been resynchronized. The data at the production site and recovery site are now identical.

Action

None.

CMUC00198I *COMMAND_INFO* Remote Mirror and Copy pair *PAIR_ID* successfully thawed.

Explanation

All queued write operations to the source volume are written. The **Queue Full** condition for the primary volume is reset.

Action

None.

CMUC00199I *COMMAND_INFO* `License Machine Code successfully applied to storage image` *STORAGE_IMAGE_ID*`.`

Explanation

The License Machine Code has been applied successfully to the storage image.

Action

None.

CMUC00200E *COMMAND_INFO* `This commmand is not supported for machine type` *TYPE*`.`

Explanation

The command is not supported on the type of machine that is currently connected to the command-line interface. For example, you might be issuing a machine type 2107 command to a storage unit that is machine type 2105.

Action

Tip: Enter "help **command_name**" for more information.

CMUC00201E *VALUE_0*`: Authentication failure: Your password has expired. Change your password with the chuser command.`

Explanation

Authentication fails because your password has expired. You must change your password with the **chuser** command before you can issue any other commands.

Action

Change your password using the **chuser** command.

CMUC00202I *COMMAND_INFO* `Remote Mirror and Copy ESCON path` *TARGET_LSS* `successfully created.`

Explanation

The Remote Mirror and Copy ESCON path has been created successfully.

Action

None.

CMUC00203E *COMMAND_INFO* `Invalid pair. Each source volume must have a matching target volume.`

Explanation

The number of specified source volumes does not equal the number of specified target volumes.

Action

Enter complete source_volume:target_volume pairs, and then resubmit the task.

CMUC00204I *COMMAND_INFO* `Password file` *FILE_NAME* `successfully created.`

Explanation

The command to create a password file completed successfully.

Action

Update the **pwfile** entry in your profile to indicate this password file name.

CMUC00205I *COMMAND_INFO* `Password file` *FILE_NAME* `successfully created.`

Explanation

The command succeeded and a new password file was created.

Action

Set the appropriate access control level for the new password file.

CMUC00206I *COMMAND_INFO* `Record` *VALUE_1* `successfully added to password file` *FILE_NAME*`.`

Explanation

The specified record has been added to the password file.

Action

None.

CMUC00207I *COMMAND_INFO* `Record` *VALUE_1* `successfully changed in password file` *FILE_NAME*`.`

Explanation

The specified record has been changed in the password file.

Action

None.

CMUC00208I *COMMAND_INFO* `Record` *VALUE_1* `successfully removed from password file` *FILE_NAME*`.`

Explanation

The specified record has been removed from the password file.

Action

None.

CMUC00209E *COMMAND_INFO* `Unable to open password file` *FILE_NAME* `for write access.`

Explanation

You are attempting to update the specified password file. However, you do not have permission to write to the file.

Action

Ask your system administrator to grant you write permissions to the file, and then resubmit the command.

CMUC00210E `Password file` *FILE_NAME* `is not formatted corrrectly.`

Explanation

You are attempting to authenticate, but the specified password file is not valid. Either this file is corrupted or it is not the correct file.

Action

Specify a correctly formatted password file, and then resubmit the task.

CMUC00211E *COMMAND_INFO* `The specified capacity` *CAPACITY* `is not valid for type` *TYPE*`.`

Explanation

The value that you specified with the **-cap** flag is not valid for the type that you specified with the **-type** flag. Refer to the **IBM TotalStorage DS Command-Line Interface User's Guide** for a description of valid capacities.

Action

Specify a capacity that is valid for the type that is specified, and then resubmit the task.

CMUC00212I *COMMAND_INFO* `completed successfully.`

Explanation

The command completed successfully.

Action

None.

CMUC00213E *COMMAND_INFO* `Unable to read License Machine Code activation codes file`

Explanation

The file containing License Machine Code activation codes for this storage image cannot be read. The file that you specify must be an xml formatted file that you have obtained from an authorized IBM source.

Action

Resubmit the task. If the problem persists, specify a different file.

CMUC00214E *COMMAND_INFO* `File` *FILE* `contains no License Machine Code for storage image` *STORAGE_IMAGE_ID*.

Explanation

The specified file does not contain License Machine Code activation codes for this storage image. The file that you specify must be an xml formatted file that you have obtained from an authorized IBM source, and it must contain activation codes that are designated for this storage image.

Action

Specify the correct file and then resubmit the task.

CMUC00215E *COMMAND_INFO* `Incorrectly formatted License Machine Code activation codes file`

Explanation

The file containing License Machine Code activation codes for this storage image is not the correct format. The file that you specify must be an xml formatted file that you have obtained from an authorized IBM source.

Action

Specify the correct file and then resubmit the task.

CMUC00216I *COMMAND_INFO* `CKD alias volume` *VOLUME* `successfully created.`

Explanation

The CKD alias volume was created successfully.

Action

None.

CMUC00217E *COMMAND_INFO* The specified logical subsystem number for volume *VOLUME* is not valid.

Explanation

The specified logical subsystem number contains characters that are not valid or is not an existing logical subsystem.

Action

Specify a valid logical subsystem number for the volume, and then resubmit the task.

CMUC00218E *COMMAND_INFO* The specified logical control unit number for volume *VOLUME* is not valid. Either you specified this volume explicitly or you specified it implicitly by parameter values.

Explanation

The specified logical control unit number contains characters that are not valid or is not an existing logical control unit.

Action

Specify a valid logical control unit number for the volume, and then resubmit the task.

CMUC00219E *COMMAND_INFO* Connection failure: The specified storage management console peers are not valid.

Explanation

The storage management console peers that are specified either as input, as command options, or in a profile file are not valid. The IP addresses might not be correct, or the storage management consoles might not be configured as peers.

Action

Specify valid peers, and then resubmit the task.

CMUC00220E *COMMAND_INFO* Connection failure: *VALUE_0*

Explanation

Connection to the specified storage management consoles failed.

Action

Ensure that the storage management console IP addresses are correct, that a network connection to the storage management consoles exists, and that the storage management consoles are available. Then resubmit the task.

CMUC00219X *COMMAND_INFO*
>> **Explanation**

>> **Action**

CMUD00000I *COMMAND_INFO* `Storage complex setting for storage image` *STORAGE_IMAGE_ID* `successfully modified.`
>> **Explanation**

>> The storage complex settings have been successfully modified.

>> **Action**

>> None.

CMUD00001I *COMMAND_INFO* `Contact information for storage image` *STORAGE_IMAGE_ID* `successfully modified.`
>> **Explanation**

>> Contact information for the specified storage image has been set successfully.

>> **Action**

>> None.

CMUD00002I *COMMAND_INFO* `SNMP settings for storage image` *STORAGE_IMAGE_ID* `successfully modified.`
>> **Explanation**

>> The SNMP setting for the specified storage image has been set successfully.

>> **Action**

>> None.

CMUD00003I *COMMAND_INFO* `SMTP settings for storage image` *STORAGE_IMAGE_ID* `successfully modified.`
>> **Explanation**

>> The SMTP settings for the specified storage image have been set successfully.

>> **Action**

>> None.

CMUD00004I *COMMAND_INFO* `SIM settings for storage image` *STORAGE_IMAGE_ID* `successfully modified.`
>> **Explanation**

>> Service Information Messages for zSeries for the specified storage image have been set successfully.

Action

None.

CMUD00005I *COMMAND_INFO* `Dial Home settings for storage image` *STORAGE_IMAGE_ID* `successfully modified.`

Explanation

The Dial Home setting for the specified storage image has been set successfully.

Action

None.

CMUD00006I *COMMAND_INFO* `State Save successfully offloaded from` *STORAGE_IMAGE_ID* `to the management node.`

Explanation

The State Save has been successfully offloaded from the specified storage image to the management node.

Action

None.

CMUD00007I *COMMAND_INFO* `PE packages for storage image` *STORAGE_IMAGE_ID* `successfully generated.`

Explanation

PE package for the specified storage image has been successfully generated.

Action

None.

CMUD00008I *COMMAND_INFO* `Problem` *PROBLEM_ID* `was successfully closed.`

Explanation

The problem that you selected to close has been closed successfully.

Action

None.

CMUD00009W *COMMAND_INFO* `Are you sure you want to close problem` *PROBLEM_ID* `? [y/n]:`

Explanation

Enter **Y** to close the specified problem. Enter **N** to not close the problem.

Action

Enter **Y** to close the specified problem. Enter **N** to not close the problem.

CMUD00010I *COMMAND_INFO* `Test problem record` *VALUE_0* `successfully created.`

Explanation

The command successfully completed and created a test problem record.

Action

None.

CMUD00011E *COMMAND_INFO* `The state,` *STATE*`, is invalid for the country,` *COUNTRY*`.`

Explanation

When you are defining contact information, you must enter a valid state for the country in the address information.

Action

Redefine the state to match a valid state for the selected country.

CMUD00012E *COMMAND_INFO* `No state save can be found on storage image` *STORAGE_IMAGE_ID*`.`

Explanation

No state save can be found. This might be because no state save has been generated, because no state save has been generated since the last offload command was issued, or because an internal error has occurred.

Action

Verify that a state save should have been generated. If so, contact IBM technical support for assistance.

CMUD00013I *COMMAND_INFO* `The following files have been copied from storage image` *STORAGE_IMAGE_ID*`:` *FILES*`.`

Explanation

The files listed were copied, and the command completed successfully.

Action

None.

CMUD00014I *COMMAND_INFO* **The following files have been sent to IBM:** *FILES***.**

Explanation

The listed files were transferred successfully to IBM.

Action

None.

CMUD00015E *COMMAND_INFO* **Country** *COUNTRY* **is not a valid country.**
Explanation

The specified country is not valid. See the **IBM TotalStorage DS Command-Line Interface User's Guide** for a list of valid countries.

Action

Specify a valid country and then resubmit the task.

CMUD00016E *COMMAND_INFO* **Contact information must be provided. Run the setcontactinfo command with the following flags:** *FLAGS***.**
Explanation

Either you issued the **setdialhome -action enable** command before you entered all the information that is required, or you issued the **setcontactinfo** command without all the required flags.

Your company name, machine location, ship to country, and contact primary phone is required.

Action

Run the **setcontactinfo** command with the required flags.

CMUD00017E *COMMAND_INFO* **The -***FLAG* **is not supported for machine type -***MACHINE_TYPE***.**
Explanation

The specified flag is not supported when you issue commands to storage units that are this machine type.

Action

Remove the flag and resubmit the task.

Management console server messages

These are management console server messages.

CMUN00000E *SOURCE* `Authentication failure`
Explanation

The storage management console server reports an authentication failure. Authentication information that is provided by the client is invalid.

Action

Provide the correct user name and password, and then resubmit the task.

CMUN00001E *SOURCE* `Configuration error`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN00002E *SOURCE* `Internal error`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN00003E *SOURCE* `Configuration connection error`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN00004E *SOURCE* `Configuration connection error`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN00005E *SOURCE* `Internal error`
Explanation

The storage management console server reports an internal Copy Services failure.

Action

Contact IBM technical support for assistance.

CMUN00006E *SOURCE* `Internal error`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN00007E *SOURCE* `Mismatched Jar file`
Explanation

The storage management console server or your client software reports that one of the Java resource files is not the correct version. The client and server cannot operate correctly if their respective files are not the same version.

Action

Install the appropriate versions of the management console server software and client software. If the problem persists, contact IBM technical support for assistance.

CMUN00008E *SOURCE* `Invalid configuration parameter`
Explanation

The storage management console server detects an invalid or nonexistent configuration parameter. Examples include:
- A null value
- An invalid extent type
- An invalid volume type
- An invalid device type
- An incorrect storage image
- An out of range subsystem identifier

Action

Correctly specify all parameters, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN00009E *SOURCE* `Invalid parameter`
Explanation

The storage management console server detects an invalid or nonexistent parameter. Examples include:
- An invalid volume
- An invalid logical subsystem
- An invalid storage image

Action

Correctly specify all parameters, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN00010E *SOURCE* `Invalid parameter.`
Explanation

The storage management console server detects an invalid parameter. Examples include:

- A null value
- An invalid type

Action

Correctly specify all parameters, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN00011E *SOURCE* `Configuration query error`
Explanation

The storage management console server detects an internal error that occurs during a resource query.

Action

Contact IBM technical support for assistance.

CMUN00012E *SOURCE* `Configuration query error`
Explanation

The storage management console server detects an internal error that occurs during a resource query.

Action

Contact IBM technical support for assistance.

CMUN00013E *SOURCE* `Resource not found`
Explanation

The storage management console server reports that it cannot find a resource. This might be because the resource is not configured on the console, or because it does not exist in the storage complex.

Action

Check the available resources and specify the correct parameters. If the problem persists, contact IBM technical support for assistance.

CMUN00014E *SOURCE* `Server error`

Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN00015E *SOURCE* `Command execution timeout`

Explanation

The storage management console server reports that an internal timeout has occurred before the task can complete.

Action

Check for intermediate task results. Remove intermediate results or modify the task as necessary. Resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN00016E *SOURCE* `Unauthorized access`

Explanation

The storage management console server reports that you are not authorized to perform this operation.

Action

Verify your user name and privileges. Contact your system administrator.

CMUN00017E *SOURCE* `Unauthorized`

Explanation

The storage management console server reports that you are not authorized to perform this operation.

Action

Verify your user name and privileges. If your password has expired, renew your password. Contact your system administrator.

CMUN00018E *SOURCE* `Unable to connect to the storage management console server`

Explanation

Your client software cannot connect to the storage management console server. This might be because the server is not enabled, a network problem exists, or the server is refusing connections because the maximum number of clients are connected already.

Action

Ensure that the storage management console is online. Ensure that you specify the storage management console IP addresses correctly. Ensure that other connections do not already exist.

CMUN00019E *SOURCE* `Unknown configuration error`
Explanation

The storage management console server detects an unknown internal error that occurs during resource configuration.

Action

Contact IBM technical support for assistance.

CMUN00020E *SOURCE* `Unknown error`
Explanation

The storage management console server detects an unknown internal error.

Action

Contact IBM technical support for assistance.

CMUN00021E *SOURCE* `Unknown management console server internal error`
Explanation

The storage management console server reports an unknown internal error.

Action

Contact IBM technical support for assistance.

CMUN00022E *SOURCE* `The specified operation is unsupported.`
Explanation

The storage management console server reports that the command that it received is unsupported. This might be because the command is invalid, because the client issuing the command is at a different software version level than the server, or because the operation is not licensed.

Action

Verify that you are issuing the correct command. Verify that you have installed the same versions of the storage management console server software and the client. Verify that you have installed licensed machine code that supports the operation.

CMUN01000E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN01001E *SOURCE* `Operation failure: retrieving rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN01002E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02000E *SOURCE* `Query failure: This action is supported only for CKD volumes.`

Explanation

This action is supported only for count-key-data volumes.

Action

Specify count-key-data volumes in a CKD logical subsystem, and then resubmit the task.

CMUN02001E *SOURCE* `Error: The logical volume has been created, but it is not assigned to an address group.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02002E *SOURCE* `Error: The logical volume has been created but it is not assigned to a logical subsystem.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02003E *SOURCE* `Error: The logical volume has been created, but it is not assigned to a volume group.`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02004E *SOURCE* `Error: The logical volume has been created, but it is not assigned to an extent pool.`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02005E *SOURCE* `Operation failure: already assigned`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02006E *SOURCE* `Unable to query rank`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02007E *SOURCE* `Unable to query rank`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02008E *SOURCE* `Unable to query logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02009E *SOURCE* `Unable to create array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02010E *SOURCE* `Unable to create array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02011E *SOURCE* `Unable to create array: internal interface communication error`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02012E *SOURCE* `Unable to create array: The array site is not unassigned.`
Explanation

An array site is not in the **unassigned** state. The task requires a unassigned array site.

Action

Check the status of the specified array site. Specify an unassigned array site, and then resubmit the task. If the problem persists, contact IBM technical support for assistance

CMUN02013E *SOURCE* `Unable to create array`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02014E *SOURCE* `Cannot delete array. The array is flagged to be serviced.`

Explanation

The array is flagged for service. An array in this state cannot be deleted until the service intent flag is removed.

Action

Wait until service is completed on the array, and then resubmit the task.

CMUN02015E *SOURCE* `Unable to delete rank: The rank is still assigned.`

Explanation

A rank cannot be deleted while it is still in the **assigned** state.

Action

Unassign the rank, and then resubmit the task.

CMUN02016E *SOURCE* `Unable to delete logical subsystem: Logical volumes are assigned.`

Explanation

Logical volumes are assigned to the logical subsystem. The logical subsystem cannot be deleted until these volumes are deleted.

Action

Delete the logical volumes, and then resubmit the task.

CMUN02017E *SOURCE* `Unable to delete rank: Extents are in use.`

Explanation

The rank cannot be deleted because extents are still allocated from the rank.

Action

Unallocate all storage from the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02018E *SOURCE* `Unable to create or delete array: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02019E *SOURCE* `Cannot exceed maximum volume group count`
Explanation

The maximum volume group count has been reached. A new volume group cannot be created.

Action

Remove unused volume groups, and then resubmit the task.

CMUN02020E *SOURCE* `Unable to create logical subsystem: ID already in use.`

Explanation

The logical subsystem cannot be created because the specified ID is already in use.

Action

Specify a different logical subsystem ID, and then resubmit the task.

CMUN02021E *SOURCE* `Unable to create logical volume: the volume number already exists.`
Explanation

The specified logical volume exists already.

Action

Specify a different volume number, and then resubmit the task.

CMUN02022E *SOURCE* `Unable to create array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02023E *SOURCE* `Unable to modify logical subsystem: cannot set session timeout`
Explanation

The specified session timeout value is negative. Only positive values are valid.

Action

Specify a valid timeout value, and then resubmit the task.

CMUN02024E *SOURCE* `Unable to modify logical subsystem: invalid critical mode enabled`
Explanation

The specification contains an invalid value for the **critical mode enabled** parameter.

Action

Specify a valid value, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02025E *SOURCE* `Unable to modify logical subsystem: invalid extended long busy enabled`
Explanation

The specification contains an invalid value for the **extended long busy enabled** parameter.

Action

Specify a valid value, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02026E *SOURCE* `Unable to modify logical subsystem: invalid extended long busy time`
Explanation

The specified **extended long busy** time value is negative. Only positive values are valid.

Action

Specify a valid value, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02027E *SOURCE* `Unable to modify logical subsystem: cannot set session timeout`

Explanation

The specified session timeout value is negative. Only positive values are valid.

Action

Specify a valid timeout value, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02028E *SOURCE* `Cannot use array sites. These sites are flagged to be serviced.`

Explanation

The array sites are flagged for service. An array cannot be created using these sites.

Action

Wait until service is completed on the array sites, and then resubmit the task.

CMUN02029E *SOURCE* `Internal error`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02030E *SOURCE* `Unable to repair array`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02031E *SOURCE* `Operation failure: changes are pending`

Explanation

The storage management console server reports a storage unit microcode-level error. The operation cannot be completed because previously stipulated changes have not yet been applied.

Action

Ensure that any other tasks that you have initiated have been completed. Wait, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02032E *SOURCE* `Unable to create logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02033E *SOURCE* `Error: The logical volume has been deleted, but the logical subsystem deletion fails.`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02034E *SOURCE* `Unable to repair array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02035E *SOURCE* `Unable to delete logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02036E *SOURCE* `Unable to delete array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02037E *SOURCE* `Unable to delete array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02038E *SOURCE* `Unable to delete array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02039E *SOURCE* `Unable to delete array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02040E *SOURCE* `Unable to delete array. The array is still assigned.`
Explanation

The array is still assigned. An assigned array cannot be deleted. Either ranks exist on the array, or a format operation is taking place.

Action

Delete the ranks on the array or wait until the format completes, and then resubmit the task.

CMUN02041E *SOURCE* `Unable to create logical subsystem: device type must be CKD`
Explanation

The specified device type must be count-key-data.

Action

Specify a CKD device type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02042E *SOURCE* `Operation failure: configuration already exists`
Explanation

You are attempting to create a configuration that already exists.

Action

Specify a unique configuration, and then resubmit the task.

CMUN02043E *SOURCE* `Operation failure: internal database not open`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02044E *SOURCE* `Operation failure: unable to allocate memory`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02045E *SOURCE* `Operation failure: unable to allocate memory`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02046E *SOURCE* `Operation failure: unable to allocate memory`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02047E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02048E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02049E *SOURCE* `Rank reconfiguration failure: memory allocation error`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02050E *SOURCE* `Unable to repair array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02051E *SOURCE* `Unable to repair array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02052E *SOURCE* `Storage unit unavailable`

Explanation

An invalid or unknown storage unit is specified.

Action

Specify a valid and known storage unit.

CMUN02053E *SOURCE* `Unable to create extent pool: maximum number of extent pools reached`

Explanation

The maximum allowed number of extent pools in the storage image has been reached already.

Action

Delete unused extent pools, and then resubmit the task.

CMUN02054E *SOURCE* `Unable to repair array`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02055E *SOURCE* `Operation failure: unable to allocate memory`

Explanation

The storage management console server reports a storage unit microcode-level error. The storage unit is unable to allocate memory. This might be a temporary problem that occurs during heavy usage.

Action

Resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02056E *SOURCE* `Operation failure: unable to allocate memory`

Explanation

The storage management console server reports a storage unit microcode-level error. The storage unit is unable to allocate memory. This might be a temporary problem that occurs during heavy usage.

Action

Resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02057E *SOURCE* `Unable to assign rank to extent pool: The rank is already assigned.`

Explanation

The rank is already assigned, so it cannot be assigned to another extent pool.

Action

Unassign the rank or specify an unassigned rank, and then resubmit the task.

CMUN02058E *SOURCE* `Unable to assign rank to extent pool`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02059E *SOURCE* `Unable to assign rank to extent pool`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02060E *SOURCE* `Unable to create extent pool`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02061E *SOURCE* `Create logical subsystem failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02062E *SOURCE* Unable to modify SCSI host port: invalid host type

Explanation

The host type is longer than the 16-character maximum length.

Action

Specify a valid host type, and then resubmit the task.

CMUN02063E *SOURCE* Unable to create SCSI host port: invalid WWPN
Explanation

The worldwide port name is invalid. A WWPN must be a 16-character hexadecimal string.

Action

Specify a valid worldwide port name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02064E *SOURCE* Unable to create SCSI host port: non-unique WWPN
Explanation

The worldwide port name is not unique.

Action

Specify a unique worldwide port name, and then resubmit the task.

CMUN02065E *SOURCE* Operation failure: device adapter cannot query data

Explanation

The storage management console server reports a storage unit microcode-level error. This might be a temporary problem due to heavy traffic, or it might indicate a hardware failure.

Action

Check for device adapter and storage device hardware errors, and follow the recommended service procedure. If the problem persists, contact IBM technical support for assistance.

CMUN02066E *SOURCE* Operation failure: database creation error
Explanation

The storage management console server reports a storage unit microcode-level error. An internal database cannot be created.

Action

Contact IBM technical support for assistance.

CMUN02067E *SOURCE* `Unable to create SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02068E *SOURCE* `Unable to create SCSI host port: invalid volume group identifier`

Explanation

The specification contains an invalid volume group identifier.

Action

Specify a valid volume group identifier, and then resubmit the task.

CMUN02069E *SOURCE* `Unable to create SCSI host port: invalid profile`

Explanation

The port profile length cannot be more than 16 characters.

Action

Correct the port specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02070E *SOURCE* `Unable to create SCSI host port: invalid WWPN`

Explanation

The worldwide port name is invalid. A WWPN must be a 16-character hexadecimal string.

Action

Provide a valid worldwide port name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02071E *SOURCE* `Unable to create SCSI host port: invalid WWPN`

Explanation

The worldwide port name is invalid. A WWPN must be a 16-character hexadecimal string.

Action

Provide a valid worldwide port name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02072E *SOURCE* Unable to create SCSI host port: invalid override default priority

Explanation

The attribute value that indicates whether default priority for I/O operations can be overridden is invalid.

Action

Correct the port specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02073E *SOURCE* Unable to create volume group

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02074E *SOURCE* Unable to create volume group: invalid user name

Explanation

The specified user name is longer than the 16-character maximum length.

Action

Specify a valid user name, and then resubmit the task.

CMUN02075E *SOURCE* Unable to delete extent pool

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02076E *SOURCE* Rank creation cannot complete.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02077E *SOURCE* `Operation failure: addition`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02078E *SOURCE* `Failed to initialize LPAR`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02079E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02080E *SOURCE* `Unable to create array: The maximum number of arrays have been created.`
Explanation

The array cannot be created because the maximum allowed number of arrays have been created already.

Action

Add additional storage or delete one or more existing arrays, and then resubmit the task.

CMUN02081E *SOURCE* `Unable to create rank: The maximum number of ranks have been created.`
Explanation

The rank cannot be created because the maximum allowed number of ranks have already been created.

Action

Add additional storage or delete one or more existing ranks, and then resubmit the task.

CMUN02082E *SOURCE* `Unable to repair array`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02083E *SOURCE* `Extent pool operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02084E *SOURCE* `Unable to delete extent pool`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02085E *SOURCE* `Unable to delete extent pool`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02086E *SOURCE* `Unable to delete logical volume`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02087E *SOURCE* `Unable to query rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02088E *SOURCE* `Unable to query rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02089E *SOURCE* `Failed to initialize LPAR`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02090E *SOURCE* `LPAR startup error`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02091E *SOURCE* `Failed to initialize LPAR`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02092E *SOURCE* `Rank creation cannot complete`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02093E *SOURCE* `Unable to create logical volume`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02094E *SOURCE* `Failed to initialize LPAR`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02095E *SOURCE* `Unable to create logical volume`

Explanation

The specification contains an invalid combination of **requested capacity**, **volume type**, and **data type**.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02096E *SOURCE* `Unable to create logical volume`

Explanation

The specification contains an invalid combination of **requested capacity**, **volume type**, and **data type**.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02097E *SOURCE* `Unable to query rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02098E *SOURCE* `Unable to create logical volume`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02099E *SOURCE* `Unable to create volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02100E *SOURCE* `Volume group operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02101E *SOURCE* `Unable to query volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02102E *SOURCE* `Unable to delete logical volume`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02103E *SOURCE* `Unable to assign volumes to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02104E *SOURCE* `Unable to assign volume to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02105E *SOURCE* `Unable to retrieve volumes assigned to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02106E *SOURCE* `Unable to retrieve volumes assigned to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02107E *SOURCE* `Unable to delete volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02108E *SOURCE* `Unable to modify volume group`

Explanation

This volume group is internally reserved and cannot be modified.

Action

Specify a different volume group, and then resubmit the task.

CMUN02109E *SOURCE* `Unable to modify SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02110E *SOURCE* `Unable to modify SCSI host port: invalid address discovery method`

Explanation

You must specify how the port discovers the LUNs that are accessible by the host port. The host port can use one of two methods:
- The **Report LUNs** command
- LUN polling

Action

Specify a valid address discovery method, and then resubmit the task.

CMUN02111E *SOURCE* `Unable to modify SCSI host port: invalid volume group type`

Explanation

The volume group being assigned to the SCSI host port has an invalid type.

Action

Specify a volume group with a valid type, and then resubmit the task.

CMUN02112E *SOURCE* Unable to modify SCSI host port: invalid volume group ID

Explanation

The specification contains an invalid volume group identifier.

Action

Specify a valid volume group identifier, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02113E *SOURCE* Unable to modify SCSI host port: logical block size and volume group type mismatch

Explanation

A 520-byte block size requires a SCSI520-All or SCSI520-Mask volume group type.

Action

Specify a valid volume group type, and then resubmit the task.

CMUN02114E *SOURCE* Unable to modify SCSI host port: invalid logical block size

Explanation

The logical block size of the devices that the port accesses must be either 512-bytes or 520-bytes.

Action

Specify a valid logical block size, and then resubmit the task.

CMUN02115E *SOURCE* Unable to modify SCSI host port: logical block size and volume group type mismatch

Explanation

A 512-byte block size requires a SCSI-All, SCSI-Mask, or SCSI-Map 256 volume group type.

Action

Specify compatible logical block size and volume group type, and then resubmit the task.

CMUN02116E *SOURCE* Unable to modify SCSI host port: invalid port mask

Explanation

The storage management console server reports a storage unit microcode-level error. A mask that controls N-port logins contains an invalid value.

Action

Correct the port specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02117E *SOURCE* `Unable to modify SCSI host port: invalid override default priority value`

Explanation

The attribute that indicates whether the default priority for I/O operations is to be overridden is invalid. The value must be either **true** or **false**.

Action

Correct the port specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02118E *SOURCE* `Unable to modify SCSI host port: invalid port profile`

Explanation

The port profile length cannot be more than 16 characters.

Action

Correct the port specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02119E *SOURCE* `Unable to modify SCSI host port: invalid port topology`

Explanation

The attaching port topology must be one of the following:
- Unknown
- Fibre Channel Point to Point or Switched (FCP)
- Fibre Channel Arbitrated Loop (FC-AL)

Action

Specify a valid attaching port topology, and then resubmit the task.

CMUN02120E *SOURCE* `Unable to modify SCSI host port: address discovery method and volume group type mismatch`

Explanation

The **Report LUNs** address discovery method requires a SCSI-Mask, SCSI-Map 256, or SCSI520-Mask volume group type.

Action

Specify compatible address discovery method and volume group types, and then resubmit the task.

CMUN02121E *SOURCE* Unable to modify SCSI host port: address discovery method and volume group type mismatch

Explanation

The **LUN Polling** address discovery method requires a SCSI-All, SCSI-Map 256, SCSI520-All, or Copy Services volume group type.

Action

Specify compatible address discovery method and volume group types, and then resubmit the task.

CMUN02122E *SOURCE* Unable to modify SCSI host port: invalid value

Explanation

The storage management console server reports a storage unit microcode-level error. A mask that controls N-port logins contains an invalid value.

Action

Correct the port specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02123E *SOURCE* Unable to modify SCSI host port: nonexistent volume group

Explanation

The specified volume group does not exist.

Action

Specify a valid volume group, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02124E *SOURCE* Unable to modify SCSI host port

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02125E *SOURCE* Unable to start or end service

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02126E *SOURCE* `Unable to repair array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02127E *SOURCE* `Unable to modify volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02128E *SOURCE* `Unable to open a session to query a logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02129E *SOURCE* `Unable to open a session`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02130E *SOURCE* `Unable to open a session`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02131E *SOURCE* `Internal database overwrite failure: The database exists and overwrite is off.`

Explanation

The storage management console server reports a storage unit microcode-level error. Database overwrite permission is turned off for an existing database. The database cannot be overwritten.

Action

Contact IBM technical support for assistance.

CMUN02132E *SOURCE* `Rank creation cannot complete.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02133E *SOURCE* `Extent pool operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Check for device adapter and storage device hardware errors, and follow the recommended service procedure. If the problem persists, contact IBM technical support for assistance.

CMUN02134E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02135E *SOURCE* `Volume group query failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02136E *SOURCE* Unable to query volume groups: invalid volume number

Explanation

The specification contains an invalid volume identifier. A logical volume identifier must be a 4-character hexadecimal string.

Action

Specify a valid volume, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02137E *SOURCE* Unable to assign rank to extent pool: type mismatch

Explanation

The specified rank and extent pool must be the same type.

Action

Specify the same type for rank and extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02138E *SOURCE* Unable to create rank
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02139E *SOURCE* Unable to create rank
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02140E *SOURCE* Unable to create rank
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02141E *SOURCE* `Rank creation failure: check device adapter`

Explanation

The storage management console server reports a storage unit microcode-level error. Creation of the rank did not complete. A device adapter might have failed.

Action

Check for device adapter hardware errors, and follow the recommended service procedure. If the problem persists, contact IBM technical support for assistance.

CMUN02142E *SOURCE* `Rank creation did not complete.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02143E *SOURCE* `Unable to create rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02144E *SOURCE* `Unable to create rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02145E *SOURCE* `Unable to create rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02146E *SOURCE* `Rank creation failure: server unavailable`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02147E *SOURCE* `Unable to repair array`
Explanation

The task must be invoked against a rank in the **FAILED** state. The rank is not in the **FAILED** state.

Action

Contact IBM technical support for assistance.

CMUN02148E *SOURCE* `Unable to repair array`
Explanation

The task must be invoked against a rank in the **inaccessible** state. The rank is not in the **inaccessible** state.

Action

Contact IBM technical support for assistance.

CMUN02149E *SOURCE* `Unable to repair array`
Explanation

The task must be invoked against a rank in the **repairing_formatted** state. The rank is not in the **repairing_formatted** state.

Action

Contact IBM technical support for assistance.

CMUN02150E *SOURCE* `Unable to delete rank`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02151E *SOURCE* `Unable to delete rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02152E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02153E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02154E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02155E *SOURCE* `Rank operation failure: device adapter error`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Check for device adapter and storage device hardware errors, and follow the recommended service procedure. If the problem persists, contact IBM technical support for assistance.

CMUN02156E *SOURCE* `Unable to reconfigure rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02157E *SOURCE* `Unable to reconfigure rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02158E *SOURCE* `Unable to reconfigure rank: server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02159E *SOURCE* `Rank reconfiguration failure: The rank is flagged to be serviced.`

Explanation

The specified rank is flagged for service. A rank cannot be reconfigured while it is flagged for service.

Action

Wait until the service is completed, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02160E *SOURCE* `Unable to reconfigure rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02161E *SOURCE* `Unable to release rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02162E *SOURCE* `Unable to reserve rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02163E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02164E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02165E *SOURCE* `Unable to unassign rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02166E *SOURCE* `Unable to reconfigure rank: The rank remains in the failed state.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02167E *SOURCE* `Unable to release rank`

Explanation

The rank is not **reserved**. Only reserved ranks can be released.

Action

Reserve the rank or choose a reserved rank, and then resubmit the task.

CMUN02168E *SOURCE* `Unable to assign volumes to volume group`

Explanation

At least one of the volumes has an invalid data type for the specified volume group.
- A SCSI-Mask volume group requires a 512-byte block data type.
- A SCSI520-Mask volume group requires a 520-byte block protected data type or a 520-byte block unprotected data type.

Action

Specify volumes with compatible data types, and then resubmit the task.

CMUN02169E *SOURCE* `Unable to assign volume to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02170E *SOURCE* `Unable to assign volume to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02171E *SOURCE* `Unable to assign volumes to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02172E *SOURCE* `Unable to assign volume to volume group`

Explanation

No rank has been created. At least one rank must exist before a volume can be created and assigned.

Action

Create at least one rank and volume, and then resubmit the task.

CMUN02173E *SOURCE* `Unable to assign volume to volume group: data type mismatch`

Explanation

The data type of the volume does not match the data type of the volume group.
- A SCSI-Mask volume group requires a 512-byte block data type.
- A SCSI520-Mask volume group requires a 520-byte block protected data type or a 520-byte block unprotected data type.

Action

Specify compatible data types, and then resubmit the task.

CMUN02174E *SOURCE* `Unable to assign volume to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02175E *SOURCE* `Unable to assign volume to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02176E *SOURCE* `Unable to assign volume to volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02177E *SOURCE* `Unable to assign volume to volume group`
Explanation

No rank has been created. At least one rank must exist before a volume can be created and assigned.

Action

Create at least one rank and volume, and then resubmit the task.

CMUN02178E *SOURCE* `Unable to reset Copy Services settings on logical subsystems`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02179E *SOURCE* `Unable to reset Copy Services settings on logical subsystem`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02180E *SOURCE* `Unable to reserve rank`
Explanation

The rank is not **assigned**. Only **assigned** ranks can be reserved.

Action

Assign the rank or choose an assigned rank, and then resubmit the task.

CMUN02181E *SOURCE* Unable to modify SCSI host port

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02182E *SOURCE* Unable to modify SCSI host port

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02183E *SOURCE* Unable to modify SCSI host port

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02184E *SOURCE* Unable to modify SCSI host port

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02185E *SOURCE* Unable to retrieve volumes assigned to the volume group

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02186E *SOURCE* `Unable to retrieve volumes assigned to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02187E *SOURCE* `Unable to retrieve volumes assigned to the volume group: no ranks exist`

Explanation

No ranks exist on the storage image. Volume information is not available.

Action

Create at least one rank and volume on the storage image, and then resubmit the task.

CMUN02188E *SOURCE* `Unable to retrieve volumes assigned to volume group.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02189E *SOURCE* `Unable to retrieve volumes assigned to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02190E *SOURCE* `Unable to assign volume to volume group`
Explanation

No rank has been created. At least one rank must exist before a volume can be created and assigned.

Action

Create at least one rank and volume, and then resubmit the task.

CMUN02191E *SOURCE* `Unable to modify volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02192E *SOURCE* `Unable to query rank`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02193E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02194E *SOURCE* `Unable to create SCSI host port: invalid port profile`
Explanation

The port profile is not a supported port profile.

Action

Specify a valid and supported port profile, and then resubmit the task.

CMUN02195E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02196E *SOURCE* `SCSI host port operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02197E *SOURCE* `Unable to modify SCSI host port: invalid port profile`
Explanation

The port profile is not a supported port profile.

Action

Specify a valid and supported port profile, and then resubmit the task.

CMUN02198E *SOURCE* `Unable to create, modify, or delete SCSI host port: local server offline`
Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02199E *SOURCE* `Unable to repair array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02200E *SOURCE* `Unable to query volume groups`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02201E *SOURCE* `Unable to assign volumes to volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02202E *SOURCE* `Unable to assign volumes to volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02203E *SOURCE* `Unable to create, modify, or delete volume group: version update`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02204E *SOURCE* `Volume group query failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02205E *SOURCE* `Rank operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02206E *SOURCE* `Unable to unassign rank`

Explanation

Only ranks in the **reserved** state can be unassigned. The rank is not in the **reserved** state.

Action

Place the rank in the **reserved** state, or choose a **reserved** rank, and then resubmit the task.

CMUN02207E *SOURCE* `Unable to unassign rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02208E *SOURCE* `Unable to unassign rank: Extents are allocated to logical volumes.`

Explanation

Extents from the specified rank are allocated to logical volumes. The rank cannot be deleted while storage is allocated from it. You must remove the volumes to deallocate the extents.

Action

Deallocate all extents from the rank by removing any volumes that use the extents, and then resubmit the task.

CMUN02209E *SOURCE* `Unable to delete SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02210E *SOURCE* `Unable to delete SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02211E *SOURCE* `Unable to delete volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02212E *SOURCE* `Unable to delete volume group: The volume group is still assigned to a SCSI host port.`
Explanation

The volume group cannot be deleted because it is assigned to one or more host ports.

Action

Unassign the volume group from the host ports, and then resubmit the task.

CMUN02213E *SOURCE* `Unable to delete volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02214E *SOURCE* `Unable to delete volume group`
Explanation

The specified volume group is internally reserved and cannot be deleted.

Action

Select another volume group, and resubmit the task.

CMUN02215E *SOURCE* `Unable to retrieve volume group information`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02216E *SOURCE* `Unable to modify volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02217E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02218E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02219E *SOURCE* `Unable to create or delete volume group: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02220E *SOURCE* `Unable to retrieve or assign volumes assigned to volume group: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02221E *SOURCE* `Unable to retrieve or assign volumes assigned to volume group: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02222E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02223E *SOURCE* `Unable to repair array`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02224E *SOURCE* `Unable to create volume group: invalid volume group type`

Explanation

The specified volume group type is invalid. The following volume group types are valid:
- SCSI-Mask
- SCSI-Map 256
- SCSI520-Mask
- Copy Services

Action

Specify a valid volume group type, and then resubmit the task.

CMUN02225E *SOURCE* Unable to assign rank to extent pool

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02226E *SOURCE* Unable to end service: Management console is not authorized.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02227E *SOURCE* Unable to create logical volume: The data type of the logical volume is incompatible with the extent type of its extent pool.

Explanation

The data type of a logical volume must be compatible with the extent type of its extent pool.

Action

Specify compatible types. Either specify a different data type for the logical volume, or specify a different extent pool. If the problem persists, contact IBM technical support for assistance.

CMUN02228E *SOURCE* Rank creation cannot complete.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Check for device adapter and storage device hardware errors, and follow the recommended service procedure. If the problem persists, contact IBM technical support for assistance.

CMUN02229E *SOURCE* Unable to create logical volume: Data type is incompatible with data type of other volumes in address group.

Explanation

The data type of the logical volume must be the same as the data type of other logical volumes in the address group.

Action

Specify the same data type or a different address group, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02230E *SOURCE* Rank definition failure: extent type mismatch

Explanation

The extent types that are specified for the rank and its extent pool do not match.

Action

Specify the same extent type for the rank and its extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02231E *SOURCE* Unable to create logical volume: rank group and logical subsystem group mismatch

Explanation

A logical volume is created from an extent pool in a rank group. The logical volume is also a member of a logical subsystem group. The rank group identifier and the logical subsystem group identifier must be identical.

Action

Specify the same identifier for the rank group and the logical subsystem group. One way to do this is by specifying a different extent pool. If the problem persists, contact IBM technical support for assistance.

CMUN02232E *SOURCE* Unable to create logical subsystem: device type mismatch

Explanation

The device type of the new logical subsystem is inconsistent with the device type of existing logical subsystems in the address group.

Action

Specify consistent device types, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02233E *SOURCE* Logical volume operation failure: inconsistent starting and ending logical volume numbers

Explanation

The starting logical volume and the ending logical volume must belong to the same logical subsystem.

Action

Specify the same logical subsystem for the starting and ending logical volumes, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02234E *SOURCE* Unable to create logical subsystem: device type format error

Explanation

The device type length must be less than 4 characters.

Action

Specify a valid device type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02235E *SOURCE* Unable to create or modify logical subsystem: invalid format

Explanation

A logical subsystem identifier must be 2 hexadecimal characters.

Action

Specify a 2-hexadecimal character logical subsystem ID, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02236E *SOURCE* Unable to create or modify logical subsystem: invalid format

Explanation

A logical subsystem identifier must be 2 hexadecimal characters.

Action

Specify a 2 hexadecimal character logical subsystem ID, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02237E *SOURCE* Unable to create array: The RAID type is neither RAID5 nor RAID10.

Explanation

The RAID type must be either RAID5 or RAID10.

Action

Specify a RAID5 or RAID10 type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02238E *SOURCE* `Unable to create or modify logical volume: invalid number`

Explanation

A logical volume number must be a 4-digit hexadecimal number.

Action

Specify a 4-digit hexadecimal logical volume number, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02239E *SOURCE* `Unable to create or modify logical volume: invalid volume number`

Explanation

A logical volume number must be a 4-digit hexadecimal number.

Action

Specify a 4-digit hexadecimal logical volume number, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02240E *SOURCE* `Unable to create logical volume: invalid volume type`

Explanation

The specification contains an invalid volume type.

Action

Specify a valid logical volume type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02241E *SOURCE* `Service intent is not currently set. Reset ignored.`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02242E *SOURCE* `Unable to create rank: Array is not unassigned.`

Explanation

The specification contains a reference to an assigned array. The rank must be created on an **unassigned** array.

Action

Specify an **unassigned** array, and then resubmit the task.

CMUN02243E *SOURCE* `Unable to create or modify logical subsystem`

Explanation

The specification contains an invalid CKD base control unit value.

Action

Specify a valid value, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02244E *SOURCE* `Logical volume operation failure: invalid data type`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02245E *SOURCE* `Unable to create extent pool: invalid extent limit enabled value`

Explanation

The specification contains an invalid parameter value. The value for **extent limit enabled** is neither true nor false.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02246E *SOURCE* `Unable to create extent pool: invalid extent limit`

Explanation

The specification contains an invalid parameter value. The value for **extent limit** is not between 0 and 100.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02247E *SOURCE* `Unable to create extent pool: invalid extent threshold`

Explanation

The specification contains an invalid parameter value. The value for **extent threshold** is not between 0 and 100.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02248E *SOURCE* `Unable to modify extent pool: invalid extent threshold`

Explanation

The specification contains an invalid **extent threshold** value.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02249E *SOURCE* `Unable to create extent pool: invalid extent type`

Explanation

The specification contains an invalid extent type.

Action

Specify a valid extent type, and then resubmit the task.

CMUN02250E *SOURCE* `Unable to create or modify extent pool: invalid user name`

Explanation

The specification contains a user name that exceeds the 16-character limit.

Action

Specify a valid user name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02251E *SOURCE* Unable to modify extent pool: invalid extent limit enabled value

Explanation

The specification contains an invalid **extent limit enabled** value.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02252E *SOURCE* Unable to modify extent pool: invalid extent limit

Explanation

The specification contains an invalid **extent limit** value.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02253E *SOURCE* Unable to start or end service: invalid storage management console ID

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02254E *SOURCE* Unable to create or modify logical volume: invalid user name

Explanation

The specified user name is longer than the 16-character maximum length.

Action

Specify a valid user name, and then resubmit the task.

CMUN02255E *SOURCE* Unable to create or modify logical subsystem: invalid logical subsystem identifier format

Explanation

The logical subsystem identifier must be a 4-character hexadecimal number.

Action

Specify a valid subsystem identifier, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02256E *SOURCE* `Unable to create or modify logical subsystem: invalid logical subsystem identifier length`

Explanation

The subsystem identifier must be 4 characters long.

Action

Specify a valid subsystem identifier, and then resubmit the task.

CMUN02257E *SOURCE* `Logical subsystem query failure: invalid LSS ID`

Explanation

A logical subsystem ID is a hexadecimal value of the range (0 - FF).

Action

Specify a valid identifier for the logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02258E *SOURCE* `Unable to delete extent pool: ranks are assigned`

Explanation

Ranks are assigned to the extent pool. The extent pool cannot be deleted while ranks are assigned to it.

Action

Unassign the ranks, and then resubmit the task.

CMUN02259E *SOURCE* `Unable to start or end service: invalid parameters`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02260E *SOURCE* `Operation failure: invalid RAID type or number of spares`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02261E *SOURCE* `Unable to create extent pool: invalid rank group`
Explanation

The specification contains an invalid rank group.

Action

Specify a valid rank group, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02262E *SOURCE* `Unable to create volumes: invalid volume type`
Explanation

The specification contains an invalid volume type. The following volume types are supported, but you might be limited to a subset of these by other factors in your storage definition:

CKD base:
- 3380 cylinder
- 3390 cylinder

CKD single-CU alias

Fixed block base:
- 512-byte block
- 520-byte block unprotected
- 520-byte block protected

Action

Specify a valid volume type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02263E *SOURCE* `Unable to create or delete extent pool: local server offline`
Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02264E *SOURCE* Unable to end service: lock still held by other management console

Explanation

Service has been initiated by two storage management consoles. The other management console holds a lock.

Action

Release the service intent lock from the other management console, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02265E *SOURCE* Logical volume operation failure: not supported

Explanation

The requested operation is not supported. This might be because the specified logical volume is an alias.

Action

Specify a base logical volume, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02266E *SOURCE* Unable to modify logical subsystem: not a CKD volume

Explanation

The specification attributes a count-key-data value to a fixed block logical subsystem.

Action

Change the specification or select a count-key-data logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02267E *SOURCE* Unable to create or modify logical subsystem: identifier already in use

Explanation

The specification contains a logical subsystem identifier that is already in use.

Action

Specify a unique identifier for the the logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02268E *SOURCE* Unable to create or modify logical subsystem: identifier must be nonzero

Explanation

The specification does not contain a logical subsystem identifier, or the identifier is zero. A nonzero identifier is required.

Action

Specify a nonzero identifier for the logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02269E *SOURCE* Unable to modify logical subsystem: identifier only for CKD

Explanation

The specified subsystem identifier is reserved for count-key-data type logical subsystems. The specified logical subsystem is fixed block and cannot be modified in this manner.

Action

Specify a a CKD logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02270E *SOURCE* Unable to create a new SCSI host port: maximum count reached

Explanation

The maximum number of SCSI host ports have been created. No more SCSI host ports can be created.

Action

Use an existing SCSI host port or delete an existing SCSI host port, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02271E *SOURCE* Unable to create SCSI host port

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02272E *SOURCE* `SCSI host port operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02273E *SOURCE* `Unable to modify SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02274E *SOURCE* `Unable to delete SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02275E *SOURCE* `Unable to create logical volume: volume type and data type mismatch`

Explanation

The specification contains inconsistent volume type and data type information.

Action

Specify consistent volume and data types, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02276E *SOURCE* `Unable to delete rank`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02277E *SOURCE* Alias volume creation failure: no logical subsystem exists

Explanation

A logical subsystem must exist before multiple alias volumes can be created.

Action

Create a logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02278E *SOURCE* Operation failure: name is not unique

Explanation

The specification contains a name that is already being used.

Action

Specify a unique name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02279E *SOURCE* Operation failure: unknown storage unit

Explanation

The specification contains a reference to an unknown storage unit.

Action

Specify a valid storage unit, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02280E *SOURCE* Unable to assign rank to extent pool: The extent pool does not exist.

Explanation

The specification contains a reference to an invalid extent pool.

Action

Specify a valid extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02281E *SOURCE* Rank operation failure

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02282E *SOURCE* Unable to create CKD logical volume: CKD volumes require a CKD logical subsystem.

Explanation

You must create a count-key-data type logical subsystem before you can create count-key-data type volumes.

Action

Create a CKD logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02283E *SOURCE* Unable to create CKD alias logical volume: no base volume exists.

Explanation

The specification contains a reference to a nonexistent base volume. A count-key-data alias can be created for existing base volumes only.

Action

Specify a valid base volume that is contained within the same logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02284E *SOURCE* Logical subsystem operation failure: logical subsystem does not exist.

Explanation

The specification contains a reference to a nonexistent logical subsystem.

Action

Specify an existing logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02285E *SOURCE* Unable to create rank: array does not exist.

Explanation

The specification contains a reference to a nonexistent array.

Action

Specify an existing array, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02286E *SOURCE* Rank operation failure: extent pool does not exist.

Explanation

The specification contains a reference to a nonexistent extent pool.

Action

Specify an existing extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02287E *SOURCE* `Rank operation failure: rank does not exist.`

Explanation

The specification contains a reference to a nonexistent rank.

Action

Specify an existing rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02288E *SOURCE* `Rank operation failure: rank does not exist.`

Explanation

The specification contains a reference to a nonexistent rank.

Action

Specify an existing rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02289E *SOURCE* `Rank operation failure: rank does not exist.`

Explanation

The specification contains a reference to a nonexistent rank.

Action

Specify an existing rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02290E *SOURCE* `Unable to create logical volume: extent pool does not exist.`

Explanation

The specification contains a reference to a nonexistent extent pool.

Action

Specify an existing extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02291E *SOURCE* `Unable to start service: device adapter pair is configuring.`

Explanation

Service intent cannot be set while a device on the adapter pair is still configuring.

Action

Wait until the device configuration completes, and then resubmit the task.

CMUN02292E *SOURCE* `XML parse error`
Explanation

The storage management console server reports a storage unit microcode-level error. An xml file cannot be parsed.

Action

Contact IBM technical support for assistance.

CMUN02293E *SOURCE* `Operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02294E *SOURCE* `Unable to delete logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02295E *SOURCE* `Unable to delete logical volume.`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02296E *SOURCE* `Unable to delete logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02297E *SOURCE* `Unable to create logical volume: FB volumes must have a data type.`

Explanation

The specification for a fixed block logical volume does not contain a data type. Fixed block logical volumes must have one of the following data types:

- 512-byte block
- 520-byte block unprotected
- 520-byte block protected

Action

Specify a data type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02298E *SOURCE* `Unable to create logical volume: FB volumes must have an extent pool.`

Explanation

The logical volume specification does not contain an extent pool. Fixed block logical volumes must have an extent pool from which their extents are allocated.

Action

Specify an extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02299E *SOURCE* `Unable to create logical volume: FB volumes must have a requested capacity.`

Explanation

The logical volume specification does not contain a requested capacity.

Action

Specify a requested capacity, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02300E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02301E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02302E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02303E *SOURCE* `Rank operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02304E *SOURCE* `Unable to create array: memory allocation error`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02305E *SOURCE* `Operation failure: SCSI host port already exists.`

Explanation

The specified SCSI host port already exists.

Action

Specify a new SCSI host port, and then resubmit the task.

CMUN02306E *SOURCE* `Unable to create, modify, or delete logical`
`volume: service intent is set on extent pool.`

Explanation

The extent pool is flagged to be serviced. No operations can be performed on extent pool objects while it is flagged for service.

Action

Wait until service is completed on the extent pool, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02307E *SOURCE* `Unable to create logical volume`

Explanation

The specification contains an invalid combination of **requested capacity**, **volume type**, and **data type**.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02308E *SOURCE* `Query failure: logical subsystem does not exist.`

Explanation

The specification contains a reference to a nonexistent logical subsystem.

Action

Specify an existing logical subsystem, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02309E *SOURCE* `Unable to modify logical volume: volume type and`
`data type mismatch`

Explanation

A fixed block type logical volume must have a fixed block data type. A count-key-data type logical volume must have a count-key-data data type.

Action

Specify a valid data type for the logical volume, and then resubmit the task.

CMUN02310E *SOURCE* `Unable to add logical volume to volume group`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02311E *SOURCE* `Unable to create logical subsystem`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02312E *SOURCE* `Unable to delete logical subsystem`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02313E *SOURCE* `Unable to delete logical subsystem`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02314E *SOURCE* `Unable to modify logical volume`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02315E *SOURCE* `Unable to modify logical subsystem`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02316E *SOURCE* `Logical subsystem query failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02317E *SOURCE* `Unable to delete CKD base logical volume: alias assigned`

Explanation

At least one alias is assigned to the count-key-data base logical volume. Aliases must be deleted before the count-key-data base logical volume can be deleted.

Action

Remove the aliases, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02318E *SOURCE* `Unable to create rank: Too many arrays are specified.`

Explanation

The storage management console server reports a storage unit microcode-level error. Only one array can be specified.

Action

Specify one array, and then resubmit the task.

CMUN02319E *SOURCE* `Unable to repair array`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02320E *SOURCE* `Unable to create rank: Service intent is set on the array.`

Explanation

An array required for the operation has been flagged to be serviced. The array cannot be used while the service flag is set.

Action

Wait until service is completed on the array, and then resubmit the task.

CMUN02321E *SOURCE* `Unable to repair array: Service intent is set.`
Explanation

The array has been flagged to be serviced. The array cannot be used while the service flag is set.

Action

Wait until service is completed on the array, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02322E *SOURCE* `Unable to repair array: Service intent is set.`
Explanation

The array has been flagged to be serviced. The array cannot be used while the service flag is set.

Action

Wait until service is completed on the array, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02323E *SOURCE* `Unable to assign rank to extent pool: Service intent is set on the storage complex.`
Explanation

The storage complex has been flagged to be serviced. No activities can be performed on objects in the storage complex while the service flag is set.

Action

Wait until service is completed on the storage complex, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02324E *SOURCE* `Unable to assign rank to extent pool: Service intent is set.`
Explanation

The rank has been flagged to be serviced. No activities can be performed on the rank while the service flag is set.

Action

Wait until service is completed on the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02325E *SOURCE* `Unable to create rank: not in dual server mode`
Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02326E *SOURCE* `Unable to release rank: Service intent is set.`
Explanation

The rank has been flagged to be serviced. No activities can be performed on the rank while the service flag is set.

Action

Wait until service is completed on the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02327E *SOURCE* `Unable to reserve rank: Service intent is set.`
Explanation

The rank has been flagged to be serviced. No activities can be performed on the rank while the service flag is set.

Action

Wait until service is completed on the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02328E *SOURCE* `Unable to unassign rank: Service intent is set.`
Explanation

The rank has been flagged to be serviced. No activities can be performed on the rank while the service flag is set.

Action

Wait until service is completed on the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02329E *SOURCE* `Unable to delete rank: not in dual server mode`
Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02330E *SOURCE* `Unable to repair array: Service intent is set.`
Explanation

The array has been flagged to be serviced. No activities can be performed on the array while the service flag is set.

Action

Wait until service is completed on the array, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02331E *SOURCE* `Unable to delete rank`
Explanation

The storage management console server reports a storage unit device adapter error.

Action

Contact IBM technical support for assistance.

CMUN02332E *SOURCE* `Unable to delete rank`
Explanation

The storage management console server reports a storage unit device adapter error.

Action

Contact IBM technical support for assistance.

CMUN02333E *SOURCE* `Unable to delete rank: Service intent is set.`
Explanation

The rank has been flagged to be serviced. No activities can be performed on the rank while the service flag is set.

Action

Wait until service is completed on the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02334E *SOURCE* `Unable to unfence volume through rank: Service intent is set.`
Explanation

The rank has been flagged to be serviced. No activities can be performed on the rank or volumes within the rank while the service flag is set.

Action

Wait until service is completed on the rank, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02335E *SOURCE* `Unable to create volumes: volume type must be specified`

Explanation

No volume type has been specified for the volumes. The following volume types are supported, but you might be limited to a subset of these by other factors in your storage definition:

CKD base:
- 3380 cylinder
- 3390 cylinder

CKD single-CU alias

Fixed block base:
- 512-byte block
- 520-byte block unprotected
- 520-byte block protected

Action

Specify a valid volume type, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02336E *SOURCE* `Unable to rebuild array`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02337E *SOURCE* `Unable to create or modify logical volume: CKD base logical volume does not exist.`
Explanation

The specified logical volume does not exist or it is not a count-key-data base volume.

Action

Create the base logical volume or specify a different base logical volume, and then resubmit the task.

CMUN02338E *SOURCE* Delete SCSI host port operation stopped. Previous attempt failed.

Explanation

The storage management console server reports a storage unit microcode-level error. A list of SCSI host ports are specified to be deleted. Because a previous deletion failed, successive deletions in the list have stopped.

Action

Contact IBM technical support for assistance.

CMUN02339E *SOURCE* Delete volume group operation stopped. Previous attempt failed.

Explanation

The storage management console server reports a storage unit microcode-level error. A list of volume groups are specified to be deleted. Because a previous deletion failed, successive deletions in the list have stopped.

Action

Contact IBM technical support for assistance.

CMUN02340E *SOURCE* Array site operation failure: The array site is used in another array.

Explanation

The specified array site is used in other array.

Action

Specify an unused array site, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02341E *SOURCE* Logical subsystem configuration error

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02342E *SOURCE* Unable to delete last rank. Logical control unit exists.

Explanation

The last rank cannot be deleted because one or more logical control units still exist.

Action

Delete all logical control units, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02343E *SOURCE* `Unable to create logical subsystem: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02344E *SOURCE* `Unable to delete logical subsystem: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02345E *SOURCE* `Unable to create logical volume: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02346E *SOURCE* `Unable to create logical volume: logical subsystem not in correct state`
Explanation

The storage management console server reports a storage unit microcode-level error. The logical volume cannot be created because its logical subsystem is not in the correct state.

Action

Contact IBM technical support for assistance.

CMUN02347E *SOURCE* `Unable to delete logical volume: local server offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02348E *SOURCE* `Operation failure: logical subsystem not in correct state`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02349E *SOURCE* `Unable to modify logical volume: incorrect state`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02350E *SOURCE* `Logical volume operation failure: incorrect state`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02351E *SOURCE* `Logical volume operation failure: Base volume is in incorrect state.`

Explanation

The logical volume operation fails because its base logical volume is not in the correct state.

Action

Change the configuration state of the base logical volume, or wait until its configuration completes, and then resubmit the task.

CMUN02352E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02353E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02354E *SOURCE* `Operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02355E *SOURCE* `Unable to delete SCSI host port`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02356E *SOURCE* Unable to create SCSI host port: invalid user host description

Explanation

The SCSI host port specification contains an invalid user host description. The SCSI host port cannot be created.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02357E *SOURCE* Unable to create SCSI host port: invalid user host name

Explanation

The SCSI host port specification contains an invalid user host name. The SCSI host port cannot be created.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02358E *SOURCE* Unable to modify SCSI host port: invalid user host description

Explanation

The SCSI host port specification contains an invalid user host description. The SCSI host port cannot be modified.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02359E *SOURCE* Unable to modify SCSI host port: invalid user host name

Explanation

The SCSI host port specification contains an invalid user host name. The SCSI host port cannot be modified.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02360E *SOURCE* Unable to add logical volume to volume group: invalid parameter

Explanation

The operation to add the logical volume to the volume group fails because an invalid parameter is detected.

Action

Correct the specification, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02361E *SOURCE* Unable to modify volume group: invalid user name

Explanation

The volume group cannot be modified because the user name that is provided is invalid.

Action

Use a valid user name with appropriate permissions, and then resubmit the task.

CMUN02362E *SOURCE* Unable to query volume groups: incorrect volume configuration

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02363E *SOURCE* Unable to query volume groups: invalid parameter

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02364E *SOURCE* Unable to query volume groups: volume does not exist

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02365E *SOURCE* `Unable to remove logical volume from volume` `group: invalid parameter`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02366E *SOURCE* `Volume group operation failure: local server` `offline`

Explanation

The storage management console server reports a storage unit microcode-level error. A local server is not online. Microcode initialization might not have completed, or a failover has occurred and one server has not yet restarted.

Action

Monitor system status, and resubmit the task when both servers are online. If the problem persists, contact IBM technical support for assistance.

CMUN02367E *SOURCE* `Volume group operation failure: incorrect volume` `configuration`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02368E *SOURCE* `Volume group operation failure: volume does not` `exist`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02369E *SOURCE* `Volume group operation failure`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02370E *SOURCE* `Volume group operation failure: incorrect volume configuration`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02371E *SOURCE* `Volume group operation failure: invalid parameter`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02372E *SOURCE* `Volume group operation failure: volume does not exist`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02373E *SOURCE* `Volume group operation failure: invalid parameter`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02374E *SOURCE* `Unable to delete volume group`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02375E *SOURCE* `Volume group operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02376E *SOURCE* `Unable to modify logical volume: invalid data type`
Explanation

The logical volume cannot be modified because the specification contains an invalid data type.

Action

Specify a valid data type, and the resubmit the task.

CMUN02377E *SOURCE* `Error: inconsistent alias and base logical volume numbers`
Explanation

The first two digits of an alias logical volume number and its base logical volume number must be identical.

Action

Specify consistent alias and base logical volume numbers, and then resubmit the task.

CMUN02378E *SOURCE* Error: A volume of this type cannot have an alias volume group.

Explanation

An alias volume group is specified for a volume type that does not support the specification of aliases.

Action

Correct the specification, and then resubmit the task.

CMUN02379E *SOURCE* Error: A volume of this type cannot have a base logical volume number.

Explanation

A base logical volume number is specified for a volume type that does not support the specification of base logical volumes.

Action

Correct the specification, and then resubmit the task.

CMUN02380E *SOURCE* Unable to create array. Array sites must be in the same loop.

Explanation

Array creation across loops is not supported. The specified array sites are not in the same loop, and an array cannot be created using these array sites.

Action

Specify arrays that are in the same loop, and then resubmit the task.

CMUN02381E *SOURCE* Unable to repair array

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02382E *SOURCE* Unable to repair array

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02383E *SOURCE* Unable to create, delete, or modify logical subsystem resources. Resource manager unavailable on alternate server.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02384E *SOURCE* Operation failure: invalid file type
Explanation

The storage management console server reports a storage unit microcode-level error. A configuation file is not the correct file type.

Action

Contact IBM technical support for assistance.

CMUN02385E *SOURCE* Unable to modify network port: The specified IP address is invalid.
Explanation

The storage management console server reports a storage unit microcode-level error. An invalid IP address is specified.

Action

Contact IBM technical support for assistance.

CMUN02386E *SOURCE* Unable to modify network port: The specified network is invalid.
Explanation

The storage management console server reports a storage unit microcode-level error. An invalid network is specified.

Action

Contact IBM technical support for assistance.

CMUN02387E *SOURCE* Unable to create array. At least one and no more than two array sites must be specified.
Explanation

You must specify at least one and no more than two array sites when you create RAID5 or RAID10 arrays.

Action

Specify one or two array sites, and then resubmit the task.

CMUN02388E `Invalid logical volume size. See the help text for this message for valid sizes.`

Explanation

The specified volume size is not supported on all platforms. Supported logical volume sizes are microcode level dependent.

For DS microcode levels 5.0.3 and above:

*   Supported Enterprise Storage System (ESS) logical volume sizes range from 0.1 to 982.2 decimal gigabytes (1GB = 10^9 bytes). You can calculate the exact number of 512 byte blocks as INT((INT(GBx10^9/512)+63)/64)x64. The size of the volume that is created on the ESS is identical to the size of the volume that is created on the DS.
*   Supported DS logical volume sizes range from 1 to 2048 binary gigabytes (1GB = 2^30 bytes). This allocation uses the storage capacity of DS systems most efficiently.
*   Supported block logical volume sizes range from 1 to 4 binary gigablocks (1 gigablock = 2^30 512-byte blocks). If a specified size matches a supported DS or ESS logical volume size, the volume is identified as a DS or ESS logical volume, even though it is created by specifying the **blocks** volume type.
*   Supported iSeries logical volume sizes are expressed in decimal gigabytes (1GB = 10^9 bytes):

```
A0  (8.6 GB protected)    A81 (8.6GB, unprotected)
A02 (17.5 GB protected)   A82 (17.5 GB unprotected)
A04 (70.5 GB protected)   A84 (70.5 GB unprotected)
A05 (35.1 GB protected)   A85 (35.1 GB unprotected)
A06 (141.12 GB protected) A86 (141.12 GB unprotected)
A07 (282.25 GB protected) A87 (282.25 GB unprotected)
```

For DS microcode levels 5.0.1 and 5.0.2, block logical volume sizes must be a multiple of 128, and ESS logical volume sizes must be in the following list:

```
 0.1 (0.1)      0.2 (0.2)      0.3 (0.3)      0.4 (0.4)
 0.9 (0.8)      1.0 (0.9)      1.1 (1.0)      1.2 (1.1)
 1.7 (1.6)      1.8 (1.7)      1.9 (1.8)      2.0 (1.9)
 2.5 (2.3)      2.6 (2.4)      2.7 (2.5)      2.8 (2.6)
 3.3 (3.1)      3.4 (3.2)      3.5 (3.3)      3.6 (3.4)
 3.7 (3.4)      4.2 (3.9)      4.3 (4.0)      4.4 (4.1)
 4.5 (4.2)      5.0 (4.7)      5.1 (4.7)      5.2 (4.8)
 5.3 (4.9)      5.8 (5.4)      5.9 (5.5)      6.0 (5.6)
 6.1 (5.7)      6.7 (6.2)      6.8 (6.3)      6.9 (6.4)
 7.0 (6.5)      7.5 (7.0)      7.6 (7.1)      7.7 (7.2)
 7.8 (7.3)      8.3 (7.7)      8.4 (7.8)      8.5 (7.9)
 8.6 (8.0)      9.1 (8.5)      9.2 (8.6)      9.3 (8.7)
 9.4 (8.8)     10.0 (9.3)     10.1 (9.4)     10.2 (9.5)
10.3 (9.6)     10.8 (10.1)    10.9 (10.2)    11.0 (10.2)
11.1 (10.3)    11.6 (10.8)    11.7 (10.9)    11.8 (11.0)
11.9 (11.1)    12.4 (11.5)    12.5 (11.6)    12.6 (11.7)
12.7 (11.8)    13.3 (12.4)    13.4 (12.5)    13.5 (12.6)
13.6 (12.7)    14.1 (13.1)    14.2 (13.2)    14.3 (13.3)
14.4 (13.4)    14.9 (13.9)    15.0 (14.0)    15.1 (14.1)
15.2 (14.2)    15.7 (14.6)    15.8 (14.7)    15.9 (14.8)
16.0 (14.9)    16.6 (15.5)    16.7 (15.6)    16.8 (15.6)
16.9 (15.7)    17.4 (16.2)    17.5 (16.3)    17.6 (16.4)
```

```
17.7 (16.5)    18.2 (17.0)    18.3 (17.0)    18.4 (17.1)
18.5 (17.2)    19.0 (17.7)    19.1 (17.8)    19.2 (17.9)
19.3 (18.0)    19.4 (18.1)    19.9 (18.5)    20.0 (18.6)
20.1 (18.7)    20.2 (18.8)    20.7 (19.3)    20.8 (19.4)
20.9 (19.5)    21.0 (19.6)    21.5 (20.0)    21.6 (20.1)
21.7 (20.2)    21.8 (20.3)    22.3 (20.8)    22.4 (20.9)
22.5 (21.0)    22.6 (21.0)    22.7 (21.1)    23.2 (21.6)
23.3 (21.7)    23.4 (21.8)    23.5 (21.9)    24.0 (22.4)
24.1 (22.4)    24.2 (22.5)    24.3 (22.6)    24.8 (23.1)
24.9 (23.2)    25.0 (23.3)    25.1 (23.4)    25.6 (23.8)
25.7 (23.9)    25.8 (24.0)    25.9 (24.1)    26.0 (24.2)
26.5 (24.7)    26.6 (24.8)    26.7 (24.9)    26.8 (25.0)
27.3 (25.4)    27.4 (25.5)    27.5 (25.6)    27.6 (25.7)
28.1 (26.2)    28.2 (26.3)    28.3 (26.4)    28.4 (26.4)
28.9 (26.9)    29.0 (27.0)    29.1 (27.1)    29.2 (27.2)
29.3 (27.3)    29.8 (27.8)    29.9 (27.8)    30.0 (27.9)
30.1 (28.0)    30.6 (28.5)    30.7 (28.6)    30.8 (28.7)
30.9 (28.8)    31.4 (29.2)    31.5 (29.3)    31.6 (29.4)
31.7 (29.5)    32.3 (30.1)    32.4 (30.2)    32.5 (30.3)
32.6 (30.4)    33.1 (30.8)    33.2 (30.9)    33.3 (31.0)
33.4 (31.1)    33.9 (31.6)    34.0 (31.7)    34.1 (31.8)
34.2 (31.9)    34.7 (32.3)    34.8 (32.4)    34.9 (32.5)
35.0 (32.6)    35.6 (33.2)    35.7 (33.2)    35.8 (33.3)
35.9 (33.4)    36.4 (33.9)    36.5 (34.0)    36.6 (34.1)
36.7 (34.2)    37.2 (34.6)    37.3 (34.7)    37.4 (34.8)
37.5 (34.9)    38.0 (35.4)    38.1 (35.5)    38.2 (35.6)
38.3 (35.7)    38.9 (36.2)    39.0 (36.3)    39.1 (36.4)
39.2 (36.5)    39.7 (37.0)    39.8 (37.1)    39.9 (37.2)
40.0 (37.3)    40.5 (37.7)    40.6 (37.8)    40.7 (37.9)
40.8 (38.0)    41.3 (38.5)    41.4 (38.6)    41.5 (38.6)
41.6 (38.7)    42.2 (39.3)    42.3 (39.4)    42.4 (39.5)
42.5 (39.6)    43.0 (40.0)    43.1 (40.1)    43.2 (40.2)
43.3 (40.3)    43.8 (40.8)    43.9 (40.9)    44.0 (41.0)
44.1 (41.1)    44.6 (41.5)    44.7 (41.6)    44.8 (41.7)
44.9 (41.8)    45.0 (41.9)    45.5 (42.4)    45.6 (42.5)
45.7 (42.6)    45.8 (42.7)    46.3 (43.1)    46.4 (43.2)
46.5 (43.3)    46.6 (43.4)    47.1 (43.9)    47.2 (44.0)
47.3 (44.1)    47.4 (44.1)    47.9 (44.6)    48.0 (44.7)
48.1 (44.8)    48.2 (44.9)    48.3 (45.0)    48.8 (45.4)
48.9 (45.5)    49.0 (45.6)    49.1 (45.7)    49.6 (46.2)
49.7 (46.3)    49.8 (46.4)    49.9 (46.5)    50.4 (46.9)
50.5 (47.0)    50.6 (47.1)    50.7 (47.2)    51.2 (47.7)
51.3 (47.8)    51.4 (47.9)    51.5 (48.0)    51.6 (48.1)
52.1 (48.5)    52.2 (48.6)    52.3 (48.7)    52.4 (48.8)
52.9 (49.3)    53.0 (49.4)    53.1 (49.5)    53.2 (49.5)
53.7 (50.0)    53.8 (50.1)    53.9 (50.2)    54.0 (50.3)
54.5 (50.8)    54.6 (50.9)    54.7 (50.9)    54.8 (51.0)
54.9 (51.1)    55.4 (51.6)    55.5 (51.7)    55.6 (51.8)
55.7 (51.9)    56.2 (52.3)    56.3 (52.4)    56.4 (52.5)
56.5 (52.6)    57.0 (53.1)    57.1 (53.2)    57.2 (53.3)
57.3 (53.4)    57.9 (53.9)    58.0 (54.0)    58.1 (54.1)
58.2 (54.2)    58.7 (54.7)    58.8 (54.8)    58.9 (54.9)
59.0 (54.9)    59.5 (55.4)    59.6 (55.5)    59.7 (55.6)
59.8 (55.7)    60.3 (56.2)    60.4 (56.3)    60.5 (56.3)
60.6 (56.4)    61.2 (57.0)    61.3 (57.1)    61.4 (57.2)
61.5 (57.3)    62.0 (57.7)    62.1 (57.8)    62.2 (57.9)
62.3 (58.0)    62.8 (58.5)    62.9 (58.6)    63.0 (58.7)
63.1 (58.8)    63.6 (59.2)    63.7 (59.3)    63.8 (59.4)
63.9 (59.5)    64.5 (60.1)    64.6 (60.2)    64.7 (60.3)
64.8 (60.3)    65.3 (60.8)    65.4 (60.9)    65.5 (61.0)
65.6 (61.1)    66.1 (61.6)    66.2 (61.7)    66.3 (61.7)
66.4 (61.8)    66.9 (62.3)    67.0 (62.4)    67.1 (62.5)
67.2 (62.6)    67.8 (63.1)    67.9 (63.2)    68.0 (63.3)
68.1 (63.4)    68.6 (63.9)    68.7 (64.0)    68.8 (64.1)
68.9 (64.2)    69.4 (64.6)    69.5 (64.7)    69.6 (64.8)
69.7 (64.9)    70.2 (65.4)    70.3 (65.5)    70.4 (65.6)
70.5 (65.7)    70.6 (65.8)    71.1 (66.2)    71.2 (66.3)
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 71.3 (66.4)     71.4 (66.5)     71.9 (67.0)      72.0 (67.1)
 72.1 (67.1)     72.2 (67.2)     72.7 (67.7)      72.8 (67.8)
 72.9 (67.9)     73.0 (68.0)     73.5 (68.5)      73.6 (68.5)
 73.7 (68.6)     73.8 (68.7)     73.9 (68.8)      74.4 (69.3)
 74.5 (69.4)     74.6 (69.5)     74.7 (69.6)      75.2 (70.0)
 75.3 (70.1)     75.4 (70.2)     75.5 (70.3)      76.0 (70.8)
 76.1 (70.9)     76.2 (71.0)     76.3 (71.1)      76.8 (71.5)
 76.9 (71.6)     77.0 (71.7)     77.1 (71.8)      77.2 (71.9)
 77.7 (72.4)     77.8 (72.5)     77.9 (72.6)      78.0 (72.6)
 78.5 (73.1)     78.6 (73.2)     78.7 (73.3)      78.8 (73.4)
 79.3 (73.9)     79.4 (73.9)     79.5 (74.0)      79.6 (74.1)
 80.1 (74.6)     80.2 (74.7)     80.3 (74.8)      80.4 (74.9)
 80.5 (75.0)     81.0 (75.4)     81.1 (75.5)      81.2 (75.6)
 81.3 (75.7)     81.8 (76.2)     81.9 (76.3)      82.0 (76.4)
 82.1 (76.5)     82.6 (76.9)     82.7 (77.0)      82.8 (77.1)
 82.9 (77.2)     83.5 (77.8)     83.6 (77.9)      83.7 (78.0)
 83.8 (78.0)     84.3 (78.5)     84.4 (78.6)      84.5 (78.7)
 84.6 (78.8)     85.1 (79.3)     85.2 (79.3)      85.3 (79.4)
 85.4 (79.5)     85.9 (80.0)     86.0 (80.1)      86.1 (80.2)
 86.2 (80.3)     86.8 (80.8)     86.9 (80.9)      87.0 (81.0)
 87.1 (81.1)     87.6 (81.6)     87.7 (81.7)      87.8 (81.8)
 87.9 (81.9)     88.4 (82.3)     88.5 (82.4)      88.6 (82.5)
 88.7 (82.6)     89.2 (83.1)     89.3 (83.2)      89.4 (83.3)
 89.5 (83.4)     90.1 (83.9)     90.2 (84.0)      90.3 (84.1)
 90.4 (84.2)     90.9 (84.7)     91.0 (84.8)      91.1 (84.8)
 91.2 (84.9)     91.7 (85.4)     91.8 (85.5)      91.9 (85.6)
 92.0 (85.7)     92.5 (86.1)     92.6 (86.2)      92.7 (86.3)
 92.8 (86.4)     93.4 (87.0)     93.5 (87.1)      93.6 (87.2)
 93.7 (87.3)     94.2 (87.7)     94.3 (87.8)      94.4 (87.9)
 94.5 (88.0)     95.0 (88.5)     95.1 (88.6)      95.2 (88.7)
 95.3 (88.8)     95.8 (89.2)     95.9 (89.3)      96.0 (89.4)
 96.1 (89.5)     96.2 (89.6)     96.7 (90.1)      96.8 (90.2)
 96.9 (90.2)     97.0 (90.3)     97.5 (90.8)      97.6 (90.9)
 97.7 (91.0)     97.8 (91.1)     98.3 (91.5)      98.4 (91.6)
 98.5 (91.7)     98.6 (91.8)     99.1 (92.3)      99.2 (92.4)
 99.3 (92.5)     99.4 (92.6)     99.5 (92.7)     100.0 (93.1)
100.1 (93.2)    100.2 (93.3)    100.3 (93.4)     100.8 (93.9)
100.9 (94.0)    101.0 (94.1)    101.1 (94.2)     101.6 (94.6)
101.7 (94.7)    101.8 (94.8)    101.9 (94.9)     102.4 (95.4)
102.5 (95.5)    102.6 (95.6)    102.7 (95.6)     102.8 (95.7)
103.3 (96.2)    103.4 (96.3)    103.5 (96.4)     103.6 (96.5)
104.1 (97.0)    104.2 (97.0)    104.3 (97.1)     104.4 (97.2)
104.9 (97.7)    105.0 (97.8)    105.1 (97.9)     105.2 (98.0)
105.7 (98.4)    105.8 (98.5)    105.9 (98.6)     106.0 (98.7)
106.1 (98.8)    106.6 (99.3)    106.7 (99.4)     106.8 (99.5)
106.9 (99.6)    107.4 (100.0)   107.5 (100.1)    107.6 (100.2)
107.7 (100.3)   108.2 (100.8)   108.3 (100.9)    108.4 (101.0)
108.5 (101.0)   109.1 (101.6)   109.2 (101.7)    109.3 (101.8)
109.4 (101.9)   109.9 (102.4)   110.0 (102.4)    110.1 (102.5)
110.2 (102.6)   110.7 (103.1)   110.8 (103.2)    110.9 (103.3)
111.0 (103.4)   111.5 (103.8)   111.6 (103.9)    111.7 (104.0)
111.8 (104.1)   112.4 (104.7)   112.5 (104.8)    112.6 (104.9)
112.7 (105.0)   113.2 (105.4)   113.3 (105.5)    113.4 (105.6)
113.5 (105.7)   114.0 (106.2)   114.1 (106.3)    114.2 (106.4)
114.3 (106.5)   114.8 (106.9)   114.9 (107.0)    115.0 (107.1)
115.1 (107.2)   115.7 (107.8)   115.8 (107.8)    115.9 (107.9)
116.0 (108.0)   116.5 (108.5)   116.6 (108.6)    116.7 (108.7)
116.8 (108.8)   117.3 (109.2)   117.4 (109.3)    117.5 (109.4)
117.6 (109.5)   118.1 (110.0)   118.2 (110.1)    118.3 (110.2)
118.4 (110.3)   119.0 (110.8)   119.1 (110.9)    119.2 (111.0)
119.3 (111.1)   119.8 (111.6)   119.9 (111.7)    120.0 (111.8)
120.1 (111.9)   120.6 (112.3)   120.7 (112.4)    120.8 (112.5)
120.9 (112.6)   121.4 (113.1)   121.5 (113.2)    121.6 (113.2)
121.7 (113.3)   121.8 (113.4)   122.3 (113.9)    122.4 (114.0)
122.5 (114.1)   122.6 (114.2)   123.1 (114.6)    123.2 (114.7)
123.3 (114.8)   123.4 (114.9)   123.9 (115.4)    124.0 (115.5)
124.1 (115.6)   124.2 (115.7)   124.7 (116.1)    124.8 (116.2)
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124.9 (116.3)   125.0 (116.4)   125.1 (116.5)   125.6 (117.0)
125.7 (117.1)   125.8 (117.2)   125.9 (117.3)   126.4 (117.7)
126.5 (117.8)   126.6 (117.9)   126.7 (118.0)   127.2 (118.5)
127.3 (118.6)   127.4 (118.7)   127.5 (118.7)   128.0 (119.2)
128.1 (119.3)   128.2 (119.4)   128.3 (119.5)   128.4 (119.6)
128.9 (120.0)   129.0 (120.1)   129.1 (120.2)   129.2 (120.3)
129.7 (120.8)   129.8 (120.9)   129.9 (121.0)   130.0 (121.1)
130.5 (121.5)   130.6 (121.6)   130.7 (121.7)   130.8 (121.8)
131.3 (122.3)   131.4 (122.4)   131.5 (122.5)   131.6 (122.6)
131.7 (122.7)   132.2 (123.1)   132.3 (123.2)   132.4 (123.3)
132.5 (123.4)   133.0 (123.9)   133.1 (124.0)   133.2 (124.1)
133.3 (124.1)   133.8 (124.6)   133.9 (124.7)   134.0 (124.8)
134.1 (124.9)   134.7 (125.4)   134.8 (125.5)   134.9 (125.6)
135.0 (125.7)   135.5 (126.2)   135.6 (126.3)   135.7 (126.4)
135.8 (126.5)   136.3 (126.9)   136.4 (127.0)   136.5 (127.1)
136.6 (127.2)   137.1 (127.7)   137.2 (127.8)   137.3 (127.9)
137.4 (128.0)   138.0 (128.5)   138.1 (128.6)   138.2 (128.7)
138.3 (128.8)   138.8 (129.3)   138.9 (129.4)   139.0 (129.5)
139.1 (129.5)   139.6 (130.0)   139.7 (130.1)   139.8 (130.2)
139.9 (130.3)   140.4 (130.8)   140.5 (130.9)   140.6 (130.9)
140.7 (131.0)   141.3 (131.6)   141.4 (131.7)   141.5 (131.8)
141.6 (131.9)   142.1 (132.3)   142.2 (132.4)   142.3 (132.5)
142.4 (132.6)   142.9 (133.1)   143.0 (133.2)   143.1 (133.3)
143.2 (133.4)   143.7 (133.8)   143.8 (133.9)   143.9 (134.0)
144.0 (134.1)   144.6 (134.7)   144.7 (134.8)   144.8 (134.9)
144.9 (134.9)   145.4 (135.4)   145.5 (135.5)   145.6 (135.6)
145.7 (135.7)   146.2 (136.2)   146.3 (136.3)   146.4 (136.3)
146.5 (136.4)   147.0 (136.9)   147.1 (137.0)   147.2 (137.1)
147.3 (137.2)   147.4 (137.3)   147.9 (137.7)   148.0 (137.8)
148.1 (137.9)   148.2 (138.0)   148.7 (138.5)   148.8 (138.6)
148.9 (138.7)   149.0 (138.8)   149.5 (139.2)   149.6 (139.3)
149.7 (139.4)   149.8 (139.5)   150.3 (140.0)   150.4 (140.1)
150.5 (140.2)   150.6 (140.3)   150.7 (140.4)   151.2 (140.8)
151.3 (140.9)   151.4 (141.0)   151.5 (141.1)   152.0 (141.6)
152.1 (141.7)   152.2 (141.7)   152.3 (141.8)   152.8 (142.3)
152.9 (142.4)   153.0 (142.5)   153.1 (142.6)   153.6 (143.1)
153.7 (143.1)   153.8 (143.2)   153.9 (143.3)   154.0 (143.4)
154.5 (143.9)   154.6 (144.0)   154.7 (144.1)   154.8 (144.2)
155.3 (144.6)   155.4 (144.7)   155.5 (144.8)   155.6 (144.9)
156.1 (145.4)   156.2 (145.5)   156.3 (145.6)   156.4 (145.7)
156.9 (146.1)   157.0 (146.2)   157.1 (146.3)   157.2 (146.4)
157.3 (146.5)   157.8 (147.0)   157.9 (147.1)   158.0 (147.1)
158.1 (147.2)   158.6 (147.7)   158.7 (147.8)   158.8 (147.9)
158.9 (148.0)   159.4 (148.5)   159.5 (148.5)   159.6 (148.6)
159.7 (148.7)   160.3 (149.3)   160.4 (149.4)   160.5 (149.5)
160.6 (149.6)   161.1 (150.0)   161.2 (150.1)   161.3 (150.2)
161.4 (150.3)   161.9 (150.8)   162.0 (150.9)   162.1 (151.0)
162.2 (151.1)   162.7 (151.5)   162.8 (151.6)   162.9 (151.7)
163.0 (151.8)   163.6 (152.4)   163.7 (152.5)   163.8 (152.6)
163.9 (152.6)   164.4 (153.1)   164.5 (153.2)   164.6 (153.3)
164.7 (153.4)   165.2 (153.9)   165.3 (153.9)   165.4 (154.0)
165.5 (154.1)   166.0 (154.6)   166.1 (154.7)   166.2 (154.8)
166.3 (154.9)   166.9 (155.4)   167.0 (155.5)   167.1 (155.6)
167.2 (155.7)   167.7 (156.2)   167.8 (156.3)   167.9 (156.4)
168.0 (156.5)   168.5 (156.9)   168.6 (157.0)   168.7 (157.1)
168.8 (157.2)   169.3 (157.7)   169.4 (157.8)   169.5 (157.9)
169.6 (158.0)   170.2 (158.5)   170.3 (158.6)   170.4 (158.7)
170.5 (158.8)   171.0 (159.3)   171.1 (159.3)   171.2 (159.4)
171.3 (159.5)   171.8 (160.0)   171.9 (160.1)   172.0 (160.2)
172.1 (160.3)   172.6 (160.7)   172.7 (160.8)   172.8 (160.9)
172.9 (161.0)   173.0 (161.1)   173.5 (161.6)   173.6 (161.7)
173.7 (161.8)   173.8 (161.9)   174.3 (162.3)   174.4 (162.4)
174.5 (162.5)   174.6 (162.6)   175.1 (163.1)   175.2 (163.2)
175.3 (163.3)   175.4 (163.4)   175.9 (163.8)   176.0 (163.9)
176.1 (164.0)   176.2 (164.1)   176.3 (164.2)   176.8 (164.7)
176.9 (164.8)   177.0 (164.8)   177.1 (164.9)   177.6 (165.4)
177.7 (165.5)   177.8 (165.6)   177.9 (165.7)   178.4 (166.1)
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178.5 (166.2)    178.6 (166.3)    178.7 (166.4)    179.2 (166.9)
179.3 (167.0)    179.4 (167.1)    179.5 (167.2)    179.6 (167.3)
180.1 (167.7)    180.2 (167.8)    180.3 (167.9)    180.4 (168.0)
180.9 (168.5)    181.0 (168.6)    181.1 (168.7)    181.2 (168.8)
181.7 (169.2)    181.8 (169.3)    181.9 (169.4)    182.0 (169.5)
182.5 (170.0)    182.6 (170.1)    182.7 (170.2)    182.8 (170.2)
182.9 (170.3)    183.4 (170.8)    183.5 (170.9)    183.6 (171.0)
183.7 (171.1)    184.2 (171.5)    184.3 (171.6)    184.4 (171.7)
184.5 (171.8)    185.0 (172.3)    185.1 (172.4)    185.2 (172.5)
185.3 (172.6)    185.9 (173.1)    186.0 (173.2)    186.1 (173.3)
186.2 (173.4)    186.7 (173.9)    186.8 (174.0)    186.9 (174.1)
187.0 (174.2)    187.5 (174.6)    187.6 (174.7)    187.7 (174.8)
187.8 (174.9)    188.3 (175.4)    188.4 (175.5)    188.5 (175.6)
188.6 (175.6)    189.2 (176.2)    189.3 (176.3)    189.4 (176.4)
189.5 (176.5)    190.0 (177.0)    190.1 (177.0)    190.2 (177.1)
190.3 (177.2)    190.8 (177.7)    190.9 (177.8)    191.0 (177.9)
191.1 (178.0)    191.6 (178.4)    191.7 (178.5)    191.8 (178.6)
191.9 (178.7)    192.5 (179.3)    192.6 (179.4)    192.7 (179.5)
192.8 (179.6)    193.3 (180.0)    193.4 (180.1)    193.5 (180.2)
193.6 (180.3)    194.1 (180.8)    194.2 (180.9)    194.3 (181.0)
194.4 (181.0)    194.9 (181.5)    195.0 (181.6)    195.1 (181.7)
195.2 (181.8)    195.8 (182.4)    195.9 (182.4)    196.0 (182.5)
196.1 (182.6)    196.6 (183.1)    196.7 (183.2)    196.8 (183.3)
196.9 (183.4)    197.4 (183.8)    197.5 (183.9)    197.6 (184.0)
197.7 (184.1)    198.2 (184.6)    198.3 (184.7)    198.4 (184.8)
198.5 (184.9)    198.6 (185.0)    199.1 (185.4)    199.2 (185.5)
199.3 (185.6)    199.4 (185.7)    199.9 (186.2)    200.0 (186.3)
200.1 (186.4)    200.2 (186.5)    200.7 (186.9)    200.8 (187.0)
200.9 (187.1)    201.0 (187.2)    201.5 (187.7)    201.6 (187.8)
201.7 (187.8)    201.8 (187.9)    201.9 (188.0)    202.4 (188.5)
202.5 (188.6)    202.6 (188.7)    202.7 (188.8)    203.2 (189.2)
203.3 (189.3)    203.4 (189.4)    203.5 (189.5)    204.0 (190.0)
204.1 (190.1)    204.2 (190.2)    204.3 (190.3)    204.8 (190.7)
204.9 (190.8)    205.0 (190.9)    205.1 (191.0)    205.2 (191.1)
205.7 (191.6)    205.8 (191.7)    205.9 (191.8)    206.0 (191.9)
206.5 (192.3)    206.6 (192.4)    206.7 (192.5)    206.8 (192.6)
207.3 (193.1)    207.4 (193.2)    207.5 (193.2)    207.6 (193.3)
208.1 (193.8)    208.2 (193.9)    208.3 (194.0)    208.4 (194.1)
208.5 (194.2)    209.0 (194.6)    209.1 (194.7)    209.2 (194.8)
209.3 (194.9)    209.8 (195.4)    209.9 (195.5)    210.0 (195.6)
210.1 (195.7)    210.6 (196.1)    210.7 (196.2)    210.8 (196.3)
210.9 (196.4)    211.5 (197.0)    211.6 (197.1)    211.7 (197.2)
211.8 (197.3)    212.3 (197.7)    212.4 (197.8)    212.5 (197.9)
212.6 (198.0)    213.1 (198.5)    213.2 (198.6)    213.3 (198.7)
213.4 (198.7)    213.9 (199.2)    214.0 (199.3)    214.1 (199.4)
214.2 (199.5)    214.8 (200.0)    214.9 (200.1)    215.0 (200.2)
215.1 (200.3)    215.6 (200.8)    215.7 (200.9)    215.8 (201.0)
215.9 (201.1)    216.4 (201.5)    216.5 (201.6)    216.6 (201.7)
216.7 (201.8)    217.2 (202.3)    217.3 (202.4)    217.4 (202.5)
217.5 (202.6)    218.1 (203.1)    218.2 (203.2)    218.3 (203.3)
218.4 (203.4)    218.9 (203.9)    219.0 (204.0)    219.1 (204.1)
219.2 (204.1)    219.7 (204.6)    219.8 (204.7)    219.9 (204.8)
220.0 (204.9)    220.5 (205.4)    220.6 (205.4)    220.7 (205.5)
220.8 (205.6)    221.4 (206.2)    221.5 (206.3)    221.6 (206.4)
221.7 (206.5)    222.2 (206.9)    222.3 (207.0)    222.4 (207.1)
222.5 (207.2)    223.0 (207.7)    223.1 (207.8)    223.2 (207.9)
223.3 (208.0)    223.8 (208.4)    223.9 (208.5)    224.0 (208.6)
224.1 (208.7)    224.2 (208.8)    224.7 (209.3)    224.8 (209.4)
224.9 (209.5)    225.0 (209.5)    225.5 (210.0)    225.6 (210.1)
225.7 (210.2)    225.8 (210.3)    226.3 (210.8)    226.4 (210.9)
226.5 (210.9)    226.6 (211.0)    227.1 (211.5)    227.2 (211.6)
227.3 (211.7)    227.4 (211.8)    227.5 (211.9)    228.0 (212.3)
228.1 (212.4)    228.2 (212.5)    228.3 (212.6)    228.8 (213.1)
228.9 (213.2)    229.0 (213.3)    229.1 (213.4)    229.6 (213.8)
229.7 (213.9)    229.8 (214.0)    229.9 (214.1)    230.4 (214.6)
230.5 (214.7)    230.6 (214.8)    230.7 (214.9)    230.8 (214.9)
231.3 (215.4)    231.4 (215.5)    231.5 (215.6)    231.6 (215.7)
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232.1 (216.2)    232.2 (216.3)    232.3 (216.3)    232.4 (216.4)
232.9 (216.9)    233.0 (217.0)    233.1 (217.1)    233.2 (217.2)
233.7 (217.7)    233.8 (217.7)    233.9 (217.8)    234.0 (217.9)
234.1 (218.0)    234.6 (218.5)    234.7 (218.6)    234.8 (218.7)
234.9 (218.8)    235.4 (219.2)    235.5 (219.3)    235.6 (219.4)
235.7 (219.5)    236.2 (220.0)    236.3 (220.1)    236.4 (220.2)
236.5 (220.3)    237.1 (220.8)    237.2 (220.9)    237.3 (221.0)
237.4 (221.1)    237.9 (221.6)    238.0 (221.7)    238.1 (221.7)
238.2 (221.8)    238.7 (222.3)    238.8 (222.4)    238.9 (222.5)
239.0 (222.6)    239.5 (223.1)    239.6 (223.1)    239.7 (223.2)
239.8 (223.3)    240.4 (223.9)    240.5 (224.0)    240.6 (224.1)
240.7 (224.2)    241.2 (224.6)    241.3 (224.7)    241.4 (224.8)
241.5 (224.9)    242.0 (225.4)    242.1 (225.5)    242.2 (225.6)
242.3 (225.7)    242.8 (226.1)    242.9 (226.2)    243.0 (226.3)
243.1 (226.4)    243.7 (227.0)    243.8 (227.1)    243.9 (227.1)
244.0 (227.2)    244.5 (227.7)    244.6 (227.8)    244.7 (227.9)
244.8 (228.0)    245.3 (228.5)    245.4 (228.5)    245.5 (228.6)
245.6 (228.7)    246.1 (229.2)    246.2 (229.3)    246.3 (229.4)
246.4 (229.5)    247.0 (230.0)    247.1 (230.1)    247.2 (230.2)
247.3 (230.3)    247.8 (230.8)    247.9 (230.9)    248.0 (231.0)
248.1 (231.1)    248.6 (231.5)    248.7 (231.6)    248.8 (231.7)
248.9 (231.8)    249.4 (232.3)    249.5 (232.4)    249.6 (232.5)
249.7 (232.6)    249.8 (232.6)    250.3 (233.1)    250.4 (233.2)
250.5 (233.3)    250.6 (233.4)    251.1 (233.9)    251.2 (233.9)
251.3 (234.0)    251.4 (234.1)    251.9 (234.6)    252.0 (234.7)
252.1 (234.8)    252.2 (234.9)    252.7 (235.3)    252.8 (235.4)
252.9 (235.5)    253.0 (235.6)    253.1 (235.7)    253.6 (236.2)
253.7 (236.3)    253.8 (236.4)    253.9 (236.5)    254.4 (236.9)
254.5 (237.0)    254.6 (237.1)    254.7 (237.2)    255.2 (237.7)
255.3 (237.8)    255.4 (237.9)    255.5 (238.0)    256.0 (238.4)
256.1 (238.5)    256.2 (238.6)    256.3 (238.7)    256.4 (238.8)
256.9 (239.3)    257.0 (239.3)    257.1 (239.4)    257.2 (239.5)
257.7 (240.0)    257.8 (240.1)    257.9 (240.2)    258.0 (240.3)
258.5 (240.7)    258.6 (240.8)    258.7 (240.9)    258.8 (241.0)
259.3 (241.5)    259.4 (241.6)    259.5 (241.7)    259.6 (241.8)
259.7 (241.9)    260.2 (242.3)    260.3 (242.4)    260.4 (242.5)
260.5 (242.6)    261.0 (243.1)    261.1 (243.2)    261.2 (243.3)
261.3 (243.4)    261.8 (243.8)    261.9 (243.9)    262.0 (244.0)
262.1 (244.1)    262.7 (244.7)    262.8 (244.8)    262.9 (244.8)
263.0 (244.9)    263.5 (245.4)    263.6 (245.5)    263.7 (245.6)
263.8 (245.7)    264.3 (246.1)    264.4 (246.2)    264.5 (246.3)
264.6 (246.4)    265.1 (246.9)    265.2 (247.0)    265.3 (247.1)
265.4 (247.2)    266.0 (247.7)    266.1 (247.8)    266.2 (247.9)
266.3 (248.0)    266.8 (248.5)    266.9 (248.6)    267.0 (248.7)
267.1 (248.8)    267.6 (249.2)    267.7 (249.3)    267.8 (249.4)
267.9 (249.5)    268.4 (250.0)    268.5 (250.1)    268.6 (250.2)
268.7 (250.2)    269.3 (250.8)    269.4 (250.9)    269.5 (251.0)
269.6 (251.1)    270.1 (251.6)    270.2 (251.6)    270.3 (251.7)
270.4 (251.8)    270.9 (252.3)    271.0 (252.4)    271.1 (252.5)
271.2 (252.6)    271.7 (253.0)    271.8 (253.1)    271.9 (253.2)
272.0 (253.3)    272.6 (253.9)    272.7 (254.0)    272.8 (254.1)
272.9 (254.2)    273.4 (254.6)    273.5 (254.7)    273.6 (254.8)
273.7 (254.9)    274.2 (255.4)    274.3 (255.5)    274.4 (255.6)
274.5 (255.6)    275.0 (256.1)    275.1 (256.2)    275.2 (256.3)
275.3 (256.4)    275.4 (256.5)    275.9 (257.0)    276.0 (257.0)
276.1 (257.1)    276.2 (257.2)    276.7 (257.7)    276.8 (257.8)
276.9 (257.9)    277.0 (258.0)    277.5 (258.4)    277.6 (258.5)
277.7 (258.6)    277.8 (258.7)    278.3 (259.2)    278.4 (259.3)
278.5 (259.4)    278.6 (259.5)    278.7 (259.6)    279.2 (260.0)
279.3 (260.1)    279.4 (260.2)    279.5 (260.3)    280.0 (260.8)
280.1 (260.9)    280.2 (261.0)    280.3 (261.0)    280.8 (261.5)
280.9 (261.6)    281.0 (261.7)    281.1 (261.8)    281.6 (262.3)
281.7 (262.4)    281.8 (262.4)    281.9 (262.5)    282.0 (262.6)
282.5 (263.1)    282.6 (263.2)    282.7 (263.3)    282.8 (263.4)
283.3 (263.8)    283.4 (263.9)    283.5 (264.0)    283.6 (264.1)
284.1 (264.6)    284.2 (264.7)    284.3 (264.8)    284.4 (264.9)
284.9 (265.3)    285.0 (265.4)    285.1 (265.5)    285.2 (265.6)
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286.1 (266.5)    286.6 (266.9)    286.7 (267.0)    286.8 (267.1)
286.9 (267.2)    287.4 (267.7)    287.5 (267.8)    287.6 (267.8)
287.7 (267.9)    288.3 (268.5)    288.4 (268.6)    288.5 (268.7)
288.6 (268.8)    289.1 (269.2)    289.2 (269.3)    289.3 (269.4)
289.4 (269.5)    289.9 (270.0)    290.0 (270.1)    290.1 (270.2)
290.2 (270.3)    290.7 (270.7)    290.8 (270.8)    290.9 (270.9)
291.0 (271.0)    291.6 (271.6)    291.7 (271.7)    291.8 (271.8)
291.9 (271.9)    292.4 (272.3)    292.5 (272.4)    292.6 (272.5)
292.7 (272.6)    293.2 (273.1)    293.3 (273.2)    293.4 (273.3)
293.5 (273.3)    294.0 (273.8)    294.1 (273.9)    294.2 (274.0)
294.3 (274.1)    294.9 (274.6)    295.0 (274.7)    295.1 (274.8)
295.2 (274.9)    295.7 (275.4)    295.8 (275.5)    295.9 (275.6)
296.0 (275.7)    296.5 (276.1)    296.6 (276.2)    296.7 (276.3)
296.8 (276.4)    297.3 (276.9)    297.4 (277.0)    297.5 (277.1)
297.6 (277.2)    298.2 (277.7)    298.3 (277.8)    298.4 (277.9)
298.5 (278.0)    299.0 (278.5)    299.1 (278.6)    299.2 (278.7)
299.3 (278.7)    299.8 (279.2)    299.9 (279.3)    300.0 (279.4)
300.1 (279.5)    300.6 (280.0)    300.7 (280.0)    300.8 (280.1)
300.9 (280.2)    301.0 (280.3)    301.5 (280.8)    301.6 (280.9)
301.7 (281.0)    301.8 (281.1)    302.3 (281.5)    302.4 (281.6)
302.5 (281.7)    302.6 (281.8)    303.1 (282.3)    303.2 (282.4)
303.3 (282.5)    303.4 (282.6)    303.9 (283.0)    304.0 (283.1)
304.1 (283.2)    304.2 (283.3)    304.3 (283.4)    304.8 (283.9)
304.9 (284.0)    305.0 (284.1)    305.1 (284.1)    305.6 (284.6)
305.7 (284.7)    305.8 (284.8)    305.9 (284.9)    306.4 (285.4)
306.5 (285.5)    306.6 (285.5)    306.7 (285.6)    307.2 (286.1)
307.3 (286.2)    307.4 (286.3)    307.5 (286.4)    307.6 (286.5)
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308.9 (287.7)    309.0 (287.8)    309.1 (287.9)    309.2 (288.0)
309.7 (288.4)    309.8 (288.5)    309.9 (288.6)    310.0 (288.7)
310.5 (289.2)    310.6 (289.3)    310.7 (289.4)    310.8 (289.5)
310.9 (289.5)    311.4 (290.0)    311.5 (290.1)    311.6 (290.2)
311.7 (290.3)    312.2 (290.8)    312.3 (290.9)    312.4 (290.9)
312.5 (291.0)    313.0 (291.5)    313.1 (291.6)    313.2 (291.7)
313.3 (291.8)    313.9 (292.3)    314.0 (292.4)    314.1 (292.5)
314.2 (292.6)    314.7 (293.1)    314.8 (293.2)    314.9 (293.3)
315.0 (293.4)    315.5 (293.8)    315.6 (293.9)    315.7 (294.0)
315.8 (294.1)    316.3 (294.6)    316.4 (294.7)    316.5 (294.8)
316.6 (294.9)    317.2 (295.4)    317.3 (295.5)    317.4 (295.6)
317.5 (295.7)    318.0 (296.2)    318.1 (296.3)    318.2 (296.3)
318.3 (296.4)    318.8 (296.9)    318.9 (297.0)    319.0 (297.1)
319.1 (297.2)    319.6 (297.7)    319.7 (297.7)    319.8 (297.8)
319.9 (297.9)    320.5 (298.5)    320.6 (298.6)    320.7 (298.7)
320.8 (298.8)    321.3 (299.2)    321.4 (299.3)    321.5 (299.4)
321.6 (299.5)    322.1 (300.0)    322.2 (300.1)    322.3 (300.2)
322.4 (300.3)    322.9 (300.7)    323.0 (300.8)    323.1 (300.9)
323.2 (301.0)    323.8 (301.6)    323.9 (301.7)    324.0 (301.7)
324.1 (301.8)    324.6 (302.3)    324.7 (302.4)    324.8 (302.5)
324.9 (302.6)    325.4 (303.1)    325.5 (303.1)    325.6 (303.2)
325.7 (303.3)    326.2 (303.8)    326.3 (303.9)    326.4 (304.0)
326.5 (304.1)    326.6 (304.2)    327.1 (304.6)    327.2 (304.7)
327.3 (304.8)    327.4 (304.9)    327.9 (305.4)    328.0 (305.5)
328.1 (305.6)    328.2 (305.7)    328.7 (306.1)    328.8 (306.2)
328.9 (306.3)    329.0 (306.4)    329.5 (306.9)    329.6 (307.0)
329.7 (307.1)    329.8 (307.2)    329.9 (307.2)    330.4 (307.7)
330.5 (307.8)    330.6 (307.9)    330.7 (308.0)    331.2 (308.5)
331.3 (308.5)    331.4 (308.6)    331.5 (308.7)    332.0 (309.2)
332.1 (309.3)    332.2 (309.4)    332.3 (309.5)    332.8 (309.9)
332.9 (310.0)    333.0 (310.1)    333.1 (310.2)    333.2 (310.3)
333.7 (310.8)    333.8 (310.9)    333.9 (311.0)    334.0 (311.1)
334.5 (311.5)    334.6 (311.6)    334.7 (311.7)    334.8 (311.8)
335.3 (312.3)    335.4 (312.4)    335.5 (312.5)    335.6 (312.6)
336.1 (313.0)    336.2 (313.1)    336.3 (313.2)    336.4 (313.3)
336.5 (313.4)    337.0 (313.9)    337.1 (313.9)    337.2 (314.0)
337.3 (314.1)    337.8 (314.6)    337.9 (314.7)    338.0 (314.8)
338.1 (314.9)    338.6 (315.3)    338.7 (315.4)    338.8 (315.5)
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339.8 (316.5)    340.3 (316.9)    340.4 (317.0)    340.5 (317.1)
340.6 (317.2)    341.1 (317.7)    341.2 (317.8)    341.3 (317.9)
341.4 (318.0)    341.9 (318.4)    342.0 (318.5)    342.1 (318.6)
342.2 (318.7)    342.8 (319.3)    342.9 (319.4)    343.0 (319.4)
343.1 (319.5)    343.6 (320.0)    343.7 (320.1)    343.8 (320.2)
343.9 (320.3)    344.4 (320.7)    344.5 (320.8)    344.6 (320.9)
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345.5 (321.8)    346.1 (322.3)    346.2 (322.4)    346.3 (322.5)
346.4 (322.6)    346.9 (323.1)    347.0 (323.2)    347.1 (323.3)
347.2 (323.4)    347.7 (323.8)    347.8 (323.9)    347.9 (324.0)
348.0 (324.1)    348.5 (324.6)    348.6 (324.7)    348.7 (324.8)
348.8 (324.8)    349.4 (325.4)    349.5 (325.5)    349.6 (325.6)
349.7 (325.7)    350.2 (326.1)    350.3 (326.2)    350.4 (326.3)
350.5 (326.4)    351.0 (326.9)    351.1 (327.0)    351.2 (327.1)
351.3 (327.2)    351.8 (327.6)    351.9 (327.7)    352.0 (327.8)
352.1 (327.9)    352.2 (328.0)    352.7 (328.5)    352.8 (328.6)
352.9 (328.7)    353.0 (328.8)    353.5 (329.2)    353.6 (329.3)
353.7 (329.4)    353.8 (329.5)    354.3 (330.0)    354.4 (330.1)
354.5 (330.2)    354.6 (330.2)    355.1 (330.7)    355.2 (330.8)
355.3 (330.9)    355.4 (331.0)    355.5 (331.1)    356.0 (331.6)
356.1 (331.6)    356.2 (331.7)    356.3 (331.8)    356.8 (332.3)
356.9 (332.4)    357.0 (332.5)    357.1 (332.6)    357.6 (333.0)
357.7 (333.1)    357.8 (333.2)    357.9 (333.3)    358.4 (333.8)
358.5 (333.9)    358.6 (334.0)    358.7 (334.1)    358.8 (334.2)
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360.1 (335.4)    360.2 (335.5)    360.3 (335.6)    360.4 (335.6)
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362.1 (337.2)    362.6 (337.7)    362.7 (337.8)    362.8 (337.9)
362.9 (338.0)    363.4 (338.4)    363.5 (338.5)    363.6 (338.6)
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365.4 (340.3)    365.9 (340.8)    366.0 (340.9)    366.1 (341.0)
366.2 (341.1)    366.7 (341.5)    366.8 (341.6)    366.9 (341.7)
367.0 (341.8)    367.5 (342.3)    367.6 (342.4)    367.7 (342.4)
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368.7 (343.4)    369.2 (343.8)    369.3 (343.9)    369.4 (344.0)
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372.8 (347.2)    373.3 (347.7)    373.4 (347.8)    373.5 (347.8)
373.6 (347.9)    374.1 (348.4)    374.2 (348.5)    374.3 (348.6)
374.4 (348.7)    375.0 (349.2)    375.1 (349.3)    375.2 (349.4)
375.3 (349.5)    375.8 (350.0)    375.9 (350.1)    376.0 (350.2)
376.1 (350.3)    376.6 (350.7)    376.7 (350.8)    376.8 (350.9)
376.9 (351.0)    377.4 (351.5)    377.5 (351.6)    377.6 (351.7)
377.7 (351.8)    377.8 (351.9)    378.3 (352.3)    378.4 (352.4)
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379.3 (353.3)    379.4 (353.3)    379.9 (353.8)    380.0 (353.9)
380.1 (354.0)    380.2 (354.1)    380.7 (354.6)    380.8 (354.6)
380.9 (354.7)    381.0 (354.8)    381.1 (354.9)    381.6 (355.4)
381.7 (355.5)    381.8 (355.6)    381.9 (355.7)    382.4 (356.1)
382.5 (356.2)    382.6 (356.3)    382.7 (356.4)    383.2 (356.9)
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384.1 (357.7)    384.2 (357.8)    384.3 (357.9)    384.4 (358.0)
384.9 (358.5)    385.0 (358.6)    385.1 (358.7)    385.2 (358.7)
385.7 (359.2)    385.8 (359.3)    385.9 (359.4)    386.0 (359.5)
386.5 (360.0)    386.6 (360.0)    386.7 (360.1)    386.8 (360.2)
387.3 (360.7)    387.4 (360.8)    387.5 (360.9)    387.6 (361.0)
387.7 (361.1)    388.2 (361.5)    388.3 (361.6)    388.4 (361.7)
388.5 (361.8)    389.0 (362.3)    389.1 (362.4)    389.2 (362.5)
389.3 (362.6)    389.8 (363.0)    389.9 (363.1)    390.0 (363.2)
390.1 (363.3)    390.7 (363.9)    390.8 (364.0)    390.9 (364.1)
391.0 (364.1)    391.5 (364.6)    391.6 (364.7)    391.7 (364.8)
391.8 (364.9)    392.3 (365.4)    392.4 (365.5)    392.5 (365.5)
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393.4 (366.4)    394.0 (366.9)    394.1 (367.0)    394.2 (367.1)
394.3 (367.2)    394.8 (367.7)    394.9 (367.8)    395.0 (367.9)
395.1 (368.0)    395.6 (368.4)    395.7 (368.5)    395.8 (368.6)
395.9 (368.7)    396.4 (369.2)    396.5 (369.3)    396.6 (369.4)
396.7 (369.5)    397.3 (370.0)    397.4 (370.1)    397.5 (370.2)
397.6 (370.3)    398.1 (370.8)    398.2 (370.9)    398.3 (370.9)
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399.2 (371.8)    399.7 (372.2)    399.8 (372.3)    399.9 (372.4)
400.0 (372.5)    400.6 (373.1)    400.7 (373.2)    400.8 (373.3)
400.9 (373.4)    401.4 (373.8)    401.5 (373.9)    401.6 (374.0)
401.7 (374.1)    402.2 (374.6)    402.3 (374.7)    402.4 (374.8)
402.5 (374.9)    403.0 (375.3)    403.1 (375.4)    403.2 (375.5)
403.3 (375.6)    403.4 (375.7)    403.9 (376.2)    404.0 (376.3)
404.1 (376.3)    404.2 (376.4)    404.7 (376.9)    404.8 (377.0)
404.9 (377.1)    405.0 (377.2)    405.5 (377.7)    405.6 (377.7)
405.7 (377.8)    405.8 (377.9)    406.3 (378.4)    406.4 (378.5)
406.5 (378.6)    406.6 (378.7)    406.7 (378.8)    407.2 (379.2)
407.3 (379.3)    407.4 (379.4)    407.5 (379.5)    408.0 (380.0)
408.1 (380.1)    408.2 (380.2)    408.3 (380.3)    408.8 (380.7)
408.9 (380.8)    409.0 (380.9)    409.1 (381.0)    409.6 (381.5)
409.7 (381.6)    409.8 (381.7)    409.9 (381.7)    410.0 (381.8)
410.5 (382.3)    410.6 (382.4)    410.7 (382.5)    410.8 (382.6)
411.3 (383.1)    411.4 (383.1)    411.5 (383.2)    411.6 (383.3)
412.1 (383.8)    412.2 (383.9)    412.3 (384.0)    412.4 (384.1)
412.9 (384.5)    413.0 (384.6)    413.1 (384.7)    413.2 (384.8)
413.3 (384.9)    413.8 (385.4)    413.9 (385.5)    414.0 (385.6)
414.1 (385.7)    414.6 (386.1)    414.7 (386.2)    414.8 (386.3)
414.9 (386.4)    415.4 (386.9)    415.5 (387.0)    415.6 (387.1)
415.7 (387.2)    416.3 (387.7)    416.4 (387.8)    416.5 (387.9)
416.6 (388.0)    417.1 (388.5)    417.2 (388.5)    417.3 (388.6)
417.4 (388.7)    417.9 (389.2)    418.0 (389.3)    418.1 (389.4)
418.2 (389.5)    418.7 (389.9)    418.8 (390.0)    418.9 (390.1)
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419.9 (391.1)    420.4 (391.5)    420.5 (391.6)    420.6 (391.7)
420.7 (391.8)    421.2 (392.3)    421.3 (392.4)    421.4 (392.5)
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422.3 (393.3)    422.9 (393.9)    423.0 (393.9)    423.1 (394.0)
423.2 (394.1)    423.7 (394.6)    423.8 (394.7)    423.9 (394.8)
424.0 (394.9)    424.5 (395.3)    424.6 (395.4)    424.7 (395.5)
424.8 (395.6)    425.3 (396.1)    425.4 (396.2)    425.5 (396.3)
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426.5 (397.2)    427.0 (397.7)    427.1 (397.8)    427.2 (397.9)
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428.1 (398.7)    428.6 (399.2)    428.7 (399.3)    428.8 (399.4)
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429.7 (400.2)    429.8 (400.3)    430.3 (400.7)    430.4 (400.8)
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438.9 (408.8)    439.4 (409.2)    439.5 (409.3)    439.6 (409.4)
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442.2 (411.8)    442.7 (412.3)    442.8 (412.4)    442.9 (412.5)
443.0 (412.6)    443.5 (413.0)    443.6 (413.1)    443.7 (413.2)
443.8 (413.3)    444.3 (413.8)    444.4 (413.9)    444.5 (414.0)
444.6 (414.1)    445.2 (414.6)    445.3 (414.7)    445.4 (414.8)
445.5 (414.9)    446.0 (415.4)    446.1 (415.5)    446.2 (415.6)
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446.3 (415.6)    446.8 (416.1)    446.9 (416.2)    447.0 (416.3)
447.1 (416.4)    447.6 (416.9)    447.7 (417.0)    447.8 (417.0)
447.9 (417.1)    448.5 (417.7)    448.6 (417.8)    448.7 (417.9)
448.8 (418.0)    449.3 (418.4)    449.4 (418.5)    449.5 (418.6)
449.6 (418.7)    450.1 (419.2)    450.2 (419.3)    450.3 (419.4)
450.4 (419.5)    450.9 (419.9)    451.0 (420.0)    451.1 (420.1)
451.2 (420.2)    451.8 (420.8)    451.9 (420.9)    452.0 (421.0)
452.1 (421.1)    452.6 (421.5)    452.7 (421.6)    452.8 (421.7)
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466.9 (434.8)    467.5 (435.4)    467.6 (435.5)    467.7 (435.6)
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485.7 (452.3)    485.8 (452.4)    485.9 (452.5)    486.4 (453.0)
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490.9 (457.2)    491.4 (457.7)    491.5 (457.7)    491.6 (457.8)
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494.2 (460.3)    494.7 (460.7)    494.8 (460.8)    494.9 (460.9)
495.0 (461.0)    495.5 (461.5)    495.6 (461.6)    495.7 (461.7)
495.8 (461.7)    496.4 (462.3)    496.5 (462.4)    496.6 (462.5)
496.7 (462.6)    497.2 (463.1)    497.3 (463.1)    497.4 (463.2)
497.5 (463.3)    498.0 (463.8)    498.1 (463.9)    498.2 (464.0)
498.3 (464.1)    498.8 (464.5)    498.9 (464.6)    499.0 (464.7)
499.1 (464.8)    499.7 (465.4)    499.8 (465.5)    499.9 (465.6)
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500.8 (466.4)    501.3 (466.9)    501.4 (467.0)    501.5 (467.1)
501.6 (467.2)    502.1 (467.6)    502.2 (467.7)    502.3 (467.8)
502.4 (467.9)    503.0 (468.5)    503.1 (468.5)    503.2 (468.6)
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512.9 (477.7)    513.0 (477.8)    513.1 (477.9)    513.2 (478.0)
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515.7 (480.3)    516.2 (480.7)    516.3 (480.8)    516.4 (480.9)
516.5 (481.0)    517.0 (481.5)    517.1 (481.6)    517.2 (481.7)
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540.9 (503.8)    541.0 (503.8)    541.1 (503.9)    541.2 (504.0)
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542.9 (505.6)    543.4 (506.1)    543.5 (506.2)    543.6 (506.3)
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552.0 (514.1)    552.5 (514.6)    552.6 (514.6)    552.7 (514.7)
552.8 (514.8)    553.3 (515.3)    553.4 (515.4)    553.5 (515.5)
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565.7 (526.8)    565.8 (526.9)    565.9 (527.0)    566.0 (527.1)
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566.9 (528.0)    567.4 (528.4)    567.5 (528.5)    567.6 (528.6)
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568.5 (529.5)    569.0 (529.9)    569.1 (530.0)    569.2 (530.1)
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574.3 (534.9)    574.8 (535.3)    574.9 (535.4)    575.0 (535.5)
575.1 (535.6)    575.6 (536.1)    575.7 (536.2)    575.8 (536.3)
575.9 (536.3)    576.5 (536.9)    576.6 (537.0)    576.7 (537.1)
576.8 (537.2)    577.3 (537.7)    577.4 (537.7)    577.5 (537.8)
577.6 (537.9)    578.1 (538.4)    578.2 (538.5)    578.3 (538.6)
578.4 (538.7)    578.9 (539.1)    579.0 (539.2)    579.1 (539.3)
579.2 (539.4)    579.8 (540.0)    579.9 (540.1)    580.0 (540.2)
580.1 (540.3)    580.6 (540.7)    580.7 (540.8)    580.8 (540.9)
580.9 (541.0)    581.4 (541.5)    581.5 (541.6)    581.6 (541.7)
581.7 (541.8)    582.2 (542.2)    582.3 (542.3)    582.4 (542.4)
582.5 (542.5)    582.6 (542.6)    583.1 (543.1)    583.2 (543.1)
583.3 (543.2)    583.4 (543.3)    583.9 (543.8)    584.0 (543.9)
584.1 (544.0)    584.2 (544.1)    584.7 (544.5)    584.8 (544.6)
584.9 (544.7)    585.0 (544.8)    585.5 (545.3)    585.6 (545.4)
585.7 (545.5)    585.8 (545.6)    585.9 (545.7)    586.4 (546.1)
586.5 (546.2)    586.6 (546.3)    586.7 (546.4)    587.2 (546.9)
587.3 (547.0)    587.4 (547.1)    587.5 (547.2)    588.0 (547.6)
588.1 (547.7)    588.2 (547.8)    588.3 (547.9)    588.8 (548.4)
588.9 (548.5)    589.0 (548.5)    589.1 (548.6)    589.2 (548.7)
589.7 (549.2)    589.8 (549.3)    589.9 (549.4)    590.0 (549.5)
590.5 (549.9)    590.6 (550.0)    590.7 (550.1)    590.8 (550.2)
591.3 (550.7)    591.4 (550.8)    591.5 (551.0)    591.6 (551.0)
592.1 (551.4)    592.2 (551.5)    592.3 (551.6)    592.4 (551.7)
592.5 (551.8)    593.0 (552.3)    593.1 (552.4)    593.2 (552.5)
593.3 (552.6)    593.8 (553.0)    593.9 (553.1)    594.0 (553.2)
594.1 (553.3)    594.6 (553.8)    594.7 (553.9)    594.8 (554.0)
594.9 (554.0)    595.5 (554.6)    595.6 (554.7)    595.7 (554.8)
595.8 (554.9)    596.3 (555.3)    596.4 (555.4)    596.5 (555.5)
596.6 (555.6)    597.1 (556.1)    597.2 (556.2)    597.3 (556.3)
597.4 (556.4)    597.9 (556.8)    598.0 (556.9)    598.1 (557.0)
598.2 (557.1)    598.8 (557.7)    598.9 (557.8)    599.0 (557.9)
599.1 (558.0)    599.6 (558.4)    599.7 (558.5)    599.8 (558.6)
599.9 (558.7)    600.4 (559.2)    600.5 (559.3)    600.6 (559.4)
600.7 (559.4)    601.2 (559.9)    601.3 (560.0)    601.4 (560.1)
601.5 (560.2)    602.1 (560.7)    602.2 (560.8)    602.3 (560.9)
602.4 (561.0)    602.9 (561.5)    603.0 (561.6)    603.1 (561.7)
603.2 (561.8)    603.7 (562.2)    603.8 (562.3)    603.9 (562.4)
604.0 (562.5)    604.5 (563.0)    604.6 (563.1)    604.7 (563.2)
604.8 (563.3)    605.4 (563.8)    605.5 (563.9)    605.6 (564.0)
605.7 (564.1)    606.2 (564.6)    606.3 (564.7)    606.4 (564.8)
606.5 (564.8)    607.0 (565.3)    607.1 (565.4)    607.2 (565.5)
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607.3 (565.6)    607.8 (566.1)    607.9 (566.2)    608.0 (566.2)
608.1 (566.3)    608.2 (566.4)    608.7 (566.9)    608.8 (567.0)
608.9 (567.1)    609.0 (567.2)    609.5 (567.6)    609.6 (567.7)
609.7 (567.8)    609.8 (567.9)    610.3 (568.4)    610.4 (568.5)
610.5 (568.6)    610.6 (568.7)    611.1 (569.1)    611.2 (569.2)
611.3 (569.3)    611.4 (569.4)    611.5 (569.5)    612.0 (570.0)
612.1 (570.1)    612.2 (570.2)    612.3 (570.2)    612.8 (570.7)
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614.5 (572.3)    614.6 (572.4)    614.7 (572.5)    614.8 (572.6)
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618.1 (575.7)    618.6 (576.1)    618.7 (576.2)    618.8 (576.3)
618.9 (576.4)    619.4 (576.9)    619.5 (577.0)    619.6 (577.0)
619.7 (577.1)    620.2 (577.6)    620.3 (577.7)    620.4 (577.8)
620.5 (577.9)    621.1 (578.4)    621.2 (578.5)    621.3 (578.6)
621.4 (578.7)    621.9 (579.2)    622.0 (579.3)    622.1 (579.4)
622.2 (579.5)    622.7 (579.9)    622.8 (580.0)    622.9 (580.1)
623.0 (580.2)    623.5 (580.7)    623.6 (580.8)    623.7 (580.9)
623.8 (581.0)    624.4 (581.5)    624.5 (581.6)    624.6 (581.7)
624.7 (581.8)    625.2 (582.3)    625.3 (582.4)    625.4 (582.4)
625.5 (582.5)    626.0 (583.0)    626.1 (583.1)    626.2 (583.2)
626.3 (583.3)    626.8 (583.8)    626.9 (583.8)    627.0 (583.9)
627.1 (584.0)    627.7 (584.6)    627.8 (584.7)    627.9 (584.8)
628.0 (584.9)    628.5 (585.3)    628.6 (585.4)    628.7 (585.5)
628.8 (585.6)    629.3 (586.1)    629.4 (586.2)    629.5 (586.3)
629.6 (586.4)    630.1 (586.8)    630.2 (586.9)    630.3 (587.0)
630.4 (587.1)    631.0 (587.7)    631.1 (587.8)    631.2 (587.9)
631.3 (587.9)    631.8 (588.4)    631.9 (588.5)    632.0 (588.6)
632.1 (588.7)    632.6 (589.2)    632.7 (589.2)    632.8 (589.3)
632.9 (589.4)    633.4 (589.9)    633.5 (590.0)    633.6 (590.1)
633.7 (590.2)    633.8 (590.3)    634.3 (590.7)    634.4 (590.8)
634.5 (590.9)    634.6 (591.0)    635.1 (591.5)    635.2 (591.6)
635.3 (591.7)    635.4 (591.8)    635.9 (592.2)    636.0 (592.3)
636.1 (592.4)    636.2 (592.5)    636.7 (593.0)    636.8 (593.1)
636.9 (593.2)    637.0 (593.3)    637.1 (593.3)    637.6 (593.8)
637.7 (593.9)    637.8 (594.0)    637.9 (594.1)    638.4 (594.6)
638.5 (594.6)    638.6 (594.7)    638.7 (594.8)    639.2 (595.3)
639.3 (595.4)    639.4 (595.5)    639.5 (595.6)    640.0 (596.0)
640.1 (596.1)    640.2 (596.2)    640.3 (596.3)    640.4 (596.4)
640.9 (596.9)    641.0 (597.0)    641.1 (597.1)    641.2 (597.2)
641.7 (597.6)    641.8 (597.7)    641.9 (597.8)    642.0 (597.9)
642.5 (598.4)    642.6 (598.5)    642.7 (598.6)    642.8 (598.7)
643.3 (599.1)    643.4 (599.2)    643.5 (599.3)    643.6 (599.4)
643.7 (599.5)    644.2 (600.0)    644.3 (600.1)    644.4 (600.1)
644.5 (600.2)    645.0 (600.7)    645.1 (600.8)    645.2 (600.9)
645.3 (601.0)    645.8 (601.4)    645.9 (601.5)    646.0 (601.6)
646.1 (601.7)    646.7 (602.3)    646.8 (602.4)    646.9 (602.5)
647.0 (602.6)    647.5 (603.0)    647.6 (603.1)    647.7 (603.2)
647.8 (603.3)    648.3 (603.8)    648.4 (603.9)    648.5 (604.0)
648.6 (604.1)    649.1 (604.5)    649.2 (604.6)    649.3 (604.7)
649.4 (604.8)    650.0 (605.4)    650.1 (605.5)    650.2 (605.5)
650.3 (605.6)    650.8 (606.1)    650.9 (606.2)    651.0 (606.3)
651.1 (606.4)    651.6 (606.8)    651.7 (606.9)    651.8 (607.0)
651.9 (607.1)    652.4 (607.6)    652.5 (607.7)    652.6 (607.8)
652.7 (607.9)    653.3 (608.4)    653.4 (608.5)    653.5 (608.6)
653.6 (608.7)    654.1 (609.2)    654.2 (609.3)    654.3 (609.4)
654.4 (609.5)    654.9 (609.9)    655.0 (610.0)    655.1 (610.1)
655.2 (610.2)    655.7 (610.7)    655.8 (610.8)    655.9 (610.9)
656.0 (610.9)    656.6 (611.5)    656.7 (611.6)    656.8 (611.7)
656.9 (611.8)    657.4 (612.3)    657.5 (612.3)    657.6 (612.4)
657.7 (612.5)    658.2 (613.0)    658.3 (613.1)    658.4 (613.2)
658.5 (613.3)    659.0 (613.7)    659.1 (613.8)    659.2 (613.9)
659.3 (614.0)    659.4 (614.1)    659.9 (614.6)    660.0 (614.7)
660.1 (614.8)    660.2 (614.9)    660.7 (615.3)    660.8 (615.4)
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660.9 (615.5)    661.0 (615.6)    661.5 (616.1)    661.6 (616.2)
661.7 (616.3)    661.8 (616.3)    662.3 (616.8)    662.4 (616.9)
662.5 (617.0)    662.6 (617.1)    662.7 (617.2)    663.2 (617.7)
663.3 (617.7)    663.4 (617.8)    663.5 (617.9)    664.0 (618.4)
664.1 (618.5)    664.2 (618.6)    664.3 (618.7)    664.8 (619.1)
664.9 (619.2)    665.0 (619.3)    665.1 (619.4)    665.6 (619.9)
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666.5 (620.7)    666.6 (620.8)    666.7 (620.9)    666.8 (621.0)
667.3 (621.5)    667.4 (621.6)    667.5 (621.7)    667.6 (621.8)
668.1 (622.2)    668.2 (622.3)    668.3 (622.4)    668.4 (622.5)
668.9 (623.0)    669.0 (623.1)    669.1 (623.1)    669.2 (623.2)
669.3 (623.3)    669.8 (623.8)    669.9 (623.9)    670.0 (624.0)
670.1 (624.1)    670.6 (624.5)    670.7 (624.6)    670.8 (624.7)
670.9 (624.8)    671.4 (625.3)    671.5 (625.4)    671.6 (625.5)
671.7 (625.6)    672.3 (626.1)    672.4 (626.2)    672.5 (626.3)
672.6 (626.4)    673.1 (626.9)    673.2 (627.0)    673.3 (627.1)
673.4 (627.2)    673.9 (627.6)    674.0 (627.7)    674.1 (627.8)
674.2 (627.9)    674.7 (628.4)    674.8 (628.5)    674.9 (628.5)
675.0 (628.6)    675.6 (629.2)    675.7 (629.3)    675.8 (629.4)
675.9 (629.5)    676.4 (629.9)    676.5 (630.0)    676.6 (630.1)
676.7 (630.2)    677.2 (630.7)    677.3 (630.8)    677.4 (630.9)
677.5 (631.0)    678.0 (631.4)    678.1 (631.5)    678.2 (631.6)
678.3 (631.7)    678.9 (632.3)    679.0 (632.4)    679.1 (632.5)
679.2 (632.6)    679.7 (633.0)    679.8 (633.1)    679.9 (633.2)
680.0 (633.3)    680.5 (633.8)    680.6 (633.9)    680.7 (634.0)
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681.6 (634.8)    682.2 (635.3)    682.3 (635.4)    682.4 (635.5)
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683.3 (636.4)    683.8 (636.8)    683.9 (636.9)    684.0 (637.0)
684.1 (637.1)    684.6 (637.6)    684.7 (637.7)    684.8 (637.8)
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686.5 (639.4)    686.6 (639.4)    687.1 (639.9)    687.2 (640.0)
687.3 (640.1)    687.4 (640.2)    687.9 (640.7)    688.0 (640.7)
688.1 (640.8)    688.2 (640.9)    688.3 (641.0)    688.8 (641.5)
688.9 (641.6)    689.0 (641.7)    689.1 (641.8)    689.6 (642.2)
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690.5 (643.1)    690.6 (643.2)    690.7 (643.3)    691.2 (643.7)
691.3 (643.8)    691.4 (643.9)    691.5 (644.0)    691.6 (644.1)
692.1 (644.6)    692.2 (644.7)    692.3 (644.8)    692.4 (644.8)
692.9 (645.3)    693.0 (645.4)    693.1 (645.5)    693.2 (645.6)
693.7 (646.1)    693.8 (646.2)    693.9 (646.2)    694.0 (646.3)
694.5 (646.8)    694.6 (646.9)    694.7 (647.0)    694.8 (647.1)
694.9 (647.2)    695.4 (647.6)    695.5 (647.7)    695.6 (647.8)
695.7 (647.9)    696.2 (648.4)    696.3 (648.5)    696.4 (648.6)
696.5 (648.7)    697.0 (649.1)    697.1 (649.2)    697.2 (649.3)
697.3 (649.4)    697.9 (650.0)    698.0 (650.1)    698.1 (650.2)
698.2 (650.2)    698.7 (650.7)    698.8 (650.8)    698.9 (650.9)
699.0 (651.0)    699.5 (651.5)    699.6 (651.6)    699.7 (651.6)
699.8 (651.7)    700.3 (652.2)    700.4 (652.3)    700.5 (652.4)
700.6 (652.5)    701.2 (653.0)    701.3 (653.1)    701.4 (653.2)
701.5 (653.3)    702.0 (653.8)    702.1 (653.9)    702.2 (654.0)
702.3 (654.1)    702.8 (654.5)    702.9 (654.6)    703.0 (654.7)
703.1 (654.8)    703.6 (655.3)    703.7 (655.4)    703.8 (655.5)
703.9 (655.6)    704.5 (656.1)    704.6 (656.2)    704.7 (656.3)
704.8 (656.4)    705.3 (656.9)    705.4 (657.0)    705.5 (657.0)
705.6 (657.1)    706.1 (657.6)    706.2 (657.7)    706.3 (657.8)
706.4 (657.9)    706.9 (658.4)    707.0 (658.4)    707.1 (658.5)
707.2 (658.6)    707.8 (659.2)    707.9 (659.3)    708.0 (659.4)
708.1 (659.5)    708.6 (659.9)    708.7 (660.0)    708.8 (660.1)
708.9 (660.2)    709.4 (660.7)    709.5 (660.8)    709.6 (660.9)
709.7 (661.0)    710.2 (661.4)    710.3 (661.5)    710.4 (661.6)
710.5 (661.7)    710.6 (661.8)    711.1 (662.3)    711.2 (662.4)
711.3 (662.4)    711.4 (662.5)    711.9 (663.0)    712.0 (663.1)
712.1 (663.2)    712.2 (663.3)    712.7 (663.8)    712.8 (663.8)
712.9 (663.9)    713.0 (664.0)    713.5 (664.5)    713.6 (664.6)
713.7 (664.7)    713.8 (664.8)    713.9 (664.9)    714.4 (665.3)
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715.3 (666.2)   715.4 (666.3)   715.5 (666.4)   716.0 (666.8)
716.1 (666.9)   716.2 (667.0)   716.3 (667.1)   716.8 (667.6)
716.9 (667.7)   717.0 (667.8)   717.1 (667.9)   717.2 (667.9)
717.7 (668.4)   717.8 (668.5)   717.9 (668.6)   718.0 (668.7)
718.5 (669.2)   718.6 (669.2)   718.7 (669.3)   718.8 (669.4)
719.3 (669.9)   719.4 (670.0)   719.5 (670.1)   719.6 (670.2)
720.1 (670.6)   720.2 (670.7)   720.3 (670.8)   720.4 (670.9)
720.5 (671.0)   721.0 (671.5)   721.1 (671.6)   721.2 (671.7)
721.3 (671.8)   721.8 (672.2)   721.9 (672.3)   722.0 (672.4)
722.1 (672.5)   722.6 (673.0)   722.7 (673.1)   722.8 (673.2)
722.9 (673.3)   723.5 (673.8)   723.6 (673.9)   723.7 (674.0)
723.8 (674.1)   724.3 (674.6)   724.4 (674.7)   724.5 (674.7)
724.6 (674.8)   725.1 (675.3)   725.2 (675.4)   725.3 (675.5)
725.4 (675.6)   725.9 (676.0)   726.0 (676.1)   726.1 (676.2)
726.2 (676.3)   726.8 (676.9)   726.9 (677.0)   727.0 (677.1)
727.1 (677.2)   727.6 (677.6)   727.7 (677.7)   727.8 (677.8)
727.9 (677.9)   728.4 (678.4)   728.5 (678.5)   728.6 (678.6)
728.7 (678.7)   729.2 (679.1)   729.3 (679.2)   729.4 (679.3)
729.5 (679.4)   730.1 (680.0)   730.2 (680.1)   730.3 (680.1)
730.4 (680.2)   730.9 (680.7)   731.0 (680.8)   731.1 (680.9)
731.2 (681.0)   731.7 (681.4)   731.8 (681.5)   731.9 (681.6)
732.0 (681.7)   732.5 (682.2)   732.6 (682.3)   732.7 (682.4)
732.8 (682.5)   733.4 (683.0)   733.5 (683.1)   733.6 (683.2)
733.7 (683.3)   734.2 (683.8)   734.3 (683.9)   734.4 (684.0)
734.5 (684.1)   735.0 (684.5)   735.1 (684.6)   735.2 (684.7)
735.3 (684.8)   735.8 (685.3)   735.9 (685.4)   736.0 (685.5)
736.1 (685.5)   736.2 (685.6)   736.7 (686.1)   736.8 (686.2)
736.9 (686.3)   737.0 (686.4)   737.5 (686.9)   737.6 (686.9)
737.7 (687.0)   737.8 (687.1)   738.3 (687.6)   738.4 (687.7)
738.5 (687.8)   738.6 (687.9)   739.1 (688.3)   739.2 (688.4)
739.3 (688.5)   739.4 (688.6)   739.5 (688.7)   740.0 (689.2)
740.1 (689.3)   740.2 (689.4)   740.3 (689.5)   740.8 (689.9)
740.9 (690.0)   741.0 (690.1)   741.1 (690.2)   741.6 (690.7)
741.7 (690.8)   741.8 (690.9)   741.9 (690.9)   742.4 (691.4)
742.5 (691.5)   742.6 (691.6)   742.7 (691.7)   742.8 (691.8)
743.3 (692.3)   743.4 (692.3)   743.5 (692.4)   743.6 (692.5)
744.1 (693.0)   744.2 (693.1)   744.3 (693.2)   744.4 (693.3)
744.9 (693.7)   745.0 (693.8)   745.1 (693.9)   745.2 (694.0)
745.7 (694.5)   745.8 (694.6)   745.9 (694.7)   746.0 (694.8)
746.1 (694.9)   746.6 (695.3)   746.7 (695.4)   746.8 (695.5)
746.9 (695.6)   747.4 (696.1)   747.5 (696.2)   747.6 (696.3)
747.7 (696.3)   748.2 (696.8)   748.3 (696.9)   748.4 (697.0)
748.5 (697.1)   749.1 (697.7)   749.2 (697.7)   749.3 (697.8)
749.4 (697.9)   749.9 (698.4)   750.0 (698.5)   750.1 (698.6)
750.2 (698.7)   750.7 (699.1)   750.8 (699.2)   750.9 (699.3)
751.0 (699.4)   751.5 (699.9)   751.6 (700.0)   751.7 (700.1)
751.8 (700.2)   752.4 (700.7)   752.5 (700.8)   752.6 (700.9)
752.7 (701.0)   753.2 (701.5)   753.3 (701.6)   753.4 (701.7)
753.5 (701.8)   754.0 (702.2)   754.1 (702.3)   754.2 (702.4)
754.3 (702.5)   754.8 (703.0)   754.9 (703.1)   755.0 (703.1)
755.1 (703.2)   755.7 (703.8)   755.8 (703.9)   755.9 (704.0)
756.0 (704.1)   756.5 (704.5)   756.6 (704.6)   756.7 (704.7)
756.8 (704.8)   757.3 (705.3)   757.4 (705.4)   757.5 (705.5)
757.6 (705.6)   758.1 (706.0)   758.2 (706.1)   758.3 (706.2)
758.4 (706.3)   759.0 (706.9)   759.1 (707.0)   759.2 (707.1)
759.3 (707.2)   759.8 (707.6)   759.9 (707.7)   760.0 (707.8)
760.1 (707.9)   760.6 (708.4)   760.7 (708.5)   760.8 (708.6)
760.9 (708.6)   761.4 (709.1)   761.5 (709.2)   761.6 (709.3)
761.7 (709.4)   761.8 (709.5)   762.3 (709.9)   762.4 (710.0)
762.5 (710.1)   762.6 (710.2)   763.1 (710.7)   763.2 (710.8)
763.3 (710.9)   763.4 (711.0)   763.9 (711.4)   764.0 (711.5)
764.1 (711.6)   764.2 (711.7)   764.7 (712.2)   764.8 (712.3)
764.9 (712.4)   765.0 (712.5)   765.1 (712.6)   765.6 (713.0)
765.7 (713.1)   765.8 (713.2)   765.9 (713.3)   766.4 (713.8)
766.5 (713.9)   766.6 (714.0)   766.7 (714.0)   767.2 (714.5)
767.3 (714.6)   767.4 (714.7)   767.5 (714.8)   768.0 (715.3)
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768.1 (715.3)    768.2 (715.4)    768.3 (715.5)    768.4 (715.6)
768.9 (716.1)    769.0 (716.2)    769.1 (716.3)    769.2 (716.4)
769.7 (716.8)    769.8 (716.9)    769.9 (717.0)    770.0 (717.1)
770.5 (717.6)    770.6 (717.7)    770.7 (717.8)    770.8 (717.9)
771.3 (718.3)    771.4 (718.4)    771.5 (718.5)    771.6 (718.6)
771.7 (718.7)    772.2 (719.2)    772.3 (719.3)    772.4 (719.4)
772.5 (719.4)    773.0 (719.9)    773.1 (720.0)    773.2 (720.1)
773.3 (720.2)    773.8 (720.7)    773.9 (720.8)    774.0 (720.8)
774.1 (720.9)    774.7 (721.5)    774.8 (721.6)    774.9 (721.7)
775.0 (721.8)    775.5 (722.2)    775.6 (722.3)    775.7 (722.4)
775.8 (722.5)    776.3 (723.0)    776.4 (723.1)    776.5 (723.2)
776.6 (723.3)    777.1 (723.7)    777.2 (723.8)    777.3 (723.9)
777.4 (724.0)    778.0 (724.6)    778.1 (724.7)    778.2 (724.8)
778.3 (724.8)    778.8 (725.3)    778.9 (725.4)    779.0 (725.5)
779.1 (725.6)    779.6 (726.1)    779.7 (726.2)    779.8 (726.2)
779.9 (726.3)    780.4 (726.8)    780.5 (726.9)    780.6 (727.0)
780.7 (727.1)    781.3 (727.6)    781.4 (727.7)    781.5 (727.8)
781.6 (727.9)    782.1 (728.4)    782.2 (728.5)    782.3 (728.6)
782.4 (728.7)    782.9 (729.1)    783.0 (729.2)    783.1 (729.3)
783.2 (729.4)    783.7 (729.9)    783.8 (730.0)    783.9 (730.1)
784.0 (730.2)    784.6 (730.7)    784.7 (730.8)    784.8 (730.9)
784.9 (731.0)    785.4 (731.5)    785.5 (731.6)    785.6 (731.6)
785.7 (731.7)    786.2 (732.2)    786.3 (732.3)    786.4 (732.4)
786.5 (732.5)    787.0 (733.0)    787.1 (733.0)    787.2 (733.1)
787.3 (733.2)    787.4 (733.3)    787.9 (733.8)    788.0 (733.9)
788.1 (734.0)    788.2 (734.1)    788.7 (734.5)    788.8 (734.6)
788.9 (734.7)    789.0 (734.8)    789.5 (735.3)    789.6 (735.4)
789.7 (735.5)    789.8 (735.6)    790.3 (736.0)    790.4 (736.1)
790.5 (736.2)    790.6 (736.3)    790.7 (736.4)    791.2 (736.9)
791.3 (737.0)    791.4 (737.0)    791.5 (737.1)    792.0 (737.6)
792.1 (737.7)    792.2 (737.8)    792.3 (737.9)    792.8 (738.4)
792.9 (738.4)    793.0 (738.5)    793.1 (738.6)    793.6 (739.1)
793.7 (739.2)    793.8 (739.3)    793.9 (739.4)    794.0 (739.5)
794.5 (739.9)    794.6 (740.0)    794.7 (740.1)    794.8 (740.2)
795.3 (740.7)    795.4 (740.8)    795.5 (740.9)    795.6 (741.0)
796.1 (741.4)    796.2 (741.5)    796.3 (741.6)    796.4 (741.7)
796.9 (742.2)    797.0 (742.3)    797.1 (742.4)    797.2 (742.5)
797.3 (742.5)    797.8 (743.0)    797.9 (743.1)    798.0 (743.2)
798.1 (743.3)    798.6 (743.8)    798.7 (743.8)    798.8 (743.9)
798.9 (744.0)    799.4 (744.5)    799.5 (744.6)    799.6 (744.7)
799.7 (744.8)    800.3 (745.3)    800.4 (745.4)    800.5 (745.5)
800.6 (745.6)    801.1 (746.1)    801.2 (746.2)    801.3 (746.3)
801.4 (746.4)    801.9 (746.8)    802.0 (746.9)    802.1 (747.0)
802.2 (747.1)    802.7 (747.6)    802.8 (747.7)    802.9 (747.8)
803.0 (747.9)    803.6 (748.4)    803.7 (748.5)    803.8 (748.6)
803.9 (748.7)    804.4 (749.2)    804.5 (749.2)    804.6 (749.3)
804.7 (749.4)    805.2 (749.9)    805.3 (750.0)    805.4 (750.1)
805.5 (750.2)    806.0 (750.6)    806.1 (750.7)    806.2 (750.8)
806.3 (750.9)    806.9 (751.5)    807.0 (751.6)    807.1 (751.7)
807.2 (751.8)    807.7 (752.2)    807.8 (752.3)    807.9 (752.4)
808.0 (752.5)    808.5 (753.0)    808.6 (753.1)    808.7 (753.2)
808.8 (753.3)    809.3 (753.7)    809.4 (753.8)    809.5 (753.9)
809.6 (754.0)    810.2 (754.6)    810.3 (754.7)    810.4 (754.7)
810.5 (754.8)    811.0 (755.3)    811.1 (755.4)    811.2 (755.5)
811.3 (755.6)    811.8 (756.0)    811.9 (756.1)    812.0 (756.2)
812.1 (756.3)    812.6 (756.8)    812.7 (756.9)    812.8 (757.0)
812.9 (757.1)    813.0 (757.2)    813.5 (757.6)    813.6 (757.7)
813.7 (757.8)    813.8 (757.9)    814.3 (758.4)    814.4 (758.5)
814.5 (758.6)    814.6 (758.7)    815.1 (759.1)    815.2 (759.2)
815.3 (759.3)    815.4 (759.4)    815.9 (759.9)    816.0 (760.0)
816.1 (760.1)    816.2 (760.1)    816.3 (760.2)    816.8 (760.7)
816.9 (760.8)    817.0 (760.9)    817.1 (761.0)    817.6 (761.4)
817.7 (761.5)    817.8 (761.6)    817.9 (761.7)    818.4 (762.2)
818.5 (762.3)    818.6 (762.4)    818.7 (762.5)    819.2 (762.9)
819.3 (763.0)    819.4 (763.1)    819.5 (763.2)    819.6 (763.3)
820.1 (763.8)    820.2 (763.9)    820.3 (764.0)    820.4 (764.1)
820.9 (764.5)    821.0 (764.6)    821.1 (764.7)    821.2 (764.8)
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821.7 (765.3)   821.8 (765.4)   821.9 (765.5)   822.0 (765.5)
822.5 (766.0)   822.6 (766.1)   822.7 (766.2)   822.8 (766.3)
822.9 (766.4)   823.4 (766.9)   823.5 (766.9)   823.6 (767.0)
823.7 (767.1)   824.2 (767.6)   824.3 (767.7)   824.4 (767.8)
824.5 (767.9)   825.0 (768.3)   825.1 (768.4)   825.2 (768.5)
825.3 (768.6)   825.9 (769.2)   826.0 (769.3)   826.1 (769.4)
826.2 (769.5)   826.7 (769.9)   826.8 (770.0)   826.9 (770.1)
827.0 (770.2)   827.5 (770.7)   827.6 (770.8)   827.7 (770.9)
827.8 (770.9)   828.3 (771.4)   828.4 (771.5)   828.5 (771.6)
828.6 (771.7)   829.2 (772.3)   829.3 (772.3)   829.4 (772.4)
829.5 (772.5)   830.0 (773.0)   830.1 (773.1)   830.2 (773.2)
830.3 (773.3)   830.8 (773.7)   830.9 (773.8)   831.0 (773.9)
831.1 (774.0)   831.6 (774.5)   831.7 (774.6)   831.8 (774.7)
831.9 (774.8)   832.5 (775.3)   832.6 (775.4)   832.7 (775.5)
832.8 (775.6)   833.3 (776.1)   833.4 (776.2)   833.5 (776.3)
833.6 (776.4)   834.1 (776.8)   834.2 (776.9)   834.3 (777.0)
834.4 (777.1)   834.9 (777.6)   835.0 (777.7)   835.1 (777.7)
835.2 (777.8)   835.8 (778.4)   835.9 (778.5)   836.0 (778.6)
836.1 (778.7)   836.6 (779.1)   836.7 (779.2)   836.8 (779.3)
836.9 (779.4)   837.4 (779.9)   837.5 (780.0)   837.6 (780.1)
837.7 (780.2)   838.2 (780.6)   838.3 (780.7)   838.4 (780.8)
838.5 (780.9)   838.6 (781.0)   839.1 (781.5)   839.2 (781.6)
839.3 (781.7)   839.4 (781.8)   839.9 (782.2)   840.0 (782.3)
840.1 (782.4)   840.2 (782.5)   840.7 (783.0)   840.8 (783.1)
840.9 (783.1)   841.0 (783.2)   841.5 (783.7)   841.6 (783.8)
841.7 (783.9)   841.8 (784.0)   841.9 (784.1)   842.4 (784.5)
842.5 (784.6)   842.6 (784.7)   842.7 (784.8)   843.2 (785.3)
843.3 (785.4)   843.4 (785.5)   843.5 (785.6)   844.0 (786.0)
844.1 (786.1)   844.2 (786.2)   844.3 (786.3)   844.8 (786.8)
844.9 (786.9)   845.0 (787.0)   845.1 (787.1)   845.2 (787.2)
845.7 (787.6)   845.8 (787.7)   845.9 (787.8)   846.0 (787.9)
846.5 (788.4)   846.6 (788.5)   846.7 (788.6)   846.8 (788.6)
847.3 (789.1)   847.4 (789.2)   847.5 (789.3)   847.6 (789.4)
848.1 (789.9)   848.2 (789.9)   848.3 (790.0)   848.4 (790.1)
848.5 (790.2)   849.0 (790.7)   849.1 (790.8)   849.2 (790.9)
849.3 (791.0)   849.8 (791.4)   849.9 (791.5)   850.0 (791.6)
850.1 (791.7)   850.6 (792.2)   850.7 (792.3)   850.8 (792.4)
850.9 (792.5)   851.5 (793.0)   851.6 (793.1)   851.7 (793.2)
851.8 (793.3)   852.3 (793.8)   852.4 (793.9)   852.5 (794.0)
852.6 (794.0)   853.1 (794.5)   853.2 (794.6)   853.3 (794.7)
853.4 (794.8)   853.9 (795.3)   854.0 (795.3)   854.1 (795.4)
854.2 (795.5)   854.8 (796.1)   854.9 (796.2)   855.0 (796.3)
855.1 (796.4)   855.6 (796.8)   855.7 (796.9)   855.8 (797.0)
855.9 (797.1)   856.4 (797.6)   856.5 (797.7)   856.6 (797.8)
856.7 (797.9)   857.2 (798.3)   857.3 (798.4)   857.4 (798.5)
857.5 (798.6)   858.1 (799.2)   858.2 (799.3)   858.3 (799.4)
858.4 (799.4)   858.9 (799.9)   859.0 (800.0)   859.1 (800.1)
859.2 (800.2)   859.7 (800.7)   859.8 (800.8)   859.9 (800.8)
860.0 (800.9)   860.5 (801.4)   860.6 (801.5)   860.7 (801.6)
860.8 (801.7)   861.4 (802.2)   861.5 (802.3)   861.6 (802.4)
861.7 (802.5)   862.2 (803.0)   862.3 (803.1)   862.4 (803.2)
862.5 (803.3)   863.0 (803.7)   863.1 (803.8)   863.2 (803.9)
863.3 (804.0)   863.8 (804.5)   863.9 (804.6)   864.0 (804.7)
864.1 (804.8)   864.2 (804.8)   864.7 (805.3)   864.8 (805.4)
864.9 (805.5)   865.0 (805.6)   865.5 (806.1)   865.6 (806.2)
865.7 (806.2)   865.8 (806.3)   866.3 (806.8)   866.4 (806.9)
866.5 (807.0)   866.6 (807.1)   867.1 (807.5)   867.2 (807.6)
867.3 (807.7)   867.4 (807.8)   867.5 (807.9)   868.0 (808.4)
868.1 (808.5)   868.2 (808.6)   868.3 (808.7)   868.8 (809.1)
868.9 (809.2)   869.0 (809.3)   869.1 (809.4)   869.6 (809.9)
869.7 (810.0)   869.8 (810.1)   869.9 (810.2)   870.4 (810.6)
870.5 (810.7)   870.6 (810.8)   870.7 (810.9)   870.8 (811.0)
871.3 (811.5)   871.4 (811.6)   871.5 (811.6)   871.6 (811.7)
872.1 (812.2)   872.2 (812.3)   872.3 (812.4)   872.4 (812.5)
872.9 (813.0)   873.0 (813.0)   873.1 (813.1)   873.2 (813.2)
873.7 (813.7)   873.8 (813.8)   873.9 (813.9)   874.0 (814.0)
874.1 (814.1)   874.6 (814.5)   874.7 (814.6)   874.8 (814.7)
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874.9 (814.8)    875.4 (815.3)    875.5 (815.4)    875.6 (815.5)
875.7 (815.6)    876.2 (816.0)    876.3 (816.1)    876.4 (816.2)
876.5 (816.3)    877.1 (816.9)    877.2 (817.0)    877.3 (817.0)
877.4 (817.1)    877.9 (817.6)    878.0 (817.7)    878.1 (817.8)
878.2 (817.9)    878.7 (818.4)    878.8 (818.4)    878.9 (818.5)
879.0 (818.6)    879.5 (819.1)    879.6 (819.2)    879.7 (819.3)
879.8 (819.4)    880.4 (819.9)    880.5 (820.0)    880.6 (820.1)
880.7 (820.2)    881.2 (820.7)    881.3 (820.8)    881.4 (820.9)
881.5 (821.0)    882.0 (821.4)    882.1 (821.5)    882.2 (821.6)
882.3 (821.7)    882.8 (822.2)    882.9 (822.3)    883.0 (822.4)
883.1 (822.5)    883.7 (823.0)    883.8 (823.1)    883.9 (823.2)
884.0 (823.3)    884.5 (823.8)    884.6 (823.8)    884.7 (823.9)
884.8 (824.0)    885.3 (824.5)    885.4 (824.6)    885.5 (824.7)
885.6 (824.8)    886.1 (825.2)    886.2 (825.3)    886.3 (825.4)
886.4 (825.5)    887.0 (826.1)    887.1 (826.2)    887.2 (826.3)
887.3 (826.4)    887.8 (826.8)    887.9 (826.9)    888.0 (827.0)
888.1 (827.1)    888.6 (827.6)    888.7 (827.7)    888.8 (827.8)
888.9 (827.9)    889.4 (828.3)    889.5 (828.4)    889.6 (828.5)
889.7 (828.6)    889.8 (828.7)    890.3 (829.2)    890.4 (829.2)
890.5 (829.3)    890.6 (829.4)    891.1 (829.9)    891.2 (830.0)
891.3 (830.1)    891.4 (830.2)    891.9 (830.6)    892.0 (830.7)
892.1 (830.8)    892.2 (830.9)    892.7 (831.4)    892.8 (831.5)
892.9 (831.6)    893.0 (831.7)    893.1 (831.8)    893.6 (832.2)
893.7 (832.3)    893.8 (832.4)    893.9 (832.5)    894.4 (833.0)
894.5 (833.1)    894.6 (833.2)    894.7 (833.3)    895.2 (833.7)
895.3 (833.8)    895.4 (833.9)    895.5 (834.0)    896.0 (834.5)
896.1 (834.6)    896.2 (834.7)    896.3 (834.7)    896.4 (834.8)
896.9 (835.3)    897.0 (835.4)    897.1 (835.5)    897.2 (835.6)
897.7 (836.0)    897.8 (836.1)    897.9 (836.2)    898.0 (836.3)
898.5 (836.8)    898.6 (836.9)    898.7 (837.0)    898.8 (837.1)
899.3 (837.5)    899.4 (837.6)    899.5 (837.7)    899.6 (837.8)
899.7 (837.9)    900.2 (838.4)    900.3 (838.5)    900.4 (838.6)
900.5 (838.7)    901.0 (839.1)    901.1 (839.2)    901.2 (839.3)
901.3 (839.4)    901.8 (839.9)    901.9 (840.0)    902.0 (840.1)
902.1 (840.1)    902.7 (840.7)    902.8 (840.8)    902.9 (840.9)
903.0 (841.0)    903.5 (841.4)    903.6 (841.5)    903.7 (841.6)
903.8 (841.7)    904.3 (842.2)    904.4 (842.3)    904.5 (842.4)
904.6 (842.5)    905.1 (842.9)    905.2 (843.0)    905.3 (843.1)
905.4 (843.2)    906.0 (843.8)    906.1 (843.9)    906.2 (844.0)
906.3 (844.1)    906.8 (844.5)    906.9 (844.6)    907.0 (844.7)
907.1 (844.8)    907.6 (845.3)    907.7 (845.4)    907.8 (845.5)
907.9 (845.5)    908.4 (846.0)    908.5 (846.1)    908.6 (846.2)
908.7 (846.3)    909.3 (846.9)    909.4 (846.9)    909.5 (847.0)
909.6 (847.1)    910.1 (847.6)    910.2 (847.7)    910.3 (847.8)
910.4 (847.9)    910.9 (848.3)    911.0 (848.4)    911.1 (848.5)
911.2 (848.6)    911.7 (849.1)    911.8 (849.2)    911.9 (849.3)
912.0 (849.4)    912.6 (849.9)    912.7 (850.0)    912.8 (850.1)
912.9 (850.2)    913.4 (850.7)    913.5 (850.8)    913.6 (850.9)
913.7 (850.9)    914.2 (851.4)    914.3 (851.5)    914.4 (851.6)
914.5 (851.7)    915.0 (852.2)    915.1 (852.3)    915.2 (852.3)
915.3 (852.4)    915.4 (852.5)    915.9 (853.0)    916.0 (853.1)
916.1 (853.2)    916.2 (853.3)    916.7 (853.7)    916.8 (853.8)
916.9 (853.9)    917.0 (854.0)    917.5 (854.5)    917.6 (854.6)
917.7 (854.7)    917.8 (854.8)    918.3 (855.2)    918.4 (855.3)
918.5 (855.4)    918.6 (855.5)    918.7 (855.6)    919.2 (856.1)
919.3 (856.2)    919.4 (856.3)    919.5 (856.4)    920.0 (856.8)
920.1 (856.9)    920.2 (857.0)    920.3 (857.1)    920.8 (857.6)
920.9 (857.7)    921.0 (857.7)    921.1 (857.8)    921.6 (858.3)
921.7 (858.4)    921.8 (858.5)    921.9 (858.6)    922.0 (858.7)
922.5 (859.1)    922.6 (859.2)    922.7 (859.3)    922.8 (859.4)
923.3 (859.9)    923.4 (860.0)    923.5 (860.1)    923.6 (860.2)
924.1 (860.6)    924.2 (860.7)    924.3 (860.8)    924.4 (860.9)
924.9 (861.4)    925.0 (861.5)    925.1 (861.6)    925.2 (861.7)
925.3 (861.8)    925.8 (862.2)    925.9 (862.3)    926.0 (862.4)
926.1 (862.5)    926.6 (863.0)    926.7 (863.1)    926.8 (863.1)
926.9 (863.2)    927.4 (863.7)    927.5 (863.8)    927.6 (863.9)
927.7 (864.0)    928.3 (864.5)    928.4 (864.6)    928.5 (864.7)
```

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928.6 (864.8)   929.1 (865.3)   929.2 (865.4)   929.3 (865.5)
929.4 (865.6)   929.9 (866.0)   930.0 (866.1)   930.1 (866.2)
930.2 (866.3)   930.7 (866.8)   930.8 (866.9)   930.9 (867.0)
931.0 (867.1)   931.6 (867.6)   931.7 (867.7)   931.8 (867.8)
931.9 (867.9)   932.4 (868.4)   932.5 (868.5)   932.6 (868.6)
932.7 (868.6)   933.2 (869.1)   933.3 (869.2)   933.4 (869.3)
933.5 (869.4)   934.0 (869.9)   934.1 (869.9)   934.2 (870.0)
934.3 (870.1)   934.9 (870.7)   935.0 (870.8)   935.1 (870.9)
935.2 (871.0)   935.7 (871.4)   935.8 (871.5)   935.9 (871.6)
936.0 (871.7)   936.5 (872.2)   936.6 (872.3)   936.7 (872.4)
936.8 (872.5)   937.3 (872.9)   937.4 (873.0)   937.5 (873.1)
937.6 (873.2)   938.2 (873.8)   938.3 (873.9)   938.4 (874.0)
938.5 (874.0)   939.0 (874.5)   939.1 (874.6)   939.2 (874.7)
939.3 (874.8)   939.8 (875.3)   939.9 (875.4)   940.0 (875.4)
940.1 (875.5)   940.6 (876.0)   940.7 (876.1)   940.8 (876.2)
940.9 (876.3)   941.0 (876.4)   941.5 (876.8)   941.6 (876.9)
941.7 (877.0)   941.8 (877.1)   942.3 (877.6)   942.4 (877.7)
942.5 (877.8)   942.6 (877.9)   943.1 (878.3)   943.2 (878.4)
943.3 (878.5)   943.4 (878.6)   943.9 (879.1)   944.0 (879.2)
944.1 (879.3)   944.2 (879.4)   944.3 (879.4)   944.8 (879.9)
944.9 (880.0)   945.0 (880.1)   945.1 (880.2)   945.6 (880.7)
945.7 (880.8)   945.8 (880.8)   945.9 (880.9)   946.4 (881.4)
946.5 (881.5)   946.6 (881.6)   946.7 (881.7)   947.2 (882.1)
947.3 (882.2)   947.4 (882.3)   947.5 (882.4)   947.6 (882.5)
948.1 (883.0)   948.2 (883.1)   948.3 (883.2)   948.4 (883.3)
948.9 (883.7)   949.0 (883.8)   949.1 (883.9)   949.2 (884.0)
949.7 (884.5)   949.8 (884.6)   949.9 (884.7)   950.0 (884.8)
950.5 (885.2)   950.6 (885.3)   950.7 (885.4)   950.8 (885.5)
950.9 (885.6)   951.4 (886.1)   951.5 (886.2)   951.6 (886.2)
951.7 (886.3)   952.2 (886.8)   952.3 (886.9)   952.4 (887.0)
952.5 (887.1)   953.0 (887.6)   953.1 (887.6)   953.2 (887.7)
953.3 (887.8)   953.9 (888.4)   954.0 (888.5)   954.1 (888.6)
954.2 (888.7)   954.7 (889.1)   954.8 (889.2)   954.9 (889.3)
955.0 (889.4)   955.5 (889.9)   955.6 (890.0)   955.7 (890.1)
955.8 (890.2)   956.3 (890.6)   956.4 (890.7)   956.5 (890.8)
956.6 (890.9)   957.2 (891.5)   957.3 (891.6)   957.4 (891.6)
957.5 (891.7)   958.0 (892.2)   958.1 (892.3)   958.2 (892.4)
958.3 (892.5)   958.8 (893.0)   958.9 (893.0)   959.0 (893.1)
959.1 (893.2)   959.6 (893.7)   959.7 (893.8)   959.8 (893.9)
959.9 (894.0)   960.5 (894.5)   960.6 (894.6)   960.7 (894.7)
960.8 (894.8)   961.3 (895.3)   961.4 (895.4)   961.5 (895.5)
961.6 (895.6)   962.1 (896.0)   962.2 (896.1)   962.3 (896.2)
962.4 (896.3)   962.9 (896.8)   963.0 (896.9)   963.1 (897.0)
963.2 (897.0)   963.8 (897.6)   963.9 (897.7)   964.0 (897.8)
964.1 (897.9)   964.6 (898.4)   964.7 (898.4)   964.8 (898.5)
964.9 (898.6)   965.4 (899.1)   965.5 (899.2)   965.6 (899.3)
965.7 (899.4)   966.2 (899.8)   966.3 (899.9)   966.4 (900.0)
966.5 (900.1)   966.6 (900.2)   967.1 (900.7)   967.2 (900.8)
967.3 (900.9)   967.4 (901.0)   967.9 (901.4)   968.0 (901.5)
968.1 (901.6)   968.2 (901.7)   968.7 (902.2)   968.8 (902.3)
968.9 (902.4)   969.0 (902.5)   969.5 (902.9)   969.6 (903.0)
969.7 (903.1)   969.8 (903.2)   969.9 (903.3)   970.4 (903.8)
970.5 (903.8)   970.6 (903.9)   970.7 (904.0)   971.2 (904.5)
971.3 (904.6)   971.4 (904.7)   971.5 (904.8)   972.0 (905.2)
972.1 (905.3)   972.2 (905.4)   972.3 (905.5)   972.8 (906.0)
972.9 (906.1)   973.0 (906.2)   973.1 (906.3)   973.2 (906.4)
973.7 (906.8)   973.8 (906.9)   973.9 (907.0)   974.0 (907.1)
974.5 (907.6)   974.6 (907.7)   974.7 (907.8)   974.8 (907.9)
975.3 (908.3)   975.4 (908.4)   975.5 (908.5)   975.6 (908.6)
976.1 (909.1)   976.2 (909.2)   976.3 (909.3)   976.4 (909.3)
976.5 (909.4)   977.0 (909.9)   977.1 (910.0)   977.2 (910.1)
977.3 (910.2)   977.8 (910.6)   977.9 (910.7)   978.0 (910.8)
978.1 (910.9)   978.6 (911.4)   978.7 (911.5)   978.8 (911.6)
978.9 (911.7)   979.5 (912.2)   979.6 (912.3)   979.7 (912.4)
```

```
979.8 (912.5)    980.3 (913.0)    980.4 (913.1)    980.5 (913.2)
980.6 (913.3)    981.1 (913.7)    981.2 (913.8)    981.3 (913.9)
981.4 (914.0)    981.9 (914.5)    982.0 (914.6)    982.1 (914.7)
982.2 (914.7)
```

Action

Specify a valid volume size and then resubmit the task.

CMUN02389E *SOURCE* Unable to create volume. Not enough extents are available.

Explanation

The volume cannot be created because not enough extents are available in the extent pool. More extents must be added to the extent pool.

Action

Add more extents to the extent pool, and then resubmit the task.

CMUN02390E *SOURCE* Unable to create volume. Not enough extents are available at this time.

Explanation

The volume cannot be created because not enough extents are available. However, freed extents in the extent pool are being reformatted. Enough extents will be available when the reformatting process completes. One terabyte of disk space can be reformatted in approximately four hours.

Action

Wait until reformatting completes, and then resubmit the task.

CMUN02391E *SOURCE* Unable to delete CKD base volume. Unable to delete or reassign aliases.

Explanation

The storage management console server reports a storage unit microcode-level error. The CKD base volume cannot be deleted because its alias volumes cannot be deleted or reassigned.

Action

Delete or reassign the alias volumes first, and then resubmit the task.

CMUN02392E *SOURCE* Invalid alias volume group

Explanation

The specified alias volume group does not exist or is not a FICON/ESCON - MASK type volume group. Volume group 10 is the default valid volume group of this type.

Action

Specify a valid volume group, and then resubmit the task.

CMUN02393E *SOURCE* Unable to create or modify CKD alias volume. The base and alias volumes belong to different logical subsystems.

Explanation

The base and its alias volumes must belong to the same logical subsystem.

Action

Specify base and alias volumes that belong to the same logical subsystem, and then resubmit the task.

CMUN02394E *SOURCE* Unable to create or modify CKD alias volume. The maximum number of aliases are already assigned to the base volume.

Explanation

A maximum of 255 aliases can be assigned to a base volume. The specified base volume already has 255 aliases that are assigned to it.

Action

Specify a different base volume, or reassign some of the previously assigned alias volumes, and then resubmit the task.

CMUN02395E *SOURCE* Unable to create or modify CKD alias volume. The base volume and alias volume are not in the same volume group.

Explanation

The base volume and alias volume must be in the same volume group. To create a new alias volume in the volume group, assign the base volume to the volume group, and then create the alias volume in the volume group. To modify an existing alias volume, you must select a base volume that is already in that volume group.

Action

Specify a base volume and alias volume that are in the same volume group and then resubmit the task.

CMUN02396E *SOURCE* Contact information must be entered before you can invoke call home.

Explanation

Your company name, machine location, ship to country, and contact primary telephone number must be entered before you can invoke the **call home** task.

Action

Use the **IBM TotalStorage DS Command-Line Interface setcontactinfo** command, or the **IBM TotalStorage DS Storage Manager Company information work sheet** to enter contact information. Then resubmit the task.

CMUN02397E *SOURCE* Unable to delete volume: The volume does not exist.

Explanation

The specified volume cannot be found. Therefore, it cannot be deleted.

Action

Specify a different volume to delete.

CMUN02398E *SOURCE* Unable to create array. All array sites must be in the same loop.

Explanation

The specified array sites are not in the same adapter loop. All of the array sites for the array must be in the same adapter loop.

Action

Specify array sites in the same loop, and then resubmit the task.

CMUN02399E *SOURCE* Unable to create array. A RAID5 array can have only one spare.

Explanation

More than one spare is specified for the array. A RAID5 array can have only one spare.

Action

Specify only one spare for the array, and then resubmit the task.

CMUN02400E *SOURCE* Unable to create logical subsystem: invalid address group

Explanation

The specification contains an invalid address group.

Action

Specify a valid address group, and then resubmit the task.

CMUN02401E *SOURCE* Unable to create logical subsystem: microcode-level error

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02402E *SOURCE* Unable to create rank: failed disk drives detected

Explanation

The specified storage includes failed disk drives. These drives must be replaced before a rank can be created on them.

Action

Specify a different array, or ensure that the failed disk drives are replaced. Then resubmit the task.

CMUN02403E *SOURCE* Unable to create rank: not a licensed operation

Explanation

Your current license does not permit you to create the rank.

Action

Obtain and install the appropriate license key, and then resubmit the task.

CMUN02404E *SOURCE* Unable to create rank: maximum number of ranks already created

Explanation

The maximum number of ranks already has been created.

Action

Delete unused ranks or install and license more storage capacity. Then resubmit the task.

CMUN02405E *SOURCE* Unable to delete rank: Extents on the rank are in use.

Explanation

Extents on the rank are still assigned to a valid volume group. You must delete volumes that use extents on the rank before you can delete the rank.

Action

Ensure that no extents from the rank are assigned, and then resubmit the task.

CMUN02406E *SOURCE* Internal logical configuration error: Collect a PE package.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Collect a PE package and contact IBM technical support for assistance.

CMUN02407E *SOURCE* `Array operation failure: Resource Manager not available on alternate server`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02408E *SOURCE* `Array creation failure: Too many array sites specified.`

Explanation

You must specify only one array site when creating RAID5 or RAID10 arrays. Multiple array sites are specified.

Action

Specify only one array site, and then resubmit the task.

CMUN02409E *SOURCE* `Rank operation failure: Resource Manager not available on alternate server`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02410E *SOURCE* `Extent pool operation failure: Resource Manager not available on alternate server`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02411E *SOURCE* Logical volume operation failure: Resource Manager not available on alternate server

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02412E *SOURCE* Volume group operation failure: Host agent Resource Manager not available on alternate server

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02413E *SOURCE* SCSI host port operation failure: Host agent Resource Manager not available on alternate server

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02414E *SOURCE* Unable to create SCSI host port. A colon ":" cannot be used when specifying a SCSI host port.

Explanation

A colon ":" is used in a SCSI host port specification. This character cannot be used in a SCSI host port specification.

Action

Omit the colon, and then resubmit the task.

CMUN02415E *SOURCE* Unable to modify SCSI host port. A colon ":" cannot be used when specifying a SCSI host port.

Explanation

A colon ":" is used in a SCSI host port specification. This character cannot be used in a SCSI host port specification.

Action

Omit the colon, and then resubmit the task.

CMUN02416E *SOURCE* `Rank repair operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02417E *SOURCE* `Rank repair operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02418E *SOURCE* `Rank repair operation failure: At least one array must be in assigned status.`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02419E *SOURCE* `Rank repair operation failure: Service intent flag is set.`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02420E *SOURCE* `Rank repair operation failure`
Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02421E *SOURCE* Rank repair operation failure: Unable to establish array site communication session.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02422E *SOURCE* Rank repair operation failure: Unable to retrieve adapter name.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02423E *SOURCE* Rank repair operation failure: device adapter error

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02424E *SOURCE* Rank repair operation failure: Multiple ranks exist or the rank is still accessible.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02425E *SOURCE* Rank repair operation failure: Unable to delete RAID array.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02426E *SOURCE* Rank repair operation failure: Unable to retrieve serial number.

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN02427E *SOURCE* Internal logical configuration error: Another configuration is in progress.

Explanation

The storage management console server reports a storage unit microcode-level error. Another configuration process is in progress. Your task cannot be performed at this time.

Action

Wait, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02428E *SOURCE* Unable to create rank. Disks are being formatted.

Explanation

The rank cannot be created until disk reformatting completes.

Action

Wait until disk reformatting completes, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02429E *SOURCE* A recovery is in progress. Logical configuration commands are blocked.

Explanation

A recovery is in progress. Logical configurations commands are rejected until recovery completes.

Action

Wait, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN02430E *SOURCE* Invalid configuration: The base and alias/map volumes must be in the same volume group.

Explanation

A volume group cannot contain an alias/map volume unless the base volume is also in that group.

Action

Ensure that the base and alias/map volumes are in the same volume group, and then resubmit the task.

CMUN02431E *SOURCE* Invalid configuration: A volume group cannot contain unconfigured logical volumes.

Explanation

A volume group cannot contain an unconfigured volume. One or more of the specified volumes is not in the **configured** state.

Action

Specify only configured volumes, and then resubmit the task.

CMUN02432E *SOURCE* Invalid configuration: volume group and volume type mismatch

Explanation

A FICON ESCON mixed volume group can contain only logical volumes of the following types:
* count-key-data base
* count-key-data alias
* count-key-data map
* 512-byte fixed-block

Action

Specify logical volumes of the correct type, and then resubmit the task.

CMUN02433E *SOURCE* Invalid configuration: 512-byte fixed-block volumes must share data.

Explanation

In a FICON ESCON mixed volume group all logical volumes of type 512-byte fixed-block must have **data sharing allowed** set to **true**.

Action

Ensure that all 512-byte fixed-block volumes permit data sharing, and then resubmit the task.

CMUN02434E *SOURCE* Invalid configuration: volume group and volume type mismatch

Explanation

A FICON ESCON (not mixed) volume group can contain only logical volumes of the following types: count-key-data base or count-key-data alias.

Action

Specify only count-key-data base or count-key-data alias volumes, and then resubmit the task.

CMUN02435E *SOURCE* Invalid configuration: volume group and volume type mismatch

Explanation

A SCSI (not mixed) volume group must contain only logical volumes of type 512-byte fixed-block.

Action

Specify only 512-byte fixed-block logical volumes, and then resubmit the task.

CMUN02436E *SOURCE* Invalid configuration: volume group and volume type mismatch

Explanation

A SCSI mixed volume group must contain only logical volumes of the following types:
- fixed-block map
- count-key-data base
- 520-byte fixed-block

Action

Specify only volumes of types fixed-block map, count-key-data base, or 520-byte fixed-block base. Then resubmit the task.

CMUN02437E *SOURCE* Invalid configuration: CKD base logical volumes must share data.

Explanation

In a SCSI mixed volume group, all count-key-data base logical volumes must have **data sharing allowed** set to **true**.

Action

Ensure that all count-key-data base logical volumes permit data sharing, and then resubmit the task.

CMUN02438E *SOURCE* `Invalid configuration: volume group and volume type mismatch`

Explanation

A SCSI520 MASK volume group must contain only logical volumes of type 520-byte fixed block.

Action

Specify only 520-byte fixed block logical volumes, and then resubmit the task.

CMUN02439E *SOURCE* `Unable to create rank. DDM repair is required or in progress.`

Explanation

The rank cannot be created because disk drive repair is required or is in progress.

Action

Wait until the drives have been repaired, and then resubmit the task.

CMUN03000E *SOURCE* `Operation failure: action cancelled due to lack of resources`

Explanation

The storage management console server reports a Copy Services error. The storage unit did not have enough resources to complete the task.

Action

Contact IBM technical support for assistance.

CMUN03001E *SOURCE* `Operation failure: action not supported`
Explanation

The storage management console server reports a Copy Services error. The command is not supported by the current microcode.

Action

Ensure that the latest version of microcode is installed on your storage unit. Contact IBM technical support for assistance.

CMUN03002E *SOURCE* Operation failure: action not supported
Explanation

The storage management console server reports a Copy Services error. The command is not supported by the current microcode.

Action

Ensure that the latest version of microcode is installed on your storage unit. Contact IBM technical support for assistance.

CMUN03003E *SOURCE* Copy Services operation failure: currently processing a previously issued Global Mirror command
Explanation

The task is being rejected because a previously issued task is still being processed.

Action

Wait until the first process completes, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN03004E *SOURCE* Copy Services operation failure: Global Mirror command not properly defined
Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03005E *SOURCE* Copy Services operation failure: Global Mirror feature not installed
Explanation

The Global Mirror feature is not installed on this storage image.

Action

Install and license the feature, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03006E *SOURCE* Copy Services operation failure: Global Mirror structures not available
Explanation

A Global Mirror command fails because an internal error occurs or because the storage image is in single cluster mode.

Action

Check for hardware errors and ensure that the storage image is in dual cluster mode. If the problem persists, contact IBM technical support for assistance.

CMUN03007E *SOURCE* `Copy Services operation failure: FlashCopy battery feature not installed`

Explanation

The task cannot be initiated because the FlashCopy battery feature is not installed.

Action

Install the FlashCopy battery feature, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03008E *SOURCE* `Copy Services operation failure: cascading FlashCopy prohibited`

Explanation

A FlashCopy target cannot be a FlashCopy source or the target of another relationship.

Action

Specify a logical volume that is not a FlashCopy target, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03009E *SOURCE* `Copy Services operation failure: cascading primary`

Explanation

A cascading primary logical volume cannot be in a Global Mirror relationship.

Action

Specify a logical volume that is not a cascading primary, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03010E *SOURCE* `Copy Services operation failure: cascading secondary noncascade`

Explanation

The specified volume was not established with the **cascading** option.

Action

Specify a volume that has been established with the **cascading** option, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03011E *SOURCE* Copy Services operation failure: cascading secondary synchronous

Explanation

Cascading secondaries cannot be primary volumes in a Metro Mirror relationship.

Action

Specify a logical volume that is not a cascading secondary, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03012E *SOURCE* Remote Mirror and Copy operation failure

Explanation

The storage management console server reports a Remote Mirror and Copy error. One of the following conditions is occurring:

- Abnormal conditions exist at the secondary controller.
- Abnormal conditions exist at the secondary storage unit.
- The communication paths between the primary and remote controller are not functioning.
- Communication cannot be established with the secondary control unit.

Action

Check for hardware errors and disconnected cables, and follow the recommended service procedure. Check the status of the secondary system. If the problem persists, contact IBM technical support for assistance.

CMUN03013E *SOURCE* CKD management is disabled.

Explanation

Management of count-key-data resources on the storage unit is disabled.

Action

Contact IBM technical support for assistance.

CMUN03014E *SOURCE* Copy Services operation failure: A microcode code load is in progress.

Explanation

A microcode code load is in progress, and no other activities can take place on the storage unit.

Action

Wait until the microcode code load completes, and then resubmit the task.

CMUN03015E *SOURCE* `Operation failure: consistent copy would be compromised`

Explanation

A pause or end Global Mirror fails because the action cannot complete without compromising the consistent copy of the data.

Action

Contact IBM technical support for assistance.

CMUN03016E *SOURCE* `Copy Services feature not installed`

Explanation

The Copy Services feature is not installed on the storage unit.

Action

Contact IBM technical support for assistance.

CMUN03017E *SOURCE* `Copy Services feature not supported.`

Explanation

The storage unit does not support the requested Copy Services feature.

Action

Contact IBM technical support for assistance.

CMUN03018E *SOURCE* `Copy Services server internal error`

Explanation

The storage management console server reports a Copy Services server internal error.

Action

Contact IBM technical support for assistance.

CMUN03019E *SOURCE* `Copy Services operation failure: critical volume mode unavailable`

Explanation

Critical volume mode cannot be specified with Global Mirror.

Action

Do not specify critical volume mode, and then resubmit the task. Contact IBM technical support for assistance.

CMUN03020E *SOURCE* `Copy Services operation failure: device not found`

Explanation

One of the following might be occurring:

- The request is being issued to an unconfigured logical volume.
- The request requires at least one configured volume, and no volumes are configured for the logical subsystem.
- An unknown error

Action

Ensure that a configured logical volume exists, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN03021E *SOURCE* `Copy Services operation failure: device status cannot be determined`

Explanation

A logical volume in the specification is either:

- Unconfigured
- Flagged for service
- In the **status cannot be determined** state
- The wrong type

Action

Make the volume or underlying device available, or specify another volume, and then resubmit the task.

CMUN03022E *SOURCE* `Copy Services operation failure: source is destination`

Explanation

The source and destination ports for a path over FCP must be unique. No port can be used as both source and destination.

Action

Specify two distinct ports, and then resubmit the task.

CMUN03023E *SOURCE* `Copy Services operation failure: ESCON - FCP collision`

Explanation

An attempt is being made to establish ESCON paths between two control units with FCP paths that already exist between the control units, or an attempt is being made to establish FCP paths between two control units with ESCON paths that already exist between the control units.

Action

Contact IBM technical support for assistance.

CMUN03024E *SOURCE* `Copy Services operation failure: ESCON - FCP remove collision`

Explanation

An attempt is being made to remove ESCON paths between two control units with FCP paths that also exist between the control units, or an attempt is being made to remove FCP paths between two control units with ESCON paths that also exist between the control units.

Action

Contact IBM technical support for assistance.

CMUN03025E *SOURCE* `Copy Services operation failure: storage image not available`

Explanation

Communication was the storage image failed.

Action

Ensure that the storage image is online and available.

CMUN03026E *SOURCE* `Copy Services operation failure: storage image not found`

Explanation

The storage image was not found in the Copy Services domain.

Action

Properly identify the storage image, and then resubmit the task.

CMUN03027E *SOURCE* `FlashCopy operation failure: action prohibited by current FlashCopy state`

Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03028E *SOURCE* `Copy Services operation failure: master process conflict`

Explanation

One of the following is taking place:

- A start or resume Global Mirror command with no modify options is being issued to a storage image on which a master process is running.
- A start or resume Global Mirror command with modify options is being issued, but the parameters do not match the existing configuration.
- A start or resume Global Mirror command with modify options is being issued, but the master process is not paused.

Action

Ensure that the master process is not running and that the parameters match. Resubmit the task.

CMUN03029E *SOURCE* `Copy Services operation failure: invalid failback primary`

Explanation

The specified failback primary does not match the existing primary for the volume.

Action

Specify the correct primary, and then resubmit the task.

CMUN03030E *SOURCE* `Copy Services operation failure: failback primary volume not suspended`

Explanation

The Remote Mirror and Copy failback primary volume must be suspended before the task is issued.

Action

Suspend the failback primary volume, and then resubmit the task.

CMUN03031E *SOURCE* `Copy Services operation failure: invalid failover primary site`

Explanation

The specified failover primary site does not match the existing primary site for the volume.

Action

Specify the correct failover primary site, and then resubmit the task.

CMUN03032E *SOURCE* `Operation failure: invalid failover secondary volume`

Explanation

The failover action fails because the volume is not a full duplex Metro Mirror secondary volume.

Action

Ensure that the secondary volume is in full duplex mode, and then resubmit the task.

CMUN03033E *SOURCE* `Copy Services operation failure: FCP - FICON path collision`

Explanation

You are attempting to establish an FCP path on a port with existing FICON logical paths.

Action

Specify a port with no existing FICON paths, and then resubmit the task.

CMUN03034E *SOURCE* `Copy Services operation failure: FCP connectivity queries are not supported by the storage image.`

Explanation

FCP connectivity queries are not supported by the storage image.

Action

Contact IBM technical support for assistance.

CMUN03035E *SOURCE* `Copy Services operation failure: feature not installed`

Explanation

The specified feature is not installed.

Action

License and install the feature, and then resubmit the task.

CMUN03036E *SOURCE* `Copy Services operation failure: maximum FlashCopy relationships exceeded or initialization in progress`

Explanation

The requested FlashCopy Relationship cannot be established because the maximum number of relationships already are established or because the volume was recently created and is still being initialized to support FlashCopy (Release 5.0.* only).

If the volume is still being initialized, wait until the initialization completes, and then resubmit the request.

Action

Remove unnecessary relationships or wait until initialization completes, and then resubmit the task.

CMUN03037E *SOURCE* Copy Services operation failure: FlashCopy inhibited

Explanation

FlashCopy is inhibited on this volume.

Action

Contact IBM technical support for assistance.

CMUN03038E *SOURCE* Copy Services operation failure: Volume is already a FlashCopy target.

Explanation

The specified Remote Mirror and Copy secondary volume is already a FlashCopy target. It cannot be used as a target for another relationship.

Action

Specify a different target logical volume, and then resubmit the task.

CMUN03039E *SOURCE* Copy Services operation failure: maximum FlashCopy targets exceeded

Explanation

The maximum number of FlashCopy targets for this source has been exceeded.

Action

Remove any unwanted targets, and then resubmit the task.

CMUN03040E *SOURCE* Copy Services operation failure: maximum relationships exceeded

Explanation

The maximum number of FlashCopy relationships has been established for this volume. No more relationships can be created.

Action

Remove any unwanted relationships, and then resubmit the task.

CMUN03041E *SOURCE* Copy Services operation failure: already a FlashCopy source

Explanation

A FlashCopy source logical volume cannot be the source of a new relationship, and it cannot be the relationship target logical volume.

Action

Specify a different logical volume, and then resubmit the task.

CMUN03042E *SOURCE* `Copy Services operation failure: already a FlashCopy target`

Explanation

The specified target is already a FlashCopy target. A FlashCopy target cannot be the target of a new relationship.

Action

Specify a different target logical volume, and then resubmit the task.

CMUN03043E *SOURCE* `Operation failure: functional code timeout`

Explanation

The storage management console server reports a storage unit microcode-level error. The storage unit does not respond in a satisfactory time period.

Action

Contact IBM technical support for assistance.

CMUN03044E *SOURCE* `Copy Services operation failure: path not available`

Explanation

The conduit logical subsystem does not have a relationship with the FlashCopy primary logical volume.

Action

Specify a different conduit logical subsystem or establish a path, and then resubmit the task.

CMUN03045E *SOURCE* `Copy Services operation failure: increment failed due to internal error`

Explanation

The relationship cannot be incremented due to an internal error.

Action

Contact IBM technical support for assistance.

CMUN03046E *SOURCE* `Copy Services operation failure: FlashCopy increment mismatch`

Explanation

The increment of a FlashCopy relationship fails because the logical volumes are in relationships with other volumes.

Action

Specify the correct relationship or remove the other relationships, and then resubmit the task.

CMUN03047E *SOURCE* `Copy Services operation failure: invalid fibre-channel protocol configuration`

Explanation

Fibre-channel protocol paths are specified, but the adapters use fibre-channel arbitrated loop protocol.

Action

Specify compatible path and adapter protocols, and then resubmit the command.

CMUN03048E *SOURCE* `Copy Services operation failure: invalid FlashCopy target`

Explanation

The specified target is a Remote Mirror and Copy or Global Mirror primary volume.

Action

Specify a different target, and then resubmit the task.

CMUN03049E *SOURCE* `Copy Services operation failure: incompatible volumes`

Explanation

FlashCopy volumes must be the same capacity, and they must belong to the same logical subsystem.

Action

Specify volumes that are the same capacity and are on the same logical subsystem, and then resubmit the task.

CMUN03050E *SOURCE* `Copy Services operation failure: invalid FlashCopy extent`

Explanation

The FlashCopy operation does not allow the specification of extents.

Action

Contact IBM technical support for assistance.

CMUN03051E *SOURCE* `Copy services operation failure: invalid FlashCopy source`

Explanation

The FlashCopy source is not the target of the addressed Remote Mirror and Copy pair.

Action

Specify a different FlashCopy source or a different Remote Mirror and Copy pair, and then resubmit the task.

CMUN03052E *SOURCE* `Copy Services operation failure: invalid secondary`

Explanation

The storage management console server reports a Copy Services error. The secondary volume address is not valid.

Action

Contact IBM technical support for assistance.

CMUN03053E *SOURCE* `Copy Services operation failure: invalid transition`

Explanation

The command attempts to perform an invalid transition between modes.

Action

Contact IBM technical support for assistance.

CMUN03054E *SOURCE* `Copy Services operation failure: invalid revertible specification`

Explanation

Either:
- A FlashCopy establish was specified with the revertible option for a pair that does not exist or is already revertible.
- A FlashCopy withdraw was specified on a pair that is not revertible.

Action

Specify a different pair, and then resubmit the command.

CMUN03055E *SOURCE* Copy Services operation failure: session or members not in correct state.

Explanation

The Global Mirror start fails because a session or session members are not in the correct state.

Action

Place the session or members in the correct state, and then resubmit the command.

CMUN03056E *SOURCE* Copy Services operation failure: invalid session state for FlashCopy

Explanation

The Global Mirror session is not in the correct state.

Action

Contact IBM technical support for assistance.

CMUN03057E *SOURCE* Copy Services operation failure: invalid subsystem ID

Explanation

The specified subsystem ID cannot be found.

Action

Specify an valid subsystem ID, and then resubmit the task.

CMUN03058E *SOURCE* Copy Services Operation failure: invalid WWNN
Explanation

The primary or secondary worldwide node name is invalid.

Action

Specify a valid worldwide node name, and then resubmit the task.

CMUN03059E *SOURCE* Copy Services operation failure: LSS not found
Explanation

The logical subsystem was not found in the Copy Services domain.

Action

Specify a valid logical subsystem, and then resubmit the task.

CMUN03060E *SOURCE* `Copy Services operation failure: logical subsystem mismatch`

Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03061E *SOURCE* `Copy Services operation failure: master serial number not defined`

Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03062E *SOURCE* `Copy Services operation failure: maximum masters exceeded`

Explanation

A start or resume Global Mirror command was received by a subordinate that already has the maximum number (32) of masters.

Action

Contact IBM technical support for assistance.

CMUN03063E *SOURCE* `Copy Services operation failure: sequence number and session ID mismatch`

Explanation

The specified sequence numbers do not match the master and subordinate sequence numbers for the session ID.

Action

Specify different sequence numbers or a different session ID, and then resubmit the task.

CMUN03064E *SOURCE* `Copy Services operation failure: mixed adapters specified`

Explanation

You must specify either all ESCON paths or all FCP paths. ESCON and FCP paths cannot be mixed within the same command.

Action

Specify paths of the same type, and then resubmit the command.

CMUN03065E *SOURCE* `Copy Services operation failure: volumes not a Remote Mirror and Copy pair`

Explanation

The operation references logical volumes that are not a Remote Mirror and Copy pair.

Action

Specify a valid Remote Mirror and Copy pair, and then resubmit the task.

CMUN03066E *SOURCE* `Copy Services operation failure: no volume zero on secondary logical subsystem`

Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03067E *SOURCE* `Copy Services operation failure: configuration does not exist`

Explanation

The specified configuration does not exist or the specified logical subsystem is incorrect.

Action

Ensure that the correct pair and the correct logical subsystem are specified, and then resubmit the task.

CMUN03068E *SOURCE* `Copy Services operation failure: not ready for resync`

Explanation

Both the source and target volumes must be suspended before they can be resynchronized.

Action

Suspend the volumes, and then resubmit the task.

CMUN03069E *SOURCE* `Pair capacity mismatch`

Explanation

The capacity of a target volume must be greater than or equal to the size of the source volume. The target volume is too small.

Action

Specify a target volume that is larger than or equal to the size of the source volume, and then resubmit the task.

CMUN03070E *SOURCE* `Copy Services operation failure: pairs remain`

Explanation

The path cannot be removed because Remote Mirror and Copy pairs are currently using the path.

Action

Remove the Remote Mirror and Copy pairs, and then resubmit the task.

CMUN03071E *SOURCE* `Copy Services operation failure: invalid parameter`

Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03072E *SOURCE* `Copy Services operation failure: invalid track`

Explanation

The storage management console server reports a Copy Services error. A defective track has been accessed.

Action

Contact IBM technical support for assistance.

CMUN03073E *SOURCE* `Copy Services operation failure: path establish failed`

Explanation

The storage management console server reports a Copy Services error. The path establish task failed. The path is in an unknown state.

Action

Contact IBM technical support for assistance.

CMUN03074E *SOURCE* `Copy Services operation failure: maximum number of device adapter paths exceeded`

Explanation

The attempt to establish the path fails because there can be no more than 4 paths from a single local adapter and no more than 8 paths to any attached adapter.

Action

Specify volumes on another device adapter, or remove other existing paths that use volumes on the adapter. Resubmit the task.

CMUN03075E *SOURCE* `Copy Services operation failure: path timeout`

Explanation

The storage management console server reports a Copy Services error. Communication to the secondary timed out.

Action

Contact IBM technical support for assistance.

CMUN03076E *SOURCE* `Operation failure: path type mismatch`

Explanation

ESCON and FCP paths cannot be established over the same hardware. A path of the other type already exists.

Action

Contact IBM technical support for assistance.

CMUN03077E *SOURCE* `Copy Services operation failure: pinned data`

Explanation

A Remote Mirror and Copy establish pair action is being issued against a logical volume that is suspended with pinned data. A relationship cannot be established using a suspended logical volume that has pinned data.

Action

Consider carefully before you discard pinned data. You might want to specify a different logical volume. Place both logical volumes in the simplex state, and then resubmit the task.

CMUN03078E *SOURCE* `Copy Services operation failure: pinned data`

Explanation

A Remote Mirror and Copy or FlashCopy pair action is being issued against a logical volume that has pinned data. A relationship cannot be established using a logical volume with pinned data.

Action

Consider carefully before you discard pinned data. You might want to specify a different logical volume. Place both logical volumes in the simplex state, and then resubmit the task.

CMUN03079E *SOURCE* `Copy Services operation failure: copy pending`

Explanation

The attempt to suspend a volume fails because the pair is still copy pending. The volume cannot be suspended because data changes are not consistent between the source and target volumes.

Action

Contact IBM technical support for assistance.

CMUN03080E *SOURCE* `Copy Services: recovery command rejected`

Explanation

The command to establish a relationship pair in failover or failback mode is being rejected because the pair is already in the requested state.

Action

None.

CMUN03081E *SOURCE* `Copy Services operation failure: secondary command invalid`

Explanation

The storage management console server reports a Copy Services error. A command that is not allowed on a secondary device is being issued to the secondary device.

Action

Contact IBM technical support for assistance.

CMUN03082E *SOURCE* `Copy Services operation failure: Global Mirror invalid transition`

Explanation

The storage management console server reports a Copy Services error. An invalid transition between modes is being attempted. A transition from Global Mirror to any mode other than synchronous mode is not allowed.

Action

Contact IBM technical support for assistance.

CMUN03083E *SOURCE* `Copy Services operation failure: preexisting Remote Mirror and Copy pair`

Explanation

The storage management console server reports a Copy Services error. The action conflicts with an existing Remote Mirror and Copy pair that is established on the logical volumes.

Action

Contact IBM technical support for assistance.

CMUN03084E *SOURCE* `Copy Services operation failure: busy`

Explanation

The storage management console server reports a Copy Services error. Copy Services is too busy to accept commands.

Action

Resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN03085E *SOURCE* `Copy Services operation failure: maximum number of FlashCopy relationships exceeded`

Explanation

The maximum number of FlashCopy relationships has been established already.

Action

Remove unnecessary relationships, and then resubmit the command.

CMUN03086E *SOURCE* `Copy Services operation failure: volume already in FlashCopy relationship`

Explanation

One or both of the volumes specified in the FlashCopy pair is already in a FlashCopy relationship. Volumes can participate in only one FlashCopy relationship at a time.

Action

Specify a different volume, and then resubmit the task.

CMUN03087E *SOURCE* `Copy Services operation failure: reverse bitmap non-zero`

Explanation

The storage management console server reports a Copy Services error. The target volume bitmap is not all zeros.

Action

Contact IBM technical support for assistance.

CMUN03088E *SOURCE* `Copy Services operation failure: secondary error`
Explanation

The storage management console server reports a Copy Services error. An error on the secondary is causing the command to fail. The secondary controller cache might not be enabled or nonvolatile storage might not be available.

Action

Contact IBM technical support for assistance.

CMUN03089E *SOURCE* `Copy Services operation failure: session already open`
Explanation

The specified session is already open for the logical subsystem or the maximum number of sessions allowed has been reached.

Action

Contact IBM technical support for assistance.

CMUN03090E *SOURCE* `Copy Services operation failure: session command not defined`
Explanation

The storage management console server reports a Copy Services error. The submitted session command was not properly defined.

Action

Contact IBM technical support for assistance.

CMUN03091E *SOURCE* `Copy Services operation failure: session members not defined`
Explanation

The storage management console server reports a Copy Services error. The submitted session members are not defined.

Action

Specify valid logical volumes for the session members, and then resubmit the task.

CMUN03092E *SOURCE* `Copy Services operation failure: session not open`

Explanation

The session that is specified for member management is not open.

Action

Open the session, and then resubmit the task.

CMUN03093E *SOURCE* `Copy Services operation failure: invalid session number`

Explanation

The specified session number is invalid. A session number is an integer between 1 and 255 inclusive.

Action

Specify a valid session number, and then resubmit the task.

CMUN03094E *SOURCE* `Operation failure: status cannot be determined.`
Explanation

Status cannot be determined for one of the following reasons:
- Unable to locate the global subsystem status tracks
- Unable to establish the status of a Remote Mirror and Copy pair or a DASD fast write volume
- Unable to access the RAID rank that the data is stored on
- Unable to access a directory for a subsystem
- Unable to synchronize the volume with data in the nonvolatile store

Action

Contact IBM technical support for assistance.

CMUN03095E *SOURCE* `Copy Services operation failure: subordinate count out of range`

Explanation

The storage management console server reports a Copy Services error. The specified subordinate count is out of range. The subordinate count must be between 0 and 16 inclusive.

Action

Contact IBM technical support for assistance.

CMUN03096E *SOURCE* `Copy Services operation failure: target online`
Explanation

The target volume is online to a host.

Action

Take the target volume offline, and then resubmit the task.

CMUN03097E *SOURCE* `Copy Services operation failure: target reserved`
Explanation

The target is reserved.

Action

Contact IBM technical support for assistance.

CMUN03098E *SOURCE* `Copy Services operation failure: topology`
`missing paths`
Explanation

Paths do not exist for specified topology.

Action

Contact IBM technical support for assistance.

CMUN03099E *SOURCE* `Copy Services operation failure: VM minidisk`
Explanation

The storage management console server reports a Copy Services error. FlashCopy failed because the volumes are managed by VM minidisk.

Action

Contact IBM technical support for assistance.

CMUN03100E *SOURCE* `Copy Services operation failure: volume in`
`session`
Explanation

The specified volume is already associated with a session.

Action

Specify a different volume, and then resubmit the task.

CMUN03101E *SOURCE* `Copy Services operation failure: volume in use`
Explanation

The storage management console server reports a Copy Services error.

Action

Contact IBM technical support for assistance.

CMUN03102E *SOURCE* `Copy Services operation failure: volume inaccessible`

Explanation

FlashCopy failed because the volumes are in the **inaccessible** or **offline** state.

Action

Make the volumes accessible, and then resubmit the command.

CMUN03103E *SOURCE* `Copy Services operation failure: volume long busy`

Explanation

One of the volumes is in the long busy state. This might be because the volume is already participating in a Global Mirror relationship.

Action

Specify a volume that is available, and then resubmit the task.

CMUN03104E *SOURCE* `Copy Services operation failure: source and target volume mismatch`

Explanation

The capacity of the source volume must be less than or equal to the capacity of the target volume, and the volumes must be the same type.

Action

Specify compatible volumes, and then resubmit the task.

CMUN03105E *SOURCE* `Copy Services operation failure: volume not restorable`

Explanation

The volume is not in a persistent FlashCopy relationship with a completed background copy.

Action

Contact IBM technical support for assistance.

CMUN03106E *SOURCE* `Copy Services operation failure: volume reserved`

Explanation

The storage management console server reports a Copy Services error. The volume is already reserved.

Action

Contact IBM technical support for assistance.

CMUN03107E *SOURCE* `Copy Services operation failure: volumes in` `session`

Explanation

The session cannot be closed because volumes still exist in the session.

Action

Remove the session members, and then resubmit the task.

CMUN03108E *SOURCE* `Copy Services operation failure: volumes not` `found`

Explanation

The storage management console server reports a Copy Services error. The volumes cannot be found in the Copy Services domain.

Action

Specify known volumes, and then resubmit the task.

CMUN03109E *SOURCE* `Copy Services operation failure: volumes not` `simplex`

Explanation

Both the source and target volumes must be in the simplex state before you can establish a relationship pair.

Action

Place both the source and target volumes in the simplex state, and then resubmit the task.

CMUN03110E *SOURCE* `Copy Services operation failure: warm start` `occurred`

Explanation

A warm start occurred on the storage image while this action was running. The action might or might not have completed.

Action

Contact IBM technical support for assistance.

CMUN03111E *SOURCE* Copy Services operation failure: writes prohibited by suspend

Explanation

Writes are prohibited. The volume is suspended.

Action

Remove the volume from the **suspended** state, and then resubmit the task.

CMUN03112E *SOURCE* Copy Services operation failure: Global Mirror consistency cannot be maintained.

Explanation

The storage management console server reports a Copy Services error. Consistency cannot be maintained. A paused increment activity has timed out, or another problem has caused the volume to be in an incorrect state.

Action

Contact IBM technical support for assistance.

CMUN03113E *SOURCE* Operation failure: CKD base required

Explanation

A count-key-data base device is required for this operation. A count-key-data alias is specified.

Action

Specify a CKD base device, and then resubmit the task.

CMUN03114E *SOURCE* Unable to establish FlashCopy with fast reverse restore: previous FRR

Explanation

A FlashCopy with fast reverse restore (FRR) cannot be established if a FlashCopy with FRR is still in progress or if one has recently completed.

Action

Wait, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN03115E *SOURCE* Performance statistics cannot be accumulated: LSS not configured

Explanation

A logical subsystem must be configured before performance statistics can be requested. No logical subsystem is configured.

Action

Configure the logical subsystem, and then resubmit the task.

CMUN03116E *SOURCE* `Performance statistics cannot be accumulated: resource not configured`

Explanation

The rank, extent pool, or I/O port to be queried for performance statistics is not configured.

Action

Configure the resource, and then resubmit the task.

CMUN03117E *SOURCE* `Unable to establish FlashCopy or Remote Mirror and Copy pair. A FlashCopy initialization is in progress.`

Explanation

The pair cannot be established until intialization completes.

Action

Wait until initialization completes, and then resubmit the task.

CMUN03118E *SOURCE* `Copy Services error: Intervention is required.`

Explanation

One of the following conditions exists:
- The addressed device is in CE mode.
- The addressed device is not ready.
- The volume configuration of the addressed device is incorrect.

Action

Ensure that the volume is ready, that it is not flagged to be serviced, and that it is correctly configured. If the problem persists, contact IBM technical support for assistance.

CMUN03119E *SOURCE* `Hardware error: An unusual hardware condition originates in the channel, drive, or storage unit.`

Explanation

The storage management console server reports a hardware error.

Action

Contact IBM technical support for assistance.

CMUN04000E *SOURCE* `Operation failure: Copy Services server failure`

Explanation

The storage management console server reports an internal error. The Copy Services server is failing.

Action

Contact IBM technical support for assistance.

CMUN04001E *SOURCE* `Operation failure`

Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN04002E *SOURCE* `Operation failure: internal error`

Explanation

The storage management console server reports a storage unit microcode-level error.

Action

Contact IBM technical support for assistance.

CMUN04003E *SOURCE* `Operation failure: internal error`

Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN04004E *SOURCE* `Operation failure: invalid parameters`

Explanation

The storage management console server reports an internal error.

Action

Check the format, type, and number of parameters, and then resubmit the task. If the problem persists, contact IBM technical support for assistance

CMUN04005E *SOURCE* `Operation failure: node agent 0 fails`

Explanation

The storage management console server reports a storage unit microcode-level error. An agent is not running on a processor card.

Action

Contact IBM technical support for assistance.

CMUN04006E *SOURCE* `Operation failure: node agent 1 fails`
Explanation

The storage management console server reports a storage unit microcode-level error. An agent is not running on a processor card.

Action

Contact IBM technical support for assistance.

CMUN04007E *SOURCE* `Operation failure: resource not found`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN04008E *SOURCE* `Operation failure`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN04009E *SOURCE* `Operation failure: unknown`
Explanation

The storage management console server reports an internal error.

Action

Contact IBM technical support for assistance.

CMUN05000E *SOURCE* `Operation failure: alternate busy`
Explanation

The storage management console server reports a storage unit microcode-level error. The alternate repository is being updated and is not available.

Action

Wait, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN05001E *SOURCE* Operation failure: duplicate user name in alternate repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05002E *SOURCE* Operation failure: duplicate user name in local repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05003E *SOURCE* Operation failure: alternate communication failure

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05004E *SOURCE* Operation failure: group not found in alternate repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05005E *SOURCE* Operation failure: group not found in local repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05006E *SOURCE* Operation failure: invalid user account name

Explanation

A user account name must be supplied.

Action

Specify a valid user account name, and then resubmit the task.

CMUN05007E *SOURCE* Operation failure: local busy

Explanation

The storage management console server reports a storage unit microcode-level error. The local repository is being updated and is not available.

Action

Wait, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN05008E *SOURCE* Operation failure

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05009E *SOURCE* Operation failure: maximum number of accounts reached on alternate repository

Explanation

The number of user accounts on the alternate repository is at the maximum allowed. No more accounts can be created.

Action

Increase the limit or remove unused accounts, and then resubmit the task.

CMUN05010E *SOURCE* Operation failure: maximum number of accounts reached on local repository

Explanation

The number of user accounts on the local repository is at the maximum allowed. No more accounts can be created.

Action

Increase the limit or remove unused accounts, and then resubmit the task.

CMUN05012E *SOURCE* `Operation failure: incorrect password format`

Explanation

The password that you specified does not meet password format requirements. Passwords must contain at least 5 alphabetic characters, and at least one numeric character, with an alphabetic character in the first and last positions. Passwords are limited to a total of 16 characters. The user name can not be part of the password. The minimum number of unique new passwords that must be used before an old password can be reused is four.

Action

Specify a valid password, and then resubmit the task.

CMUN05013E *SOURCE* `Operation failure: password same as previous` password

Explanation

A user account password cannot be used again.

Action

Specify a password that has not been used previously, and then resubmit the task.

CMUN05014E *SOURCE* `Operation failure: alternate repository not` accessible

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05015E *SOURCE* `Operation failure: local repository not` accessible

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05016E *SOURCE* `Operation failure: request timed out`

Explanation

The storage management console server reports an internal security error. A security request is timing out. The alternate repository might not be responding.

Action

Contact IBM technical support for assistance.

CMUN05017E *SOURCE* Operation failure: internal error in alternate repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05018E *SOURCE* Operation failure: internal error in local repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05019E *SOURCE* Operation failure: settings entry not found in alternate repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05020E *SOURCE* Operation failure: settings entry not found in local repository

Explanation

The storage management console server reports an internal security error.

Action

Contact IBM technical support for assistance.

CMUN05021E *SOURCE* Operation failure: user not found in alternate repository

Explanation

The specified user name cannot be found in the alternate repository.

Action

Specify a valid user name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN05022E *SOURCE* `Operation failure: user not found in local` `repository`

Explanation

The specified user name cannot be found in the local repository.

Action

Specify a valid user name, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN06000E *SOURCE* `Operation failure: unable to connect`
Explanation

The storage management console server reports an internal service advisor error. A code load fails, possibly because of a communication failure.

Action

Check for cabling and hardware problems, and follow the recommended service procedure. If the problem persists, contact IBM technical support for assistance.

CMUN06001E *SOURCE* `Operation failure: unable to copy code`
Explanation

The service advisor is unable to copy the code bundle to the storage unit.

Action

This problem might be temporary. Ensure that there is network connectivity to the storage unit. Verify that you can log in to the storage unit and that no other administrators are attempting to copy code or activate a code load. If the problem persists, contact IBM technical support for assistance.

CMUN06002E *SOURCE* `Operation failure: unable to copy log files`
Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06003E *SOURCE* `Operation failure: unable to copy PE package`
Explanation

The storage management console server reports an internal service advisor error.

CMUN06004E *SOURCE* Operation failure: unable to copy SA logs to the PE package

Explanation

The storage management console server reports an internal service advisor error.

Action

Submit the command from the storage management console with administrator authority. If the problem persists, then re-install the storage management console server software. If the problem still persists, contact IBM technical support for assistance.

CMUN06005E *SOURCE* Operation failure: unable to copy state save
Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06006E *SOURCE* Operation failure: unable to create PE package
Explanation

The storage management console server reports an internal service advisor error. The storage unit might not have sufficient disk space available.

Action

Contact IBM technical support for assistance.

CMUN06007E *SOURCE* Operation failure: results list is empty
Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06008E *SOURCE* Operation failure: console server exception returned to SA
Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06009E *SOURCE* Operation failure: unable to retrieve list of field-replacable units

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06010E *SOURCE* Operation failure: unable to retrieve list of network ports

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06011E *SOURCE* Operation failure: unable to retrieve password

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06012E *SOURCE* Operation failure: unable to retrieve list of storage servers

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06013E *SOURCE* Operation failure: unable to retrieve software version

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06014E *SOURCE* `Operation failure: unable to retrieve trace service`

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06015E *SOURCE* `Operation failure: unable to extract Jar file for package bundle`

Explanation

The storage management console server reports an internal service advisor error. The code load bundle that was downloaded to the storage management console is corrupted.

Action

Download a new copy of the code bundle and try again. If the problem persists, contact IBM technical support for assistance.

CMUN06016E *SOURCE* `Operation failure: file or directory not found`

Explanation

The storage management console server reports an internal service advisor error.

Action

Ensure that the destination and source directories on the storage management console are valid. If the problem persists, contact IBM technical support for assistance.

CMUN06017E *SOURCE* `Operation failure: FTP failure`

Explanation

The storage management console server reports an internal service advisor error. Problem determination data cannot be sent to IBM using file transfer protocol.

Action

1. Ensure that all the files in directory %MR1750_SM_HOME%\send2IBM are valid and can be transferred by FTP.
2. Ensure that network connectivity and firewall access is available.
3. Attempt to resend the data again.
4. If the problem persists, contact IBM technical support for assistance.

CMUN06018E *SOURCE* Unable to activate code load: incompatible hardware and code versions

Explanation

Code load cannot be activated on the storage unit. The hardware on the storage unit is not compatible with the code bundle that you are attempting to load.

Action

Ensure that the engineering change level of the storage unit and the code bundle version level are compatible, and then try again. If the hardware and code versions should be compatible, contact IBM technical support for assistance.

CMUN06019E *SOURCE* Unable to activate code load: incompatible software version in package bundle

Explanation

Code load cannot be activated on the storage unit. The bundle version and the current storage unit software version are incompatible for concurrent code load.

Action

Either perform a non concurrent code load or choose a bundle level that is compatible with the microcode version that is currently running on the storage unit. If you still cannot activate the code load, contact IBM technical support for assistance.

CMUN06020E *SOURCE* Operation failure: invalid code bundle

Explanation

The storage management console server reports an internal service advisor error. The code bundle that was copied to the storage management console is not valid.

Action

Download a new copy of the code bundle and try again. If the problem persists, contact IBM technical support for assistance.

CMUN06021E *SOURCE* Operation failure: invalid file or directory

Explanation

The storage management console server reports an internal service advisor error.
- Environment variables might not be set properly.
- This command can be run from the storage management console only.

Action

1. Submit the command from the storage management console with administrator authority.
2. If the problem persists, then re-install the storage management console server software.
3. If the problem still persists, contact IBM technical support for assistance.

CMUN06022E *SOURCE* `Operation failure: unable to load code bundle`

Explanation

The storage management console server reports an internal service advisor error. The storage management console server software installation might have failed or the code bundle might be invalid.

Action

1. Download a new copy of the code bundle and try again.
2. If the problem persists, then re-install the storage management console server software.
3. If the problem persists, contact IBM technical support for assistance.

CMUN06023E *SOURCE* `Operation failure: unable to mark state save`

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06024E *SOURCE* `Operation failure: possible invalid code bundle`

Explanation

The storage management console server reports an internal service advisor error. The code bundle might not be valid.

Action

Download a new copy of the code bundle and try again. If the problem persists, contact IBM technical support for assistance.

CMUN06025E *SOURCE* `Operation failure: unable to open file`

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN06026E *SOURCE* `Operation failure: an external utility does not run`

Explanation

The utility might not run for one of the following reasons:
- The utility invoked by the service advisor does not exist or the utility has been moved.
- You are not invoking the utility from the storage management console.
- The storage management console server software installation failed.

Action

1. Ensure that the **PUTTY** command is installed properly and its location is specified in the **PATH** environment variable.
2. Ensure that %MR1750_SM_HOME%\bin is specified in the **PATH** environment variable.
3. Run the command from the storage management console with administrator authority.
4. If the problem persists, then re-install the storage management console server software.
5. If the problem still persists, contact IBM technical support for assistance.

CMUN06027E *SOURCE* `Operation failure: thread interupted`

Explanation

The storage management console server reports an internal service advisor error. The program is interrupted for an unknown reason.

Action

Contact IBM technical support for assistance.

CMUN06028E *SOURCE* `Operation failure: timeout`

Explanation

The storage management console server reports an internal service advisor error. The program times out before it completes.

Action

This might be a temporary problem. Resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN06029E *SOURCE* `Operation failure: unknown operating system`

Explanation

The storage management console server reports an internal service advisor error. An unknown operating system is detected.

Action

Install the storage management console server on a supported operating system. If the problem persists, contact IBM technical support for assistance.

CMUN06030E *SOURCE* `Operation failure: environment variable not found`

Explanation

The service advisor relies on environment variables that are initialized when the storage management console server software is installed. The storage management console server software installation might have failed.

Action

Submit the command from the storage management console. If the problem persists, then re-install the storage management console server software. If the problem still persists, contact IBM technical support for assistance.

CMUN06031E *SOURCE* `Operation failure: unable to compress all files to zip file`

Explanation

The storage management console server reports an internal service advisor error.

Action

Contact IBM technical support for assistance.

CMUN80000E `Storage management console server unavailable`

Explanation

The storage management console server cannot be reached over the TCP/IP network. The server might not be enabled, a network problem might exist, or the server might be refusing connections because too many clients are connected.

Action

Ensure the network is functioning properly and the server is enabled. If too many clients are connected, wait until the server has fewer clients. Resubmit the task.

CMUN80001E `An error occurs while communicating with the storage management console server.`

Explanation

This message is displayed only if a specific storage management console server error is not available. The problem might be temporary, due to heavy network traffic, or it might be a more serious condition.

Action

Check network traffic to determine if unusual workloads exist. Check for network adapter hardware errors, configuration changes, or address changes. Resubmit the task. If the problem persists, contact IBM technical support.

CMUN80002E `The client code is not at the same version level as the storage management console server code.`

Explanation

The client and storage management console server code are at different version levels. This can cause miscommunication between the client and server.

Action

Ensure that both client and server code are at the same version level.

CMUN80003E Information for this resource cannot be retrieved.

Explanation

The query for information for this resource cannot run. No specific information about the cause of the failure is available.

Action

Ensure that the correct version of software has been installed. If the problem persists, contact IBM technical support.

CMUN80004E The resource cannot be created.

Explanation

You attempting to create a resource, but an error occurs and the creation cannot be committed. No specific information about the cause of the failure is available.

Action

Ensure that the correct version of software has been installed. Resubmit the task. If the problem persists, contact IBM technical support.

CMUN80005E An error occurs while committing configuration changes.

Explanation

You are attempting to configure a resource, but an error occurs and the configuration cannot be committed. No specific information about the cause of the failure is available.

Action

Ensure that the correct version of software has been installed. Resubmit the task. If the problem persists, contact IBM technical support.

CMUN80006E The information for this resource cannot be retrieved.

Explanation

The query for information on extent usage for the resource cannot run. No specific information about the cause of the failure is available.

Action

Ensure that the correct version of software has been installed. Resubmit the task. If the problem persists, contact IBM technical support.

CMUN80007E Information for this resource cannot be retrieved.

Explanation

No specific information about the cause of the failure is available.

Action

Ensure that the correct version of software has been installed. Resubmit the task. If the problem persists, contact IBM technical support.

CMUN80008E Unknown error
Explanation

While querying for data or committing changes, an error of unknown origin occurs. No specific information about the cause of the failure is available.

Action

Ensure that the correct version of software has been installed. Resubmit the task. If the problem persists, contact IBM technical support.

CMUN80009E The attributes specified for the resource are not valid.
Explanation

You are attempting to create or modify a resource and the system detects one or more attributes that are not valid for that resource.

Action

Ensure that the resource attributes are valid, and then resubmit the task.

CMUN80010E You are not authorized to perform this action through the storage management console.
Explanation

You are attempting to perform an action for which you have no authorization.

Action

Contact your system administrator to change your authorization level. Resubmit the task.

CMUN80011E The connection cannot be made because authentication information is invalid.
Explanation

The authentication information is invalid.

Action

Ensure that correct authentication information is entered. Resubmit the task.

CMUN80012E The IP address of the host cannot be determined.
Explanation

The IP address cannot be determined for the host name that you entered.

Action

Provide the correct host name and IP address, and then resubmit the task.

CMUN80013E Task execution failure: timeout
Explanation

The storage management console server reports a timeout error because the storage management console server or the storage image cannot complete the submitted task within the expected time period.

Action

Wait until the server or storage unit is less busy. Resubmit the task.

Note: If your task involved storage unit configuration changes, first check to see if the task was partially completed before the failure occurred.

CMUN80014E Invalid parameter
Explanation

The storage management console server reports one or more invalid parameters in the specification.

Action

Ensure that the format and data type of the specified parameters are correct. Resubmit the task.

CMUN80015E Resource not found
Explanation

The storage management console server cannot find the specified resource.

Action

Ensure that the resource is configured on the storage complex and is specified correctly in the task. Resubmit the task.

CMUN80016E The storage management console server reports an internal error.
Explanation

The storage management console server reports an internal error.

Action

Ensure that the correct version of the server software has been installed. Resubmit the task. If the problem persists, call technical support.

CMUN80017E *SOURCE* `Copy Services communications error`

Explanation

While communicating with the Copy Services server, the storage management console server reported an error

Action

This might be a temporary problem due to unusually high network traffic. Resubmit the task. If the problem persists, call technical support.

CMUN80018E *SOURCE* `Authentication failure: Your account is locked.`

Explanation

The storage management console server reports an authentication failure. Your account is locked. Access will be denied until the account is unlocked by an administrative user.

Action

Ask your system administrator to unlock your account using the user administration panels. If you are the system administrator, you must use the security recovery utility.

CMUN80019E *SOURCE* `Authentication failure: The security database is not accessible.`

Explanation

The storage management console server reports an authentication failure. The security database is not accessible.

Action

Contact IBM technical support for assistance.

CMUN80020E *SOURCE* `Authentication failure: invalid password`

Explanation

The storage management console server reports an authentication failure. The specified password is invalid.

Action

Specify a valid password, and then resubmit the task.

CMUN80021E *SOURCE* `Authentication failure: Unable to connect to type 2105 machine.`

Explanation

The storage management console server reports an authentication failure that occurs while you are trying to connect to a machine type 2105 Enterprise Storage Server. Your user name and password might not be correctly defined on the 2105, or the user name and password that you supplied might be incorrect.

Action

Ensure that the user name and password that you specify are correctly defined on the type 2105 system, and then resubmit the task. If the problem persists, contact IBM technical support for assistance.

CMUN80022E *SOURCE* Authentication failure: Your password has expired.

Explanation

The storage management console server reports an authentication failure. Your password has expired. You must change your password now.

Action

Enter your expired password, and then change your password to a new password.

CMUN80023E *SOURCE* Authentication failure: Nonexistent account.

Explanation

The storage management console server reports an authentication failure. The specified user account does not exist.

Action

Ask your system administrator to create this account and ensure that it is registered in the security database, or log in using a different user name.

CMUN80024E *SOURCE* Authorization failure: You are not authorized to run this task.

Explanation

The storage management console server reports an authentication failure. You are not authorized to run the task.

Action

Ask your system administrator to grant you the necessary permissions to run the task, and then resubmit the task.

CMUN80025E *SOURCE* Rank creation denied. This rank would exceed the installed LMC feature key enablement. Delete all references to this rank.

Explanation

The installed license machine code does not permit the creation of additional ranks. Your request to create a rank is denied. A reference to this uncreated rank is visible to make the request and denial history available. This reference can be deleted.

Action

Delete the rank reference. Obtain a license for additional ranks, and then resubmit the task.

Accessibility

Accessibility features provide users who have disabilities with the ability to successfully access information and use technology.

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully.

Features

These are the major accessibility features in the IBM TotalStorage DS6000 information:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen. IBM Home Page Reader version 3.0 has been tested.
- You can operate features using the keyboard instead of the mouse.

Navigating by keyboard

You can use keys or key combinations to perform operations and initiate menu actions that can also be done through mouse actions. You can navigate the IBM TotalStorage DS6000 information from the keyboard by using the shortcut keys for your browser or Home Page Reader. See your browser Help for a list of shortcut keys that it supports. See the following Web site for a list of shortcut keys supported by Home Page Reader: http://www-306.ibm.com/able/solution_offerings/keyshort.html

Accessing the publications

You can find HTML versions of the IBM TotalStorage DS6000 information at the following Web site:
http://www.ehone.ibm.com/public/applications/publications/cgibin/pbi.cgi

You can access the information using IBM Home Page Reader 3.0.

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Zulassungsbescheinigung laut Gesetz ueber die elektromagnetische Vertraeglichkeit von Geraeten (EMVG) vom 30. August 1995.

Dieses Geraet ist berechtigt, in Uebereinstimmung mit dem deutschen EMVG das EG-Konformitaetszeichen - CE - zu fuehren.

Der Aussteller der Konformitaetserklaeung ist die IBM Deutschland.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

```
Das Geraet erfuellt die Schutzanforderungen nach EN 50082-1 und
EN 55022 Klasse A.
```

EN 55022 Klasse A Geraete beduerfen folgender Hinweise:

Nach dem EMVG:

```
"Geraete duerfen an Orten, fuer die sie nicht ausreichend entstoert
sind, nur mit besonderer Genehmigung des Bundesministeriums
fuer Post und Telekommunikation oder des Bundesamtes fuer Post und
Telekommunikation
betrieben werden. Die Genehmigung wird erteilt, wenn keine
elektromagnetischen Stoerungen zu erwarten sind." (Auszug aus dem
EMVG, Paragraph 3, Abs.4)
```

```
Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung
mit der entsprechenden Kostenverordnung (Amtsblatt 14/93)
kostenpflichtig.
```

Nach der EN 55022:

```
"Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im
Wohnbereich Funkstoerungen verursachen; in diesem Fall kann vom
Betreiber verlangt werden, angemessene Massnahmen durchzufuehren
und dafuer aufzukommen."
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Anmerkung:

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Um die Einhaltung des EMVG sicherzustellen, sind die Geraete wie in den
Handbuechern angegeben zu installieren und zu betreiben.
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Japanese Voluntary Control Council for Interference (VCCI) class A statement

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Please note that this device has been certified for business use with regard to electromagnetic interference. If you find this is not suitable for your use, you may exchange it for one of residential use.

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Glossary

This glossary includes terms for the IBM TotalStorage and other Resiliency Family products.

This glossary includes selected terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172–1990, copyright 1990 by the American National Standards Institute (ANSI), 11 West 42nd Street, New York, New York 10036. Definitions derived from this book have the symbol (A) after the definition.
- *IBM Terminology*, which is available online at the following Web site: http://www-306.ibm.com/ibm/terminology/index.html. Definitions derived from this source have the symbol (GC) after the definition.
- The *Information Technology Vocabulary* developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions derived from this book have the symbol (I) after the definition. Definitions taken from draft international standards, committee drafts, and working papers that the ISO/IEC JTC1/SC1 is developing have the symbol (T) after the definition, indicating that final agreement has not been reached among the participating National Bodies of SC1.

This glossary uses the following cross-reference forms:

See   Refers the reader to one of two kinds of related information:

- A term that is the expanded form of an abbreviation or acronym. This expanded form of the term contains the full definition.
- A synonym or more preferred term

See also
    Refers the reader to one or more related terms.

Contrast with
    Refers the reader to a term that has an opposite or substantively different meaning.

Numerics

750   A model of the Enterprise Storage Server featuring a 2-way processor with limited physical storage capacity. This model can be updated to the model 800.

800   A model of the Enterprise Storage Server featuring a standard processor or an optional Turbo processor. The Model 800 supports RAID 5, RAID 10, and 15000 rpm drives. Model 800 supersedes Model F20.

1750   The machine type for the IBM TotalStorage DS6000 series. Models for the DS6000 include the 511 and EX1.

2105   The machine number for the IBM TotalStorage Enterprise Storage Server. Models of the Enterprise Storage Server are expressed as the number 2105 followed by "Model *<xxx>*", such as 2105 Model 800. The 2105 Model 100 is an Enterprise Storage Server expansion enclosure that is typically referred to simply as the Model 100.

3390   The machine number of an IBM disk storage system. The Enterprise Storage Server, when interfaced to IBM zSeries hosts, is set up to appear as one or more 3390 devices, with a choice of 3390-2, 3390-3, or 3390-9 track formats.

3990   The machine number of an IBM control unit.

7133   The machine number of an IBM disk storage system. The Model D40 and 020 drawers of the 7133 can be installed in the 2105-100 expansion enclosure of the ESS.

A

access
    1) To obtain the use of a computer resource.

    2) In computer security, a specific type of interaction between a subject and an

object that results in flow of information from one to the other.

access-any mode
One of the two access modes that can be set for the storage unit during initial configuration. It enables all fibre-channel-attached host systems with no defined access profile to access all logical volumes on the storage unit. With a profile defined in DS Storage Manager for a particular host, that host has access only to volumes that are assigned to the WWPN for that host. See also *pseudo host* and *worldwide port name*.

ACK See *request for acknowledgment and acknowledgment*.

agent A program that automatically performs some service without user intervention or on a regular schedule. See also *subagent*.

alert A message or log that a storage unit generates as the result of error event collection and analysis. An alert indicates that a service action is required.

allegiance
For zSeries, a relationship that is created between a device and one or more channel paths during the processing of certain conditions. See also *implicit allegiance*, *contingent allegiance*, and *reserved allegiance*.

allocated storage
The space that is allocated to volumes but not yet assigned. Contrast with *assigned storage*.

American National Standards Institute (ANSI)
An organization of producers, consumers, and general interest groups that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States. (A)

Anonymous
In the DS Storage Manager, the label on an icon that represents all connections that are using fibre-channel adapters between the storage unit and hosts but are not completely defined to the storage unit. See also *anonymous host*, *pseudo host*, and *access-any mode*.

anonymous host
Synonym for *pseudo host*. Contrast with *Anonymous* and *pseudo host*.

ANSI See *American National Standards Institute*.

APAR See *authorized program analysis report*. (GC)

API See *application programming interface*.

application programming interface
An interface that allows an application program that is written in a high-level language to use specific data or functions of the operating system or another program.

arbitrated loop
A fibre-channel topology that enables the interconnection of a set of nodes. See also *point-to-point connection* and *switched fabric*.

array An ordered collection, or group, of physical devices (disk drive modules) that is used to define logical volumes or devices. In the storage unit, an array is a group of disks that the user designates to be managed by the RAID technique. See also *redundant array of independent disks*.

ASCII (American National Standard Code for Information Interchange) The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), that is used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters. (A) Some organizations, including IBM, have used the parity bit to expand the basic code set.

assigned storage
The space that is allocated to a volume and that is assigned to a port.

authorized program analysis report (APAR)
A request for correction of a defect in a current release of an IBM-supplied program. (GC)

availability
The degree to which a system or resource is capable of performing its normal function. See *data availability*.

B

bay The physical space that is used for installing SCSI, ESCON, and fibre-channel host adapter cards. The DS6000 has four bays, two in each cluster. See also *service boundary*.

bit 1) Either of the digits 0 or 1 when used in the binary numeration system. (T)

2) The storage medium required to store a single binary digit. See also *byte*.

block A string of data elements recorded or transmitted as a unit. The elements may be characters, words, or physical records. (T)

A group of consecutive bytes used as the basic storage unit in fixed-block architecture (FBA). All blocks on the storage device are the same size (fixed size). See also *fixed-block architecture* and *data record*.

byte 1) A group of eight adjacent binary digits that represent one EBCDIC character.

2) The storage medium required to store eight bits. See also *bit*.

C

cache A special-purpose buffer storage, smaller and faster than main storage, used to hold a copy of instructions and data obtained from main storage and likely to be needed next by the processor. (T)

cache fast write
A form of the fast-write operation in which the storage server writes the data directly to cache, where it is available for later destaging.

cache hit
An event that occurs when a read operation is sent to the cluster, and the requested data is found in cache. Contrast with *cache miss*.

cache memory
Memory, typically volatile memory, that a storage server uses to improve access times to instructions or data. The cache memory is typically smaller and faster than the primary memory or storage medium. In addition to residing in cache memory, the same data also resides on the storage devices in the storage unit.

cache miss
An event that occurs when a read operation is sent to the cluster, but the data is not found in cache. Contrast with *cache hit*.

call home
A communication link established between the DS6000 and a service provider. The DS6000 can use this link to place a call to IBM or to another service provider when it requires service. With access to the machine, service personnel can perform service tasks, such as viewing error logs and problem logs or initiating trace and dump retrievals. See also *heartbeat* and *remote technical assistance information network*.

cascading
1) Connecting network controllers to each other in a succession of levels to concentrate many more lines than a single level permits.

2) In high-availability cluster multiprocessing (HACMP), cascading pertains to a cluster configuration in which the cluster node with the highest priority for a particular resource acquires the resource if the primary node fails. The cluster node relinquishes the resource to the primary node upon reintegration of the primary node into the cluster.

catcher
A server that service personnel use to collect and retain status data that an DS6000 sends to it.

CCR See *channel command retry*.

CCW See *channel command word*.

CD See *compact disc*.

CEC See *computer-electronic complex*.

channel
For zSeries, the part of a channel subsystem that manages a single I/O interface between a channel subsystem and a set of control units.

channel command retry (CCR)
For zSeries, the protocol used between a channel and a control unit that enables the control unit to request that the channel reissue the current command.

channel command word (CCW)
For zSeries, a data structure that specifies an I/O operation to the channel subsystem.

channel path
For zSeries, the interconnection between a channel and its associated control units.

channel subsystem
For zSeries, the part of a host computer that manages I/O communication between the program and any attached control units.

channel-subsystem image
For zSeries, the logical functions that a system requires to perform the function of a channel subsystem. With ESCON multiple image facility (EMIF), one channel subsystem image exists in the channel subsystem for each logical partition (LPAR). Each image appears to be an independent channel subsystem program, but all images share a common set of hardware facilities.

CKD See *count key data*.

CLI See *command-line interface*. See also *Copy Services command-line interface*.

cluster
1) A partition capable of performing all DS6000 functions. With two clusters in the DS6000, any operational cluster can take over the processing of a failing cluster.

2) In the AIX operating system, a group of nodes within a complex.

cluster processor complex (CPC)
The unit within a cluster that provides the management function for the DS6000. It consists of cluster processors, cluster memory, and related logic.

command-line interface (CLI)
An interface provided by an operating system that defines a set of commands and enables a user (or a script-like language) to issue these commands by typing text in response to the command prompt (for example, DOS commands or UNIX shell commands). See also *Copy Services command-line interface*.

compact disc
An optically read disc, typically storing approximately 660 MB. CD-ROM (compact disc read-only memory) refers to

the read-only format used to distribute DS6000 code and documentation.

compression
1) The process of eliminating gaps, empty fields, redundancies, and unnecessary data to shorten the length of records or blocks.

2) Any encoding that reduces the number of bits used to represent a given message or record. (GC)

computer-electronic complex (CEC)
The set of hardware facilities associated with a host computer.

concurrent copy
A facility on a storage server that enables a program to make a backup of a data set while the logical volume remains available for subsequent processing. The data in the backup copy is frozen at the point in time that the server responds to the request.

concurrent installation of licensed internal code Process of installing licensed internal code on a DS6000 while applications continue to run.

concurrent maintenance
Service that is performed on a unit while it is operational.

concurrent media maintenance
Service performed on a disk drive module (DDM) without losing access to the data.

configure
In storage, to define the logical and physical configuration of the input/output (I/O) subsystem through the user interface that the storage unit provides for this function.

consistency group
A group of volumes participating in FlashCopy relationships in a logical subsystem, across logical subsystems, or across multiple storage units that must be kept in a consistent state to ensure data integrity.

consistency group interval time
The value in seconds that indicates the length of time between the formation of consistency groups.

consistent copy
A copy of a data entity (a logical volume,

for example) that contains the contents of the entire data entity at a single instant in time.

console
> A user interface to a server, for example, the interface provided on a personal computer. See also *IBM TotalStorage Management Console*.

contingent allegiance
> For zSeries, a relationship that is created in a control unit between a device and a channel when the channel accepts unit-check status. The allegiance causes the control unit to guarantee access; the control unit does not present the busy status to the device. The allegiance enables the channel to retrieve sense data that is associated with the unit-check status on the channel path associated with the allegiance.

control path
> The route that is established from the master storage unit to the subordinate storage unit when more than one storage unit participates in a Global Mirror session. If there is only one storage unit (the master) in the Global Mirror session, no control path is required.

control unit (CU)
> 1) A device that coordinates and controls the operation of one or more input/output devices, and synchronizes the operation of such devices with the operation of the system as a whole.
>
> 2) For zSeries, a storage server with ESCON or OEMI interfaces. The control unit adapts a native device interface to an I/O interface that a zSeries host system supports.
>
> 3) The portion of the storage unit that supports the attachment of emulated count key data devices over ESCON, FICON, or OEMI interfaces. See also *cluster*.

control-unit image
> For zSeries, a logical subsystem that is accessed through an ESCON I/O interface. One or more control-unit images exist in each control unit. Each image appears as an independent control unit, but all control-unit images share a common set of hardware facilities. The

DS6000 can emulate 3990-3, TPF, 3990-6, or 2105 control units.

control-unit-initiated reconfiguration (CUIR)
> A software mechanism that the DS6000 uses to request that an operating system of a zSeries host verify that one or more subsystem resources can be taken offline for service. The DS6000 can use this process to automatically vary channel paths offline and online to facilitate bay service or concurrent code installation. Depending on the operating system, support for this process might be model dependent, might depend on the IBM TotalStorage Enterprise Storage Server Subsystem Device Driver, or might not exist.

Coordinated Universal Time (UTC)
> The international standard of time that is kept by atomic clocks around the world.

Copy Services
> A collection of optional software features, with a Web-browser interface, used for configuring, managing, and monitoring data-copy functions.

Copy Services CLI
> See *Copy Services command-line interface*.

Copy Services client
> Software that runs on each DS6000 cluster in the Copy Services server group and that performs the following functions:
> - Communicates configuration, status and connectivity information to the Copy Services server
> - Performs data-copy functions on behalf of the Copy Services server

Copy Services command-line interface (Copy Services CLI)
> The command-line interface software that is provided with DS6000 Copy Services and used for invoking Copy Services functions from host systems attached to the DS6000. See also *command-line interface*.

Copy Services server
> A cluster that the Copy Services administrator designates to perform the DS6000 Copy Services functions.

Copy Services server group
> A collection of user-designated DS6000

clusters participating in Copy Services functions that a designated, active, Copy Services server manages. A Copy Services server group is also called a Copy Services domain.

count field
The first field of a count key data (CKD) record. This eight-byte field contains a four-byte track address (CCHH). It defines the cylinder and head that are associated with the track, and a one-byte record number (R) that identifies the record on the track. It defines a one-byte key length that specifies the length of the record's key field (0 means no key field). It defines a two-byte data length that specifies the length of the record's data field (0 means no data field). Only the end-of-file record has a data length of zero.

count key data (CKD)
For zSeries, a data-record format employing self-defining record formats in which each record is represented by up to three fields: a *count* field that identifies the record and specifies its format, an optional *key* field that identifies the data area contents, and an optional *data* field that typically contains the user data. For CKD records on the storage unit, the logical volume size is defined in terms of the device emulation mode (3390 or 3380 track format). The count field is always 8 bytes long and contains the lengths of the key and data fields, the key field has a length of 0 to 255 bytes, and the data field has a length of 0 to 65 535 or the maximum that will fit on the track. See also *data record*.

CPC   See *cluster processor complex*.

CRC   See *cyclic redundancy check*.

CU   See *control unit*.

CUIR   See *control-unit initiated reconfiguration*.

custom volume
A volume in count-key-data (CKD) format that is not a standard volume, which means that it does not necessarily present the same number of cylinders and capacity to its assigned logical control unit as provided by one of the following standard zSeries volume types: 3390-2, 3390-3, 3390-9, 3390-2 (3380-track

mode), or 3390-3 (3380-track mode). See also *count-key-data*, *interleave*, *standard volume*, and *volume*.

CUT   See *Coordinated Universal Time*.

cyclic redundancy check (CRC)
A redundancy check in which the check key is generated by a cyclic algorithm. (T)

cylinder
A unit of storage on a CKD device with a fixed number of tracks.

D

DA   See *device adapter*. See also *IBM Serial Storage adapter*.

daisy chain
See *serial connection*.

DASD   See *direct access storage device*.

DASD fast write (DFW)
A function of a storage server in which active write data is stored in nonvolatile cache, thus avoiding exposure to data loss.

data availability
The degree to which data is available when needed, typically measured as a percentage of time that the system would be capable of responding to any data request (for example, 99.999% available).

data compression
A technique or algorithm used to encode data such that the encoded result can be stored in less space than the original data. The original data can be recovered from the encoded result through a reverse technique or reverse algorithm. See also *compression*.

Data Facility Storage Management Subsystem (DFSMS)
An operating environment that helps automate and centralize the management of storage. To manage storage, DFSMS provides the storage administrator with control over data class, storage class, management class, storage group, and automatic class selection routine definitions.

data field
The optional third field of a count key data (CKD) record. The count field specifies the

length of the data field. The data field contains data that the program writes.

data record
The basic unit of zSeries storage on a DS6000, also known as a count-key-data (CKD) record. Data records are stored on a track. The records are sequentially numbered starting with 0. The first record, R0, is typically called the track descriptor record and contains data that the operating system normally uses to manage the track. See also *count-key-data* and *fixed-block architecture*.

data set FlashCopy
For zSeries hosts, a feature of FlashCopy that indicates how many partial volume FlashCopy relationships are active on a volume.

data sharing
The ability of multiple host systems to concurrently utilize data that they store on one or more storage devices. The storage unit enables configured storage to be accessible to any, or all, attached host systems. To use this capability, the host program must be designed to support data that it is sharing.

DDM See *disk drive module*.

DDM group
See *disk pack*.

dedicated storage
Storage within a storage unit that is configured such that a single host system has exclusive access to the storage.

demote
To remove a logical data unit from cache memory. A storage server demotes a data unit to make room for other logical data units in the cache or because the logical data unit is not valid. The storage unit must destage logical data units with active write units before they can be demoted. See also *destage*.

destage
To move data from an online or higher priority to an offline or lower priority device. The storage unit stages incoming data into cache and then destages it to disk.

device
For zSeries, a disk drive.

device adapter (DA)
A physical component of the DS6000 that provides communication between the clusters and the storage devices. The DS6000 has eight device adapters that it deploys in pairs, one from each cluster. Device adapter pairing enables the DS6000 to access any disk drive from either of two paths, providing fault tolerance and enhanced availability.

device address
For zSeries, the field of an ESCON device-level frame that selects a specific device on a control-unit image.

device ID
The unique two-digit hexadecimal number that identifies the logical device.

device interface card
A physical subunit of a storage cluster that provides the communication with the attached device drive modules.

device number
For zSeries, a four-hexadecimal-character identifier, for example 13A0, that the systems administrator associates with a device to facilitate communication between the program and the host operator. The device number is associated with a subchannel.

device sparing
A subsystem function that automatically copies data from a failing device drive module to a spare device drive module. The subsystem maintains data access during the process.

DFS See *distributed file service*.

DFSMS
See *Data Facility Storage Management Subsystem*.

direct access storage device (DASD)
1) A mass storage medium on which a computer stores data.

2) A disk device.

disk cage
A container for disk drives. Each disk cage supports eight disk packs (64 disks).

disk drive
Standard term for a disk-based nonvolatile

storage medium. The DS6000 uses hard disk drives as the primary nonvolatile storage media to store host data.

disk drive module (DDM)
A field replaceable unit that consists of a single disk drive and its associated packaging.

disk drive module group
See *disk pack*.

disk pack
A group of disk drive modules (DDMs) installed as a unit in a DDM bay.

disk group
A collection of 4 disk drives that are connected to the same pair of IBM Serial Storage adapters and can be used to create a RAID array. A disk group can be formatted as count key data or fixed block, and as RAID or non-RAID, or it can be left unformatted. A disk group is a logical assemblage of disk drives. Contrast with *disk pack*.

distributed file service (DFS)
A service that provides data access over IP networks.

DNS See *domain name system*.

domain
1) That part of a computer network in which the data processing resources are under common control.

2) In TCP/IP, the naming system used in hierarchical networks.

3) A Copy Services server group, in other words, the set of clusters the user designates to be managed by a particular Copy Services server.

domain name system (DNS)
In TCP/IP, the server program that supplies name-to-address translation by mapping domain names to internet addresses. The address of a DNS server is the internet address of the server that hosts the DNS software for the network.

dotted decimal notation
A convention used to identify IP addresses. The notation consists of four 8-bit numbers written in base 10. For example, 9.113.76.250 is an IP address that contains the octets 9, 113, 76, and 250.

drawer
A unit that contains multiple device drive modules and provides power, cooling, and related interconnection logic to make the device drive modules accessible to attached host systems.

drive 1) A peripheral device, especially one that has addressed storage media. See also *disk drive module*.

2) The mechanism used to seek, read, and write information on a storage medium.

DS6000
See *IBM TotalStorage DS6000*.

DS6000 Batch Configuration tool
A program that automatically configures a DS6000. The configuration is based on data that IBM service personnel enter into the program.

DS Storage Manager
See *IBM TotalStorage DS Storage Manager*.

duplex
1) Regarding Copy Services, the state of a volume pair after Remote Mirror and Copy has completed the copy operation and the volume pair is synchronized.

2) In general, pertaining to a communication mode in which data can be sent and received at the same time.

dynamic sparing
The ability of a storage server to move data from a failing disk drive module (DDM) to a spare DDM while maintaining storage functions.

E

E10 The predecessor of the F10 model of the Enterprise Storage Server. See also *F10*.

E20 The predecessor of the F20 model of the Enterprise Storage Server. See also *F20*.

EBCDIC
See *extended binary-coded decimal interchange code*.

EC See *engineering change*.

ECKD See *extended count key data*.

eight pack
See *disk pack*.

electrostatic discharge (ESD)
    An undesirable discharge of static electricity that can damage equipment and degrade electrical circuitry.

emergency power off (EPO)
    A means of turning off power during an emergency, usually a switch.

EMIF See *ESCON multiple image facility*.

enclosure
    A unit that houses the components of a storage subsystem, such as a control unit, disk drives, and power source.

end of file
    A coded character recorded on a data medium to indicate the end of the medium. On a count-key-data direct access storage device, the subsystem indicates the end of a file by including a record with a data length of zero.

engineering change (EC)
    An update to a machine, part, or program.

Enterprise Systems Architecture/390 (ESA/390)
    An IBM architecture for mainframe computers and peripherals. Processor systems that follow the ESA/390 architecture include the ES/9000® family. See also *z/Architecture*.

Enterprise Systems Connection (ESCON)
    1) A zSeries computer peripheral interface. The I/O interface uses zSeries logical protocols over a serial interface that configures attached units to a communication fabric.

    2) A set of IBM products and services that provide a dynamically connected environment within an enterprise.

EPO See *emergency power off*.

ERDS See *error-recording data set*.

ERP See *error recovery procedure*.

error-recording data set (ERDS)
    On zSeries hosts, a data set that records data-storage and data-retrieval errors. A service information message (SIM) provides the error information for the ERDS.

error recovery procedure (ERP)
    Procedures designed to help isolate and, where possible, to recover from errors in equipment. The procedures are often used in conjunction with programs that record information on machine malfunctions.

ESA/390
    See *Enterprise Systems Architecture/390*.

ESCD See *ESCON director*.

ESCON
    See *Enterprise System Connection*.

ESCON channel
    A zSeries channel that supports ESCON protocols.

ESCON director (ESCD)
    An I/O interface switch that allows the interconnection of multiple ESCON interfaces in a distributed-star topology.

ESCON host systems
    zSeries hosts that attach to the DS6000 with an ESCON adapter. Such host systems run on operating systems that include MVS, VSE, TPF, or versions of VM.

ESCON multiple image facility (EMIF)
    For zSeries, a function that enables LPARs to share an ESCON channel path by providing each LPAR with its own channel-subsystem image.

EsconNet
    In the DS Storage Manager, the label on a pseudo host icon that represents a host connection that uses the ESCON protocol and that is not completely defined on the DS6000. See also *pseudo host* and *access-any mode*.

ESD See *electrostatic discharge*.

eserver
    See *IBM e(logo)server*.

ESSNet
    See *IBM TotalStorage Enterprise Storage Server Network*.

express configuration
    A method for configuring a storage complex, where the storage server simplifies the task by making several configuration decisions for the user.

extended binary-coded decimal interchange code (EBCDIC)
    An IBM-developed coding scheme used to represent various alphabetic, numeric, and special symbols with a coded character set of 256 eight-bit codes.

extended count key data (ECKD)
An extension of the count key data (CKD) architecture.

extent A continuous space on a disk that is occupied by or reserved for a particular data set, data space, or file. The unit of increment is a track. See also *multiple allegiance* and *parallel access volumes*.

extent pool
A groups of extents. See also *extent*.

F

fabric In fibre-channel technology, a routing structure, such as a switch, receives addressed information and routes to the appropriate destination. A fabric can consist of more than one switch. When multiple fibre-channel switches are interconnected, they are said to be *cascaded*.

failback
Pertaining to a cluster recovery from failover following repair. See also *failover*.

failover
Pertaining to the process of transferring all control to a single cluster when the other cluster in the storage unit fails. See also *cluster* and *failback*.

fast write
A write operation at cache speed that does not require immediate transfer of data to a disk drive. The subsystem writes the data directly to cache, to nonvolatile storage, or to both. The data is then available for destaging. A fast-write operation reduces the time an application must wait for the I/O operation to complete.

FBA See *fixed-block architecture*.

FC See *feature code*. **Note**: *FC* is a common abbreviation for fibre channel in the industry, but the DS6000 customer documentation library reserves *FC* for feature code.

FC-AL See *Fibre Channel-Arbitrated Loop*.

FCP See *fibre-channel protocol*.

FCS See *fibre-channel standard*.

feature code (FC)
A code that identifies a particular orderable option and that is used by service personnel to process hardware and software orders. Individual optional features are each identified by a unique feature code.

fibre channel
A data-transmission architecture based on the ANSI Fibre Channel standard, which supports full-duplex communication. The DS6000 supports data transmission over fiber-optic cable through its fibre-channel adapters. See also *fibre-channel protocol* and *fibre-channel standard*.

Fibre Channel-Arbitrated Loop (FC-AL)
An implementation of the Fibre Channel standard that uses a ring topology for the communication fabric. Refer to American National Standards Institute (ANSI) X3T11/93-275. In this topology, two or more fibre-channel end points are interconnected through a looped interface.

fibre-channel connection (FICON)
A fibre-channel communications protocol designed for IBM mainframe computers and peripherals.

fibre-channel protocol (FCP)
A protocol used in fibre-channel communications with five layers that define how fibre-channel ports interact through their physical links to communicate with other ports.

Fibre-Channel standard (FCS)
An ANSI standard for a computer peripheral interface. The I/O interface defines a protocol for communication over a serial interface that configures attached units to a communication fabric. The protocol has two layers. The IP layer defines basic interconnection protocols. The upper layer supports one or more logical protocols (for example, FCP for SCSI command protocols and SBCON for zSeries command protocols). Refer to American National Standards Institute (ANSI) X3.230-199x. See also *fibre-channel protocol*.

fibre-channel topology
An interconnection topology supported on fibre-channel adapters. See also *point-to-point connection*, *switched fabric*, and *arbitrated loop*.

FICON
See *fibre-channel connection*.

FiconNet

In the DS Storage Manager, the label on a pseudo host icon that represents a host connection that uses the FICON protocol and that is not completely defined on the DS6000. See also *pseudo host* and *access-any mode*.

field replaceable unit (FRU)

An assembly that is replaced in its entirety when any one of its components fails. In some cases, a field replaceable unit might contain other field replaceable units. (GC)

FIFO　See *first-in-first-out*.

File Transfer Protocol (FTP)

In TCP/IP, an application protocol used to transfer files to and from host computers. See also *Transmission Control Protocol/Internet Protocol*.

firewall

A protection against unauthorized connection to a computer or a data storage system. The protection is usually in the form of software on a gateway server that grants access to users who meet authorization criteria.

first-in-first-out (FIFO)

A queuing technique in which the next item to be retrieved is the item that has been in the queue for the longest time. (A)

fixed-block architecture (FBA)

An architecture for logical devices that specifies the format of and access mechanisms for the logical data units on the device. The logical data unit is a block. All blocks on the device are the same size (fixed size). The subsystem can access them independently.

fixed-block device

An architecture for logical devices that specifies the format of the logical data units on the device. The logical data unit is a block. All blocks on the device are the same size (fixed size); the subsystem can access them independently. This is the required format of the logical data units for host systems that attach with a SCSI or fibre-channel interface. See also *fibre channel* and *small computer systems interface*.

FlashCopy

An optional feature of the DS6000 that can make an instant copy of data, that is, a point-in-time copy of a volume.

FlashCopy relationship

A mapping of a FlashCopy source volume and a FlashCopy target volume that allows a point-in-time copy of the source volume to be copied to the target volume. FlashCopy relationships exist from the time that you initiate a FlashCopy operation until the storage unit copies all data from the source volume to the target volume or until you delete the FlashCopy relationship, if it is persistent.

FRU　See *field replaceable unit*.

FTP　See *File Transfer Protocol*.

full duplex

See *duplex*.

fuzzy copy

A function of the Global Copy feature wherein modifications to the primary logical volume are performed on the secondary logical volume at a later time. The original order of update is not strictly maintained. See also *Global Copy*.

G

GB　See *gigabyte*.

GDPS　See *Geographically Dispersed Parallel Sysplex*.

Geographically Dispersed Parallel Sysplex (GDPS)

A zSeries multisite application-availability solution.

gigabyte (GB)

A gigabyte of storage is 10^9 bytes. A gigabyte of memory is 2^{30} bytes.

Global Copy

An optional capability of the DS6000 remote mirror and copy feature that maintains a fuzzy copy of a logical volume on the same DS6000 or on another DS6000. In other words, all modifications that any attached host performs on the primary logical volume are also performed on the secondary logical volume at a later point in time. The original order of update is not strictly maintained. See also *Remote Mirror and Copy* and *Metro Mirror*.

Global Mirror

An optional capability of the DS6000 remote mirror and copy feature that provides a 2-site extended distance remote copy. Data that is written by the host to the storage unit at the local site is automatically maintained at the remote site. See also *Metro Mirror* and *Remote Mirror and Copy*.

group In DS6000 documentation, a nickname for two different kinds of groups, depending on the context. See *disk pack* or *Copy Services server group*.

H

HA See *host adapter*.

HACMP

See *High-Availability Cluster Multi-Processing*.

hard disk drive (HDD)

1) A storage medium within a storage server used to maintain information that the storage server requires.

2) A mass storage medium for computers that is typically available as a fixed disk (such as the disks used in system units of personal computers or in drives that are external to a personal computer) or a removable cartridge.

hardware service manager (HSM)

An option on an AS/400 or iSeries host that enables the user to display and work with system hardware resources and to debug input-output processors (IOP), input-output adapters (IOA), and devices.

HCD See *Hardware Configuration Data*.

HDA See *head and disk assembly*.

HDD See *hard disk drive*.

hdisk An AIX term for storage space.

head and disk assembly (HDA)

The portion of an HDD associated with the medium and the read/write head.

heartbeat

A status report sent at regular intervals from the DS6000. The service provider uses this report to monitor the health of the call home process. See also *call home*, *heartbeat call home record*, and *remote technical assistance information network*.

heartbeat call home record

Machine operating and service information sent to a service machine. These records might include such information as feature code information and product logical configuration information.

hierarchical storage management

1) A function in storage management software, such as Tivoli Storage Management or Data Facility Storage Management Subsystem/MVS (DFSMS/MVS), that automatically manages free space based on the policy that the storage administrator sets.

2) In AS/400 storage management, an automatic method to manage and distribute data between the different storage layers, such as disk units and tape library devices.

High-Availability Cluster Multi-Processing (HACMP)

Software that provides host clustering, so that a failure of one host is recovered by moving jobs to other hosts within the cluster.

high-speed link (HSL)

A hardware connectivity architecture that links system processors to system input/output buses and other system units.

home address

A nine-byte field at the beginning of a track that contains information that identifies the physical track and its association with a cylinder.

hop Interswitch connection. A hop count is the number of connections that a particular block of data traverses between source and destination. For example, data traveling from one hub over a wire to another hub traverses one hop.

host See *host system*.

host adapter

A physical subunit of a storage server that provides the ability to attach to one or more host I/O interfaces.

host name

The Internet address of a machine in the network. The host name can be entered in the host definition as the fully qualified domain name of the attached host system, such as `mycomputer.city.company.com`, or

as the subname of the fully qualified
domain name, for example, `mycomputer`.
See also *host system*.

host processor
A processor that controls all or part of a
user application network. In a network, the
processing unit in which the data
communication access method resides.
See also *host system*.

host system
A computer, either of the mainframe (for
example, zSeries) or of the open-systems
type, that is connected to theDS6000.
zSeries hosts are connected to the
DS6000 through ESCON interfaces.
Open-systems hosts are connected to the
DS6000 by SCSI or fibre-channel
interfaces.

hot plug
Pertaining to the ability to add or remove
a hardware facility or resource to a unit
while power is on.

HSL See *high-speed link*.

HSM See *hierarchical storage management* or
Hardware Service Manager.

I

i5/OS The IBM operating system that runs the
IBM i5/OS and e(logo)Server i5 server
families of servers.

IBM e(logo)server
The IBM brand name for a series of
server products that are optimized for
e-commerce. The products include the
iSeries, pSeries, xSeries, and zSeries.

IBM product engineering (PE)
The third-level of IBM service support.
Product engineering is composed of IBM
engineers who have experience in
supporting a product or who are
knowledgeable about the product.

IBM Serial Storage adapter
A physical adapter based on the IBM
Serial Storage architecture. IBM Serial
Storage adapters connect disk drive
modules to DS6000 clusters.

IBM TotalStorage
The brand name used to identify storage
products from IBM, including the IBM
TotalStorage DS6000. See also *IBM*

TotalStorage DS6000 and *IBM*
TotalStorage DS Storage Manager.

IBM TotalStorage DS6000
A member of the IBM TotalStorage
Resiliency Family of storage servers and
attached storage devices (disk drive
modules). The DS6000 delivers
high-performance, fault-tolerant storage
and management of enterprise data,
affording access through multiple
concurrent operating systems and
communication protocols. High
performance is provided by multiple
symmetrical multiprocessors, integrated
caching, RAID support for the disk drive
modules, and disk access through a
high-speed serial storage architecture
interface.

IBM TotalStorage DS CLI
The command-line interface (CLI) that is
specific to the DS6000.

**IBM TotalStorage DS Storage Manager (DS
Storage Manager)**
Software with a Web-browser interface for
configuring the DS6000.

**IBM TotalStorage Enterprise Storage Server
Network (ESSNet)**
A private network providing Web browser
access to the Enterprise Storage Server.
IBM installs the ESSNet software on an
IBM workstation called the IBM
TotalStorage ESS Master Console,
supplied with the first ESS delivery.

IBM TotalStorage Management Console (MC)
An IBM workstation that acts as the focal
point for configuration, Copy Services
management, and maintenance for the
DS6000 . It includes a Web browser that
provides links to the user interface,
including the DS Storage Manager and
the DS6000 Copy Services.

**IBM TotalStorage Multipath Subsystem Device
Driver (SDD)**
Software that is designed to support the
multipath configuration environments of
the DS6000. The SDD resides in a host
system with the native disk device driver.

IBM TotalStorage Resiliency Family
A set of hardware and software features
and products, as well as integrated
software and services that are available
on theIBM TotalStorage DS6000 and the

IBM TotalStorage Enterprise Storage Server, Models 750 and 800.

IML   See *initial microcode load*.

implicit allegiance
> In Enterprise Systems Architecture/390, a relationship that a control unit creates between a device and a channel path when the device accepts a read or write operation. The control unit guarantees access to the channel program over the set of channel paths that it associates with the allegiance.

initial microcode load (IML)
> The action of loading microcode for a computer into that computer's storage.

initial program load (IPL)
> The action of loading software into a computer, typically an operating system that controls the computer.

initiator
> A SCSI device that communicates with and controls one or more targets. Contrast with *target*.

i-node The internal structure in an AIX operating system that describes the individual files in the operating system. It contains the code, type, location, and owner of a file.

input/output (I/O)
> Pertaining to (a) input, output, or both or (b) a device, process, or channel involved in data input, data output, or both.

input/output configuration data set
> A configuration definition built by the I/O configuration program (IOCP) and stored on disk files associated with the processor controller.

interleave
> To automatically create two striped partitions across the drives in a RAID-5 array, both of which use the count-key-data (CKD) record format.

Internet Protocol (IP)
> In the Internet suite of protocols, a protocol without connections that routes data through a network or interconnecting networks and acts as an intermediary between the higher protocol layers and the physical network. The upper layer supports one or more logical protocols (for example, a SCSI-command protocol and a zSeries command protocol). Refer to ANSI

X3.230-199*x*. The IP acronym is the IP in TCP/IP. See also *Transmission Control Protocol/Internet Protocol*.

invalidate
> To remove a logical data unit from cache memory because it cannot support continued access to the logical data unit on the device. This removal might be the result of a failure within the storage server or a storage device that is associated with the device.

I/O   See *input/output*.

I/O adapter (IOA)
> An input-output adapter on the PCI bus.

IOCDS
> See *input/output configuration data set*.

IOCP See *I/O Configuration Program*.

I/O Configuration Program (IOCP)
> A program that defines to a system all the available I/O devices and channel paths.

I/O device
> An addressable read and write unit, such as a disk drive device, magnetic tape device, or printer.

I/O interface
> An interface that enables a host to perform read and write operations with its associated peripheral devices.

I/O Priority Queueing
> A facility in the Workload Manager of zSeries that enables the system administrator to set priorities for queueing I/Os from different system images. See also *multiple allegiance* and *parallel access volume*.

I/O processor (IOP)
> Controls input-output adapters and other devices.

I/O sequential response time
> The time an I/O request is queued in processor memory waiting for previous I/Os to the same volume to complete.

IOSQ See *I/O sequential response time*.

IP   See *Internet Protocol*.

IPL   See *initial program load*.

iSeries
> An IBM e(logo)server product that

emphasizes integration. It is the successor to the AS/400 family of servers.

J

Java Virtual Machine (JVM)
A software implementation of a central processing unit (CPU) that runs compiled Java code (applets and applications). (GC)

JVM See *Java Virtual Machine*.

K

KB See *kilobyte*.

key field
The second (optional) field of a count key data record. The key length is specified in the count field. The key length determines the field length. The program writes the data in the key field and uses the key field to identify or locate a given record. The subsystem does not use the key field.

kilobyte (KB)
1) For processor storage, real, and virtual storage, and channel volume, 2^{10} or 1024 bytes.

2) For disk storage capacity and communications volume, 1000 bytes.

Korn shell
Interactive command interpreter and a command programming language.

KPOH See *thousands of power-on hours*.

L

LAN See *local area network*.

last-in first-out (LIFO)
A queuing technique in which the next item to be retrieved is the item most recently placed in the queue. (A)

LBA See *logical block address*.

LCU See *logical control unit*.

least recently used (LRU)
1) The algorithm used to identify and make available the cache space that contains the least-recently used data.

2) A policy for a caching algorithm that chooses to remove from cache the item that has the longest elapsed time since its last access.

LED See *light-emitting diode*.

LMC See *licensed machine code*.

licensed machine code (LMC)
Microcode that IBM does not sell as part of a machine, but licenses to the customer. LMC is implemented in a part of storage that is not addressable by user programs. Some IBM products use it to implement functions as an alternate to hard-wired circuitry.

LIFO See *last-in first-out*.

light-emitting diode (LED)
A semiconductor chip that gives off visible or infrared light when activated.

link address
On an ESCON interface, the portion of a source or destination address in a frame that ESCON uses to route a frame through an ESCON director. ESCON associates the link address with a specific switch port that is on the ESCON director. Equivalently, it associates the link address with the channel subsystem or control unit link-level functions that are attached to the switch port.

link-level facility
The ESCON hardware and logical functions of a control unit or channel subsystem that allow communication over an ESCON write interface and an ESCON read interface.

local area network (LAN)
A computer network located on a user's premises within a limited geographic area.

local e-mail
An e-mail configuration option for storage servers that are connected to a host-system network that does not have a domain name system (DNS) server.

logical address
On an ESCON interface, the portion of a source or destination address in a frame used to select a specific channel-subsystem or control-unit image.

logical block address (LBA)
The address assigned by the DS6000 to a sector of a disk.

logical control unit (LCU)
See *control-unit image*.

logical data unit
A unit of storage that is accessible on a given device.

logical device
The facilities of a storage server (such as the DS6000) associated with the processing of I/O operations directed to a single host-accessible emulated I/O device. The associated storage is referred to as a logical volume. The logical device is mapped to one or more host-addressable units, such as a device on a zSeries I/O interface or a logical unit on a SCSI I/O interface, such that the host initiating I/O operations to the I/O-addressable unit interacts with the storage on the associated logical device.

logical partition (LPAR)
For zSeries, a set of functions that create the programming environment in which more than one logical partition (LPAR) is established on a processor. An LPAR is conceptually similar to a virtual machine environment except that the LPAR is a function of the processor. Also, the LPAR does not depend on an operating system to create the virtual machine environment.

logical path
1) The relationship between a channel image and a control-unit image that designates the physical path to be used for device-level communications between these images. The logical path is established as part of the channel and control-unit initialization procedures by the exchange of link-level frames.

2) With the Remote Mirror and Copy feature, the relationship between a source logical subsystem (LSS) and a target LSS that is created over a physical path through the interconnection fabric that is used for Remote Mirror and Copy functions. An LSS is a primary control unit, which performs the functions of a channel image.

logical subsystem (LSS)
A topological construct that consists of a group of up to 256 logical devices. A DS6000 can have up to 16 CKD-formatted logical subsystems (4096 CKD logical devices) and also up to 16 fixed-block logical subsystems (4096 fixed-block logical devices). The logical subsystem

facilitates configuration of the DS6000 and might have other implications relative to the operation of certain functions. There is a one-to-one mapping between a CKD logical subsystem and a zSeries control-unit image.

For zSeries hosts, a logical subsystem represents a logical control unit (LCU). Each control-unit image is associated with only one logical subsystem. See also *control-unit image*.

logical unit
In open systems, a logical disk drive.

logical unit number (LUN)
In the SCSI protocol, a unique number that is used on a SCSI bus to enable it to differentiate between separate devices, each of which is a logical unit.

logical volume
The storage medium that is associated with a logical disk drive. A logical volume typically resides on one or more storage devices. The DS6000 administrator defines this unit of storage. The logical volume, when residing on a RAID-formatted array, is spread over the drives in the array.

logical volume manager (LVM)
A set of system commands, library routines, and other tools that allow the user to establish and control logical volume storage. The LVM maps data between the logical view of storage space and the physical disk drive module.

longitudinal redundancy check (LRC)
1) A method of error checking during data transfer that involves checking parity on a row of binary digits that are members of a set that forms a matrix. Longitudinal redundancy check is also called a longitudinal parity check.

2) A mechanism that the DS6000 uses for locating errors. The LRC checks the data as it progresses from the host, through theDS6000 controller, into the device adapter, and to the array.

longwave laser adapter
A connector that is used between a host and the DS6000 to support longwave fibre-channel communication.

loop The physical connection between a pair of device adapters in the DS6000. See also *device adapter*.

LPAR See *logical partition*.

LRC See *longitudinal redundancy check*.

LRU See *least recently used*.

LSS See *logical subsystem*.

LUN See *logical unit number*.

LVM See *logical volume manager*.

M

machine level control (MLC)
A database that contains the EC level and configuration of products in the field.

machine reported product data (MRPD)
Product data gathered by a machine and sent to a destination such as an IBM support server or RETAIN. These records might include such information as feature code information and product logical configuration information.

mainframe
A computer, usually in a computer center, with extensive capabilities and resources to which other computers may be connected so that they can share facilities. (T)

maintenance analysis procedure (MAP)
A hardware maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of a failure.

management console
See *IBM TotalStorage Management Console*.

Management Information Base (MIB)
1) A collection of objects that can be accessed by means of a network management protocol. (GC)

2) The MIB record conforms to the Open Systems Interconnection (OSI) standard defined by the International Organization for Standardization (ISO) for the exchange of information. See also *simple network management protocol*.

MAP See *maintenance analysis procedure*.

master storage unit
The physical unit that controls the creation of consistency groups in a Global Mirror session. The master storage unit sends commands to subordinate storage units. A storage unit can be a master for only one Global Mirror session. Contrast with *subordinate storage unit*.

maximum consistency group drain time
The value in seconds that indicates the maximum time that writes from the local site are delayed to the remote site while the current consistency group is being formed at the remote site. When this time is exceeded, the current attempt to form a consistency group is ended and another attempt is started. If this time is exceeded five times, this maximum time is ignored on the next attempt to form a consistency group. The default value is the larger of four minutes or two times the consistency group interval time if this value is set to zero.

maximum coordination time
The value in milliseconds that indicates the maximum time that is allowed for host I/O to be delayed during the coordination of the primary volumes of an Global Mirror session. The default is 50 milliseconds if this value is set to zero.

MB See *megabyte*.

MC See *IBM TotalStorage Management Console*.

MCA See *Micro Channel architecture*.

MDM See *Multiple Device Manager*.

mean time between failures (MTBF)
1) A projection of the time that an individual unit remains functional. The time is based on averaging the performance, or projected performance, of a population of statistically independent units. The units operate under a set of conditions or assumptions.

2) For a stated period in the life of a functional unit, the mean value of the lengths of time between consecutive failures under stated conditions. (I) (A)

medium
For a storage unit, the disk surface on which data is stored.

megabyte (MB)
1) For processor storage, real and virtual storage, and channel volume, 2^{20} or 1 048 576 bytes.

2) For disk storage capacity and communications volume, 1 000 000 bytes.

Metro Mirror
A function of a storage server that maintains a consistent copy of a logical volume on the same storage server or on another storage server. All modifications that any attached host performs on the primary logical volume are also performed on the secondary logical volume. See also *Remote Mirror and Copy* and *Global Copy*.

MES   See *miscellaneous equipment specification*.

MIB   See *management information base*.

Micro Channel architecture (MCA)
The rules that define how subsystems and adapters use the Micro Channel bus in a computer. The architecture defines the services that each subsystem can or must provide.

Microsoft Internet Explorer (MSIE)
Web browser software manufactured by Microsoft.

migration
The replacement of a system or subsystem with a different type of system or subsystem, such as replacing a SCSI host adapter with a fibre-channel host adapter. In the context of data migration regarding the DS6000, the transfer of data from one storage unit to another, such as from a 3390 to the DS6000.

MIH   See *missing-interrupt handler*.

mirrored pair
Two units that contain the same data. The system refers to them as one entity.

mirroring
In host systems, the process of writing the same data to two disk units within the same auxiliary storage pool at the same time.

miscellaneous equipment specification (MES)
IBM field-installed change to a machine.

missing-interrupt handler (MIH)
An MVS and MVS/XA facility that tracks

I/O interrupts. MIH informs the operator and creates a record whenever an expected interrupt fails to occur before a specified elapsed time is exceeded.

MLC   See *machine level control*.

mobile solutions terminal (MoST)
The mobile terminal used by service personnel.

mode conditioning patch cable
A cable that converts a single-mode signal from a longwave adapter into a light signal that is appropriate for multimode fibre. Another mode conditioning patch cable is required at the terminating end of the multimode fibre to convert the signal back to a single-mode signal for a longwave adapter.

Model 100
A 2105 Model 100, often simply referred to as a Mod 100, is an expansion enclosure for the Enterprise Storage Server. See also *2105*.

MoST   See *mobile solutions terminal*.

MRPD   See *machine reported product data*.

MSA   See *multiport serial adapter*.

MSIE   See *Microsoft Internet Explorer*.

MTBF   See *mean time between failures*.

Multipath Subsystem Device Driver
See *IBM TotalStorage DS6000 Multipath Subsystem Device Driver*.

multiple allegiance
A DS6000 hardware function that is independent of software support. This function enables multiple system images to concurrently access the same logical volume on the DS6000 as long as the system images are accessing different extents. See also *extent* and *parallel access volumes*.

Multiple Device Manager (MDM)
A component of the IBM TotalStorage Productivity Center that allows administrators to configure, manage, and monitor the performance of SAN storage devices from a single console.

multiple relationship FlashCopy
An option of the DS6000 that creates backup copies from one source to multiple

targets by simultaneously establishing multiple FlashCopy relationships.

multiple virtual storage (MVS)
Implies MVS/390, MVS/XA, MVS/ESA, and the MVS element of the zSeries operating system.

multiplex
The action of transmitting simultaneously.

multiport serial adapter (MSA)
An adapter on the IBM TotalStorage Management Console that has multiple ports to which aDS6000 can be attached.

multiprocessor
A computer that includes two or more processors that have common access to a main storage. For the DS6000, the multiprocessors operate in parallel.

MVS See *multiple virtual storage*.

N

name server
A server that stores names of the participating DS6000 clusters.

Netfinity
IBM Intel-processor-based server; predecessor to the IBM xSeries server.

Netscape Navigator
Web browser software manufactured by Netscape.

network manager
A program or group of programs that is used to monitor, manage, and diagnose the problems of a network. (GC)

node The unit that is connected in a fibre-channel network. A DS6000 is a node in a fibre-channel network.

non-RAID
A disk drive set up independently of other disk drives and not set up as part of a disk pack to store data using the redundant array of disks (RAID) data-striping methodology.

nonremovable medium
A recording medium that cannot be added to or removed from a storage device.

nonvolatile storage (NVS)
Memory that stores active write data to avoid data loss in the event of a power loss.

NVS See *nonvolatile storage*.

O

octet In Internet Protocol addressing, one of the four parts of a 32-bit integer presented in dotted decimal notation. See also *dotted decimal notation*.

OEMI See *original equipment manufacturer's information*.

open system
A system whose characteristics comply with standards made available throughout the industry and that therefore can be connected to other systems complying with the same standards. Applied to the DS6000, such systems are those hosts that connect to the DS6000 through SCSI or FCP protocols. See also *small computer system interface* and *fibre-channel protocol*.

organizationally unique identifier (OUI)
An IEEE-standards number that identifies an organization with a 24-bit globally unique assigned number referenced by various standards. OUI is used in the family of 802 LAN standards, such as Ethernet and Token Ring.

original equipment manufacturer's information (OEMI)
A reference to an IBM guideline for a computer peripheral interface. The interface uses ESA/390 logical protocols over an I/O interface that configures attached units in a multidrop bus topology.

OS/390
The IBM operating system that includes and integrates functions that many IBM software products (including the MVS operating system) previously provided for the IBM S/390 family of enterprise servers.

OUI See *organizationally unique identifier*.

P

panel The formatted display of information that appears on a display screen.

parallel access volume (PAV)
An advanced function of the DS6000 that enables OS/390 and z/OS systems to issue concurrent I/O requests against a count key data logical volume by

associating multiple devices of a single control-unit image with a single logical device. Up to eight device addresses can be assigned to a PAV. The PAV function enables two or more concurrent write operations to the same logical volume, as long as the write operations are not to the same extents. See also *extent*, *I/O Priority Queueing*, and *multiple allegiance*.

parity A data checking scheme used in a computer system to ensure the integrity of the data. The RAID implementation uses parity to re-create data if a disk drive fails.

path group
In zSeries architecture, a set of channel paths that are defined to a control unit as being associated with a single logical partition (LPAR). The channel paths are in a group state and are online to the host. See also *logical partition*.

path group identifier
In zSeries architecture, the identifier that uniquely identifies a given logical partition (LPAR). The path group identifier is used in communication between the LPAR program and a device. The identifier associates the path group with one or more channel paths, thereby defining these paths to the control unit as being associated with the same LPAR. See also *logical partition*.

PAV See *parallel access volume*.

PCI See *peripheral component interconnect*.

PDU See *protocol data unit*.

PE See *IBM product engineering*.

peripheral component interconnect (PCI)
An architecture for a system bus and associated protocols that supports attachments of adapter cards to a system backplane.

persistent FlashCopy
A state where a FlashCopy relationship remains indefinitely until the user deletes it. The relationship between the source and target volumes is maintained after a background copy completes.

physical path
A single path through the I/O interconnection fabric that attaches two units. For Copy Services, this is the path from a host adapter on one DS6000

(through cabling and switches) to a host adapter on anotherDS6000.

pinned data
Data that is held in cache until either an error condition is corrected and it can be moved to disk storage or until the data is discarded by a host command. Pinned data conditions can only occur on an ESS Model 800 during fast-write or dual-copy functions.

point-in-time copy
A FlashCopy option that creates an instantaneous view of original source data at a specific moment in time.

point-to-point connection
A fibre-channel topology that enables the direct interconnection of ports. See also *arbitrated loop* and *switched fabric*.

port A physical connection on a host adapter to the cable that connects the DS6000 to hosts, switches, or another DS6000. The DS6000 uses SCSI and ESCON host adapters that have two ports per adapter, and fibre-channel host adapters that have one port. See also *ESCON*, *fibre channel*, *host adapter*, and *small computer system interface*.

POST See *power-on self test*.

power-on self test (POST)
A diagnostic test that servers or computers run when they are turned on.

predictable write
A write operation that can cache without knowledge of the existing format on the medium. All write operations on FBA DASD devices are predictable. On CKD DASD devices, a write operation is predictable if it does a format write operation for the first data record on the track.

primary control unit
The DS6000 to which a Remote Mirror and Copy primary device is physically attached.

processor complex
A partition of a storage server that is capable of performing all defined functions of the storage server. Multiple processor complexes provide redundancy.

product engineering
See *IBM product engineering*.

program

On a computer, a generic term for software that controls the operation of the computer. Typically, the program is a logical assemblage of software modules that perform multiple related tasks.

program-controlled interruption

An interruption that occurs when an I/O channel fetches a channel command word with the program-controlled interruption flag on.

program temporary fix (PTF)

A temporary solution to, or bypass of, a problem diagnosed by IBM as the result of a defect in a current unaltered release of a licensed program. (GC)

promote

To add a logical data unit to cache memory.

protected volume

In AS/400, a disk storage device that is protected from data loss by RAID techniques. An AS/400 host does not mirror a volume configured as a protected volume, while it does mirror all volumes configured as unprotected volumes. The DS6000, however, can be configured to indicate that an AS/400 volume is protected or unprotected and give it RAID protection in either case.

protocol data unit (PDU)

A unit of data specified in the protocol of a given layer and consisting of protocol control information for the layer and, possibly, user data for the layer.

pSeries

The product name of an IBM e(logo)server product that emphasizes performance. It is the successor to the RS/6000 family of servers.

pseudo host

A host connection that is not explicitly defined to the DS6000 and that has access to at least one volume that is configured on the DS6000. The FiconNet pseudo host icon represents the FICON protocol. The EsconNet pseudo host icon represents the ESCON protocol. The pseudo host icon labelled Anonymous represents hosts connected through the FCP protocol. *Anonymous host* is a commonly used synonym for *pseudo host*.

The DS6000 adds a pseudo host icon only when it is set to access-any mode. See also *access-any mode*.

PTF See *program temporary fix*.

PV Links

Short for Physical Volume Links, an alternate pathing solution from Hewlett-Packard that provides for multiple paths to a volume, as well as static load balancing.

R

R0 See *track-descriptor record*.

rack See *enclosure*.

RAID See *redundant array of independent disks*. RAID is also commonly expanded to redundant array of *inexpensive* disks. See also *array*.

RAID 5

A type of RAID that optimizes cost-effective performance while emphasizing use of available capacity through data striping. RAID 5 provides fault tolerance for up to two failed disk drives by distributing parity across all the drives in the array plus one parity disk drive. The DS6000 automatically reserves spare disk drives when it assigns arrays to a device adapter pair (DA pair). See also *device adapter*, *RAID 10*, and *redundant array of independent disks*.

RAID 10

A type of RAID that optimizes high performance while maintaining fault tolerance for up to two failed disk drives by striping volume data across several disk drives and mirroring the first set of disk drives on an identical set. The DS6000 automatically reserves spare disk drives when it assigns arrays to a device adapter pair (DA pair). See also *device adapter*, *RAID 5*, and *redundant array of independent disks*.

random access

A mode of accessing data on a medium in a manner that requires the storage device to access nonconsecutive storage locations on the medium.

rank See *array*.

redundant array of independent disks (RAID)

A methodology of grouping disk drives for

managing disk storage to insulate data from a failing disk drive.

refresh FlashCopy target volume
An option (previously called *incremental FlashCopy*) of the DS6000 that creates a point-in-time data copy without copying an entire volume for each point-in-time copy.

Remote Mirror and Copy
A feature of a storage server that constantly updates a secondary copy of a logical volume to match changes made to a primary logical volume. The primary and secondary volumes can be on the same storage server or on separate storage servers. See also *Global Mirror*, *Metro Mirror* and *Global Copy*.

remote technical assistance information network (RETAIN)
The initial service tracking system for IBM service support, which captures heartbeat and call-home records. See also *support catcher* and *support catcher telephone number*.

REQ/ACK
See *request for acknowledgment and acknowledgment*.

request for acknowledgment and acknowledgment (REQ/ACK)
A cycle of communication between two data transport devices for the purpose of verifying the connection, which starts with a request for acknowledgment from one of the devices and ends with an acknowledgment from the second device. The REQ and ACK signals help to provide uniform timing to support synchronous data transfer between an initiator and a target. The objective of a synchronous data transfer method is to minimize the effect of device and cable delays.

reserved allegiance
For zSeries, a relationship that is created in a control unit between a device and a channel path, or path group, when the device completes a Sense Reserve command. The allegiance causes the control unit to guarantee access (that is, busy status is not presented) to the device. Access is over the set of channel paths that are associated with the allegiance; access is for one or more channel programs until the allegiance ends.

RETAIN
See *remote technical assistance information network*.

S

S/390 IBM enterprise servers based on Enterprise Systems Architecture/390 (ESA/390). *S/390* is the currently accepted shortened form of the original name *System/390*.

S/390 storage
Storage arrays and logical volumes that are defined as connected to S/390 servers. This term is synonymous with count-key-data storage.

SAID See *system adapter identification number*.

SAM See *sequential access method*.

SAN See *storage area network*.

SBCON
See *Single-Byte Command Code Sets Connection*.

screen
The physical surface of a display device upon which information is shown to users.

SCSI See *small computer system interface*.

SCSI device
A disk drive connected to a host through an I/O interface using the SCSI protocol. A SCSI device is either an initiator or a target. See also *initiator* and *small computer system interface*.

SCSI-FCP
Synonym for fibre-channel protocol, a protocol used to transport data between an open-systems host and a fibre-channel adapter on an DS6000. See also *fibre-channel protocol* and *small computer system interface*.

SCSI host systems
Host systems that are attached to the DS6000 with a SCSI interface. Such host systems run on UNIX, i5/OS, Windows NT, Windows 2000, or Novell NetWare operating systems.

SCSI ID
A unique identifier assigned to a SCSI device that is used in protocols on the SCSI interface to identify or select the device. The number of data bits on the SCSI bus determines the number of

available SCSI IDs. A wide interface has 16 bits, with 16 possible IDs.

SDD See *IBM Subsystem Multipathing Device Driver*.

secondary control unit
The DS6000 to which a Remote Mirror and Copy secondary device is physically attached.

self-timed interface (STI)
An interface that has one or more conductors that transmit information serially between two interconnected units without requiring any clock signals to recover the data. The interface performs clock recovery independently on each serial data stream and uses information in the data stream to determine character boundaries and inter-conductor synchronization.

sequential access
A mode of accessing data on a medium in a manner that requires the storage device to access consecutive storage locations on the medium.

sequential access method (SAM)
An access method for storing, deleting, or retrieving data in a continuous sequence based on the logical order of the records in the file.

serial connection
A method of device interconnection for determining interrupt priority by connecting the interrupt sources serially.

server A host that provides certain services to other hosts that are referred to as clients.

A functional unit that provides services to one or more clients over a network. (GC)

service boundary
A category that identifies a group of components that are unavailable for use when one of the components of the group is being serviced. Service boundaries are provided on the DS6000, for example, in each host bay and in each cluster.

service information message (SIM)
A message sent by a storage server to service personnel through an zSeries operating system.

service personnel
A generalization referring to individuals or companies authorized to service the DS6000. The terms *service provider*, *service representative*, and *IBM service support representative (SSR)* refer to types of service personnel. See also *service support representative*.

service processor
A dedicated processing unit that is used to service a storage unit.

service support representative (SSR)
Individuals or a company authorized to service the DS6000. This term also refers to a service provider, a service representative, or an IBM service support representative (SSR). An IBM SSR installs the DS6000.

SES SCSI Enclosure Services.

session
A collection of volumes within a logical subsystem that are managed together during the creation of consistent copies of data. All volumes in a session must transfer their data successfully to the remote site before the increment can be called complete.

SFP Small form factor pluggables.

shared storage
Storage that is configured so that multiple hosts can concurrently access the storage. The storage has a uniform appearance to all hosts. The host programs that access the storage must have a common model for the information on a storage device. The programs must be designed to handle the effects of concurrent access.

shortwave laser adapter
A connector that is used between host and DS6000 to support shortwave fibre-channel communication.

SIM See *service information message*.

Simple Network Management Protocol (SNMP)
In the Internet suite of protocols, a network management protocol that is used to monitor routers and attached networks. SNMP is an application layer protocol. Information on devices managed is defined and stored in the application's Management Information Base (MIB). (GC) See also *management information base*.

simplex volume
A volume that is not part of a FlashCopy, XRC, or PPRC volume pair.

Single-Byte Command Code Sets Connection (SBCON)
The ANSI standard for the ESCON I/O interface.

small computer system interface (SCSI)
A standard hardware interface that enables a variety of peripheral devices to communicate with one another. (GC)

smart relay host
A mail relay or mail gateway that has the capability to correct e-mail addressing problems.

SMIT See *System Management Interface Tool*.

SMP See *symmetrical multiprocessor*.

SNMP See *Simple Network Management Protocol*.

SNMP agent
A server process that resides on a network node and is responsible for communicating with managers regarding that node. The node is represented as a managed object, which has various fields or variables that are defined in the appropriate MIB.

SNMP manager
A managing system that runs a managing application or suite of applications. These applications depend on Management Information Base (MIB) objects for information that resides on the managed system. Managers generate requests for this MIB information, and an SNMP agent on the managed system responds to these requests. A request can either be the retrieval or modification of MIB information.

software transparency
Criteria applied to a processing environment that states that changes do not require modifications to the host software in order to continue to provide an existing function.

source device
One of the devices in a dual-copy or remote-copy volume pair. All channel commands to the logical volume are directed to the source device. The data on

the source device is duplicated on the target device. See also *target device*.

spare A disk drive on the DS6000 that can replace a failed disk drive. A spare can be predesignated to allow automatic dynamic sparing. Any data preexisting on a disk drive that is invoked as a spare is destroyed by the dynamic sparing copy process.

spatial reuse
A feature of serial storage architecture that enables a device adapter loop to support many simultaneous read/write operations. See also *serial storage architecture*.

SSID See *subsystem identifier*.

SSR See *service support representative*.

stacked status
For zSeries, the condition when the control unit is in a holding status for the channel, and the last time the control unit attempted to present the status, the channel responded with the stack-status control.

stage operation
The operation of reading data from the physical disk drive into the cache.

staging
To move data from an offline or low-priority device back to an online or higher priority device, usually on demand of the system or on request of the user.

standard volume
A volume that emulates one of several zSeries volume types, including 3390-2, 3390-3, 3390-9, 3390-2 (3380-track mode), or 3390-3 (3380-track mode), by presenting the same number of cylinders and capacity to the host as provided by the native zSeries volume type of the same name.

STI See *self-timed interface*.

storage area network
A network that connects a company's heterogeneous storage resources.

storage capacity
The amount of data that a storage medium can hold; usually expressed in kilobytes, megabytes, or gigabytes.

storage complex
A configuration of one or more storage units that is managed by a management console.

storage device
A physical unit that provides a mechanism to store data on a given medium such that it can be subsequently retrieved. See also *disk drive module*.

storage extent
The minimum contiguous range of storage on a physical storage device, array, or rank that can be allocated to a local volume

storage server
A physical unit that manages attached storage devices and provides an interface between them and a host computer by providing the function of one or more logical subsystems. The storage server can provide functions that the storage device does not provide. The storage server has one or more clusters.

storage unit
A physical unit that consists of a storage server that is integrated with one or more storage devices that provide storage capability to a host computer.

storage unit identifier
A unique identifier for a storage unit that consists of a manufacturer, a model number, a type number, a plant of manufacture, and a sequence number.

striping
A technique that distributes data in bit, byte, multibyte, record, or block increments across multiple disk drives.

subagent
An extension to an SNMP agent that permits a user to dynamically add, or in some cases replace, additional management variables in the local MIB, thereby providing a means of extending the range of information that network managers can access. See also *agent*.

subchannel
A logical function of a channel subsystem associated with the management of a single device.

subordinate storage unit
The physical unit that receives commands from the master storage unit and is specified when a Global Mirror session is started. The subordinate storage unit forms consistency groups and performs other Global Mirror processing. A subordinate storage unit can be controlled by only one master storage unit. Contrast with *master storage unit*.

subsystem identifier (SSID)
A number that uniquely identifies a logical subsystem within a computer installation.

support catcher
See *catcher*.

support catcher telephone number
The telephone number that connects the support catcher server to the DS6000 to receive a trace or dump package. See also *support catcher* and *remote technical assistance information network*.

switched fabric
A fibre-channel topology in which ports are interconnected through a switch. Fabric switches can also be interconnected to support numerous ports on a single network. See also *arbitrated loop* and *point-to-point connection*.

symmetrical multiprocessor (SMP)
An implementation of a multiprocessor computer consisting of several identical processors configured in a way that any subset of the set of processors is capable of continuing the operation of the computer. TheDS6000 contains four processors set up in SMP mode.

synchronous write
A write operation whose completion is indicated after the data has been stored on a storage device.

System/390
See *S/390*.

system adapter identification number (SAID)
The unique identification number that is automatically assigned to each DS6000 host adapter for use by Copy Services.

System Management Interface Tool (SMIT)
An interface tool of the AIX operating system for installing, maintaining, configuring, and diagnosing tasks.

System Modification Program
A program used to install software and software changes on MVS systems.

T

TAP See *Telocator Alphanumeric Protocol*.

target A SCSI device that acts as a subordinate to an initiator and consists of a set of one or more logical units, each with an assigned logical unit number (LUN). The logical units on the target are typically I/O devices. A SCSI target is analogous to a zSeries control unit. See also *small computer system interface*.

target device
One of the devices in a dual-copy or remote-copy volume pair that contains a duplicate of the data that is on the source device. Unlike the source device, the target device might only accept a limited subset of data. See also *source device.*

TB See *terabyte*.

TCP/IP
See *Transmission Control Protocol/Internet Protocol*.

Telocator Alphanumeric Protocol (TAP)
An industry standard protocol for the input of paging requests.

terabyte (TB)
1) Nominally, 1 000 000 000 000 bytes, which is accurate when speaking of bandwidth and disk storage capacity.

2) For DS6000 cache memory, processor storage, real and virtual storage, a terabyte refers to 2^{40} or 1 099 511 627 776 bytes.

terminal emulator
A function of the management console that allows it to emulate a terminal.

thousands of power-on hours (KPOH)
A unit of time used to measure the mean time between failures (MTBF).

time sharing option (TSO)
An operating system option that provides interactive time sharing from remote terminals.

TotalStorage
See *IBM TotalStorage*.

TPF See *transaction processing facility*.

track A unit of storage on a CKD device that can be formatted to contain a number of data records. See also *home address*, *track-descriptor record*, and *data record*.

track-descriptor record (R0)
A special record on a track that follows the home address. The control program uses it to maintain certain information about the track. The record has a count field with a key length of zero, a data length of 8, and a record number of 0. This record is sometimes referred to as R0.

transaction processing facility (TPF)
A high-availability, high-performance IBM operating system, designed to support real-time, transaction-driven applications. The specialized architecture of TPF is intended to optimize system efficiency, reliability, and responsiveness for data communication and database processing. TPF provides real-time inquiry and updates to a large, centralized database, where message length is relatively short in both directions, and response time is generally less than three seconds. Formerly known as the Airline Control Program/Transaction Processing Facility (ACP/TPF).

Transmission Control Protocol (TCP)
A communications protocol used in the Internet and in any network that follows the Internet Engineering Task Force (IETF) standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It uses the Internet Protocol (IP) as the underlying protocol.

Transmission Control Protocol/Internet Protocol (TCP/IP)
1) A combination of data-transmission protocols that provide end-to-end connections between applications over interconnected networks of different types.

2) A suite of transport and application protocols that run over the Internet Protocol. (GC) See also *Internet Protocol* and *Transmission Control Protocol*.

transparency
See *software transparency*.

TSO See *time sharing option*.

turbo processor
A faster multiprocessor that has six processors with common access to the main storage.

U

UFS   UNIX filing system.

Ultra-SCSI
An enhanced small computer system interface.

unconfigure
To delete the configuration.

unit address
For zSeries, the address associated with a device on a given control unit. On ESCON interfaces, the unit address is the same as the device address. On OEMI interfaces, the unit address specifies a control unit and device pair on the interface.

unprotected volume
An AS/400 term that indicates that the AS/400 host recognizes the volume as an unprotected device, even though the storage resides on a RAID-formatted array and is, therefore, fault tolerant by definition. The data in an unprotected volume can be mirrored. Also referred to as an *unprotected device*.

upper-layer protocol
The layer of the Internet Protocol (IP) that supports one or more logical protocols (for example, a SCSI-command protocol and an ESA/390 command protocol). Refer to ANSI X3.230-199*x.*

UTC   See *Coordinated Universal Time.*

V

virtual machine facility
A virtual data processing machine that appears to the user to be for the exclusive use of that user, but whose functions are accomplished by sharing the resources of a shared data processing system. An alternate name for the VM/370 IBM operating system.

vital product data (VPD)
Information that uniquely defines the system, hardware, software, and microcode elements of a processing system.

VM   The root name of several IBM operating systems, such as VM/XA, VM/ESA, VM/CMS, and z/VM. See also *virtual machine facility.*

volume
For zSeries, the information recorded on a single unit of recording medium. Indirectly, it can refer to the unit of recording medium itself. On a nonremovable-medium storage device, the term can also indirectly refer to the storage device associated with the volume. When multiple volumes are stored on a single storage medium transparently to the program, the volumes can be referred to as logical volumes.

volume group
A collection of either physical or logical volumes.

volume label
A unique identifier that a user assigns to a logical volume.

VPD   See *vital product data.*

VSE/ESA
An IBM operating system, the letters of which represent virtual storage extended/enterprise systems architecture.

W

worldwide node name (WWNN)
A unique 64-bit identifier for a host that contains a fibre-channel port. See also *worldwide port name.*

worldwide port name (WWPN)
A unique 64-bit identifier associated with a fibre-channel adapter port. It is assigned in an implementation- and protocol-independent manner. See also *worldwide node name*

write hit
A write operation in which the requested data is in the cache.

write penalty
The performance impact of a classical RAID-5 write operation.

WWNN
See *worldwide node name.*

WWPN
See *worldwide port name.*

X

xSeries
The product name of an IBM e(logo)server product that emphasizes industry-standard

server scalability and self-managing server technologies. It is the successor to the Netfinity family of servers.

Z

z/Architecture
An IBM architecture for mainframe computers and peripherals. The IBM e(logo)server zSeries family of servers uses the z/Architecture architecture. It is the successor to the S/390 and 9672 family of servers. See also *iSeries.*

z/OS An operating system for the IBM e(logo)server product line that supports 64-bit real storage.

z/OS Global Mirror
A function of a storage server that assists a control program to maintain a consistent copy of a logical volume on another storage unit. All modifications of the primary logical volume by any attached host are presented in order to a single host. The host then makes these modifications on the secondary logical volume. This function was formerly called extended remote copy or XRC.

zSeries
An IBM e(logo)server family of servers that emphasizes near-zero downtime.

IBM enterprise servers based on z/Architecture.

zSeries storage
Storage arrays and logical volumes that are defined in the DS6000 as connected to zSeries servers.

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Command-Line Interface
User's Guide

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