

IBM TotalStorage® DS6000



Migrating

IBM TotalStorage® DS6000



Migrating

Note:

Before using this information and the product it supports, read the information in "Notices" on page 31.

Twenty-fifth Edition (April 2007)

© Copyright International Business Machines Corporation 2004, 2007. All rights reserved.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Tables	v	Chapter 10. Obtaining services for a storage unit	23
Notices and publication information	vii	Chapter 11. Data migration from a UNIX-based host system to a DS6000 storage unit	25
Safety notices	vii	Migrating data to a DS6000 storage unit using volume management methods	25
Environmental notices.	vii	Migrating data using the direct copy method	26
Product recycling and disposal.	vii	Migrating data using backup and restore methods	26
Battery return program	viii	Migrating data from an eServer i5 400 or iSeries host system to the DS6000	26
How to send your comments	ix	Chapter 12. Migrating data between DS6000 storage units	29
Chapter 1. Migrating	1	Migrating data between storage units.	29
Chapter 2. Migrating data to a storage unit.	3	Moving workloads when migrating data between storage units	29
Chapter 3. Considerations for replacing existing storage	5	Offloading workloads when migrating data between storage units	30
Chapter 4. How to select a data migration method	7	Notices	31
Chapter 5. Migrating data from an S/390 or zSeries host system to the DS6000 storage unit	9	Accessibility	32
Chapter 6. Migrating data from a Windows 2000 or Windows Server 2003-based host system	11	Trademarks	33
Chapter 7. Using backup and restore methods to migrate data	13	Terms and conditions	34
Chapter 8. Overview of the logical volume management software	15	Electronic emission notices	35
Copying a complete logical volume	15	Federal Communications Commission (FCC) statement	35
Using mirroring to migrate data	16	Industry Canada compliance statement	35
Using the migratepv command.	16	European Union EMC Directive conformance statement	35
Using the direct copy method	18	Japanese Voluntary Control Council for Interference (VCCI) class A statement.	37
Chapter 9. Reformatting disk drive modules on open systems	21	Korean Ministry of Information and Communication (MIC) statement	37
		Taiwan class A compliance statement.	37
		Index	39

Tables

Notices and publication information

This section contains information about safety notices that are used in this guide, environmental notices for this product, publication information, and information about sending your comments to IBM.

Safety notices

Complete this task 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 System Storage Solutions Safety Notices for IBM Versatile Storage Server and IBM System Storage Enterprise Storage Server, GC26-7229*.

Environmental notices

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

Product recycling and disposal

This unit contains recyclable materials.

This unit must be recycled or discarded according to applicable local and national regulations. IBM® encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.



Notice: This mark applies only to countries within the European Union (EU) and Norway.

Appliances are labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

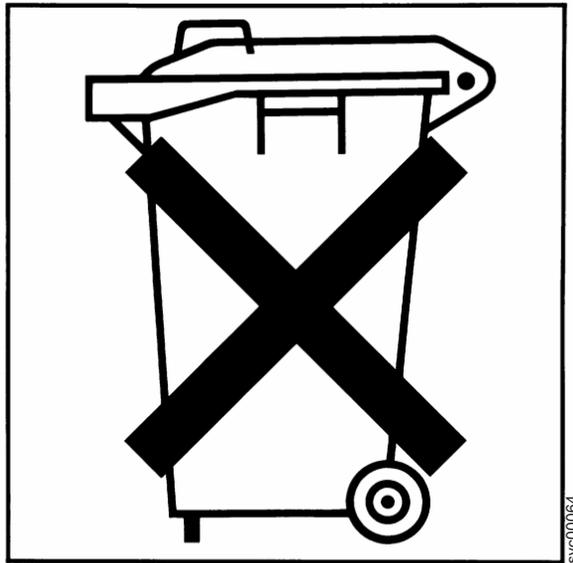
In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

Battery return program

This product may contain sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to <http://www.ibm.com/ibm/environment/products/index.shtml> or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and other battery packs from IBM Equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Please have the IBM part number listed on the battery available prior to your call.

In the Netherlands the following applies:



For Taiwan:



Please recycle batteries.

廢電池請回收

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

Chapter 1. Migrating

The topics in this section provide migration information related to your DS6000. Topics covered include migration considerations and processes.

Chapter 2. Migrating data to a storage unit

The DS6000 supports over 90 operating systems. You can migrate data to a storage unit from these host and operating system environments. The planning and methods of data migration vary by environment.

When you replace existing storage, you can partition the storage so that its virtual disks are similar in configuration to the disk drives that they are replacing. New configurations must be large enough to accommodate the existing data. Also, when data is moved, the data must be in a certain state, typically requiring that updates or changes cease while the movement occurs. Depending on the amount of data that you are moving and your migrating method, data could be unavailable for an extended period of time, perhaps several hours.

Your system administrator must select the data migration method that is the best compromise between efficiency and impact on the users of your system.

The following list is representative of the host and operating system environments supported by the DS6000:

- AIX
- OS/400
- iSeries (IBM i5/OS)
- zSeries (z/OS, z/OS.e, z/VM, VSE/ESA, UNIX, and TPF1)
- TRU64 UNIX
- Windows 2000 Server and Advanced Server with SP4
- Windows 2003
- Windows XP with SP1

Data migration is a service offered through IBM Global Services. Contact your IBM Representative for more information.

Chapter 3. Considerations for replacing existing storage

There are various factors to consider (remapping, reformatting of disk drives, partitioning) when replacing existing storage.

When you are replacing existing storage, partition the storage so that its virtual disks are similar in configuration to the disk drives that they are replacing. New configurations must be large enough to accommodate the existing data.

Note: You might want to take advantage of this opportunity to do some remapping. The allocation and distribution of data does not have to be a straight one-to-one relationship, although that is possible. For instance, you can take advantage of using a maximum of 64 logical subsystems whereas the prior limitation was 32 logical subsystems.

Chapter 4. How to select a data migration method

Your system administrator selects the data migration method that is the best compromise between efficiency and impact on the users of the system.

Most methods of data migration affect the everyday operation of a computer system. When data is moved, the data must be in a certain state, typically requiring that updates or changes cease while the movement occurs. Depending on the amount of data that you are moving and your migrating method, data could be unavailable for an extended period of time, perhaps several hours. The following factors might contribute to the migration time:

- Creating new logical volumes or file systems
- Modifying configuration files
- Receiving integrity checks

The following items are more than likely among the topics considered by your system administrator to determine the best method to use to migrate your data:

- Management software provides simple robust methods that you can generally use during production without disturbing users.
- The AIX® logical volume manager (LVM) provides methods that you can use at any time without disrupting user access to the data. You might notice a small performance degradation, but this is preferable to shutting down databases or requiring users to log off the system.

Notes:

- AIX and HP-UX 11.xx ship with logical volume management (LVM) software as part of the base operating system. LVM provides complete control over all disks and file systems that exist on an AIX system. HP-UX has similar volume management software.
- Sun Microsystems has a basic volume management product called Solstice, which is available for the Solaris systems.
- Methods that use backup and restore procedures generally have the most impact on the system usage. They require that databases and file systems be in quiescent states to ensure a valid snapshot of the data.

Chapter 5. Migrating data from an S/390 or zSeries host system to the DS6000 storage unit

You can use various methods to migrate data from an S/390 or zSeries host system to a DS6000 storage unit. The correct method depends on your environment and system.

The following table highlights a few of the data migration methods available:

Environment or Operating System	Data Migration Method
S/390 environment	IBM System Storage™ Global Mirror , Remote Mirror and Copy (when available)
zSeries environment	IBM System Storage Global Mirror , Remote Mirror and Copy (when available)
z/OS operating system	<ul style="list-style-type: none"> • DFSMSdss (simplest method) • DFSMShsm • IDCAMS EXPORT/IMPORT (VSAM) • IDCAMS REPRO (VSAM, SAM, BDAM) • IEBCOPY (partitioned data set (PDS), including load module libraries, and PDSE) • ICEGENER (SAM), part of DFSORT • IEBGENER (SAM) • Specialized database utilities for CICS, DB2, or IMS • Softek Transparent Data Migration Facility (TDMF), available from IBM as a data migration service
VM operating system	DFSMS/VM with the following functions: <ul style="list-style-type: none"> • DASD Dump Restore—Used to dump data from disk to tape, restore data from tape to disk, and copy data between like disk drive volumes. You cannot use DDR to copy data between disk devices with different track formats. • CMDISK—A DIRMAINT command used to move minidisks from any device types that VM supports to any other type. • COPYFILE—A CMS command used to copy files or minidisks between devices with the same or different track modes. • PTAPE—A Control Program (CP) command used to dump spool files to tape and to load files from tape to disk.

Environment or Operating System	Data Migration Method
VSE operating system	<ul style="list-style-type: none"> • Backup and Restore dialogs • VSE fastcopy command to move volumes and files between devices with identical track formats. • VSE ditto command to copy files. • VSE power command to transfer the spool queue from one device to another. • VSE REPRO or EXPORT/IMPORT function to move any VSAM data set.

Chapter 6. Migrating data from a Windows 2000 or Windows Server 2003-based host system

Use the following information as a guide for how to migrate data from a Windows 2000 or Windows Server 2003-based host system.

You can migrate data from Windows 2000-based host systems into an storage unit by mirroring the data and splitting the mirrors (similar to the method described for UNIX systems). Create a full backup of the data before attempting any data migration. Migrating data maintains file ownership, permissions, and the date and time while the copy is made. The drag-and-drop function and the **xcopy** command might cause ownership problems to date-related information in the copy of the new data.

Mirroring the data and splitting the mirrors requires some outage to rename drive letters at the end of the migration. If the mirroring tool that the operating system supplies cannot be used (for example, if drive sizes in the old and new systems are not the same), you might be able to use a third-party mirroring tool to accomplish the same goal. If an outage occurs, you can copy Windows 2000 data to the new disk using the **scopy** command.

Chapter 7. Using backup and restore methods to migrate data

Use the following information as a guide for how to use the backup and restore methods to migrate data.

In some cases, the only method that is available to transfer data is to back it up to tape and then restore it to the new disk. This method is slower because tape devices require that you move the data twice. However, if you are removing disks before you install the DS6000, the only way to move the data is with a tape device.

You can find a number of different archive utilities on UNIX systems. The **cpio** command can also create and read archives on tape devices. Use the **-o** (output) option to create archives, and use the **-i** (input) option to read and extract data from archives.

AIX provides a pair of commands: **backup** and **restore**. The **backup** command has two different methods of creating archives, either by file name or by the i-node. Use the **restore** command to read any archive that is created by the **backup** command. Solaris and HP-UX provide the **dump** and **restore** commands, which backup and restore data by the i-node.

The **tar** command is available on all UNIX systems that support the DS6000 and is another way to create and extract tape archives. Use the **c** option to create archives. Use the **x** option to extract files from archives.

Chapter 8. Overview of the logical volume management software

The logical volume manager (LVM) software migrates data at a single logical volume level, a physical volume (DDM) level, or entire contents of a volume group. The LVM software provides complete control over all disks and file systems.

The primary tasks involved in migrating data using the LVM rely upon the use of LVM commands that affect the following functions:

- Copying
- Mirroring
- Migrating

Direct copy is another method to migrate data. While this method uses LVM, its main focus is on the use of the UNIX® **find** command and the **cpio** command.

Copying a complete logical volume

Use this information as a guide for using the logical volume manager (LVM) **cplv** command to copy a complete logical volume.

The AIX LVM provides the **cplv** command for copying logical volumes within volume groups or to different volume groups. You can use this command to create a new logical volume while running the command, or you can overwrite an existing logical volume. The following two examples shows how to use the **cplv** command.

```
# cplv -v datavg -y newlv oldlv
# cplv -e existinglv oldlv
```

In the first example, the **cplv** command copies data from the existing logical volume `oldlv`. It creates a new logical volume that it calls `newlv` (`-y`) in the volume group `datavg` (`-v`). If you omit the `-v` option, the volume group to which the existing logical volume belongs receives the new logical volume. When the **cplv** command creates a new logical volume, it creates the new volume with exactly the same characteristics as the existing logical volume.

In the second example, the **cplv** command copies data from existing logical volume `oldlv` to existing logical volume `existinglv` (`-e`). When you use the `-e` option, it overwrites the existing target-logical volume with the data from the source-logical volume. When you use the `-e` option, it maintains the characteristics of the existing target-logical volume. Take care when you use this option.

The **cplv** command is a good method for copying or migrating a single logical volume. Sometimes, however, you might need to migrate all the data from a physical volume.

Using mirroring to migrate data

Use the following information as guide for how to use the mirroring function of logical volume manager (LVM) to migrate data. Mirroring can only be used on logical volumes. It cannot be used for physical volumes.

Mirroring is an LVM task that you perform only on logical volumes to migrate data. The following example shows how to create a mirror copy of a logical volume using the **mklvcopy** command:

```
# mklvcopy -e m -s y -k data1v 2 hdisk3 hdisk7
.
.
.
# splitlvcopy -y splitlv data1v 1
```

The **mklvcopy** command options specify the following values:

- (-e m)* To use minimum inter-disk allocation policy
- (-s y)* To strictly allocate mirror copies on separate physical volumes
- (-k)* To synchronize new copies immediately
- data1v* The name of the logical volume where you want to start a mirroring operation
- 2* The number of copies that you want to make of the data (a maximum of 3)
- hdisk3 and hdisk7*
The physical volumes where the logical volume resides
- hdisk3* The physical volume that already holds the data of *data1v*
- hdisk7* The physical volume that will hold the mirror copy and where you want to move the data

The second example is similar to example 1. The **mklvcopy** command starts mirroring the *infx1v* logical volume.

```
# mklvcopy -e m -s y -k infx1v 2 hdisk4 hdisk10
.
.
.
# rmlvcopy infx1v 1 hdisk4
```

In this example, *hdisk4* is where the data for *infx1v* already exists, and *hdisk10* is where the mirror copy resides. It is also where you want to ultimately move the data.

Using the migratepv command

Use the following information as a guide for how to use the logical volume manager (LVM) **migratepv** command to migrate data that is associated with physical volumes.

You can use the LVM **migratepv** command to migrate data that is associated with physical volumes.

The following examples show how to use the **migratepv** command.

```
# migratepv hdisk1 hdisk2
# migratepv -l data1v hdisk3 hdisk9
```

In the example, all data migrates from `hdisk1` to `hdisk2`. The **migratepv** command updates all LVM references. From the time that the command completes, the LVM no longer uses `hdisk1` to access data that was previously stored there. As the data is physically moved, the target physical volume must have enough spare physical volumes to accommodate data from the source physical volumes. After this command completes, you can remove the source-physical volume from the volume group.

To avoid disrupting users, use the **migratepv** command while the system is active.

The **migratepv** command migrates data by performing the following actions:

- Creating a mirror of the logical volumes that you are moving
- Synchronizing the logical volumes
- Removing the original logical volume

You can use the **migratepv** command to move data from one physical volume to another physical volume within the same volume group. The following usage parameters apply to this command:

```
migratepv [-i] [-l LVname] SourcePV DestinationPV...
```

Note: You can specify more than one destination physical volume.

First, identify the source disk from which you want to migrate the data. Then, identify the target disk to which you want to migrate the data. You can only migrate to disks that are already in the `rootvg` volume group. To get a list of disks that are already in the `rootvg` volume group, run the **lsvg -p rootvg** command. The following example displays output when you issue the **lsvg -p rootvg** command:

```
# lsvg -p rootvg
rootvg:
PV_NAME PV STATE TOTAL PPs FREE PPs   FREE DISTRIBUTION
hdisk0  active   515      116      57..00..00..00..59
hdisk1  active   515      515      00..00..00..00..00
```

Now, determine the space that is currently in use on the disk that you want to migrate. This is the total physical partitions (PPs) value minus the free PPs value for the desired disk. In the preceding example, refer to `hdisk0`, which is using (515 - 116) PPs or 399 physical partitions.

Next, find a disk or disks that have the available space. In this case, `hdisk1` has 515 free physical partitions, which is more than the required space of 399 physical partitions.

The only situation that is specific to `rootvg` is if the desired disk contains the boot image. Generally, this is the logical volume called `hd5`. From the following partial list of `lsvg -l rootvg`, this logical volume has a type of `boot`:

LV NAME	TYPE	Ps	PPs	PVs	LV STATE	MOUNT POINT
hd5	boot	1	1	1	closed/syncd	N/A

To determine if the boot image is on the disk that you want to migrate, run the **lslv -l** command. The following example displays the output when you issue the **lslv -l** command:

```
# lslv -l hd5
hd5:N/A
PV          COPIES          IN BAND          DISTRIBUTION
hdisk0     001:000:000      100%            001:000:000:000:000
```

In this case, the boot image resides on the disk that you want to migrate. You must first move the boot image with the **migratepv -l** command.

Using the direct copy method

Use the following information as a guide for how to use the direct copy method to migrate data.

There are times when you must use the direct copy method to migrate data. While this method uses the logical volume manager, the primary focus is on the use of the UNIX **find** command and the **cpio** command. The **find** command generates the list of files to be migrated. The **cpio** command migrates the files on the list.

The easiest way to produce the list of files is with the UNIX **find** command. Pipe its standard output to the standard input of the **cpio** command. The following output shows a typical example of using the **cpio** command to move data.

```
# mount /dev/lv00 /mnt
# cd /data
# find . -print | cpio -pdmuv /mnt
.
.
.
# umount /mnt
# umount /data
# mount /dev/lv00 /data
```

For the example above, the following considerations can apply:

- Assume that you made a file system on the /dev/lv00 logical volume. AIX LVM uses this file system to view part or all the virtual disks that the storage unit has made available to the system.
- Mount the logical volume on a temporary mount point, in this case/mnt.
- Change directories to the directory at the top of the file system that you want to move (cd/data).
- Use the **find** command to produce a list of file names, which a pipe (|) passes to the **cpio** command.
- Unmount both file systems and mount the new file system over the original mount point directory when the migration is complete.

You will probably be unable to use the volume management methods if the database uses volume serial numbers in its licensing code or validity checking. If

the database uses licensing methods or validity checking, you might be able to only export the database from its old locations or import the database to its new location.

The database software provides the mechanism to move the data. This can take the form of a standard database backup and restore if it does not have any specific tools for moving data.

Chapter 9. Reformatting disk drive modules on open systems

To provide integrity-checking of data and to allow different operating systems to use the storage unit, IBM formats storage unit disks to a 524-byte sector.

The 524-byte sector replaces the traditional 512-byte sector of fixed-block architecture disk drive modules (DDMs). The 524-byte sector format requires that you reformat all disks that you are migrating to the storage unit. Because reformatting will erase any data that is already contained on the drives, you must back up the data to some form of temporary storage.

You can use the disk drive module (DDM) for either direct migration of data or as temporary storage while the existing drives are moved. If this is not possible, use a removable media device such as a tape drive to temporarily store the data while you reformat the drives.

The AIX LVM uses a fixed-byte sector of 512-bytes. When used in an storage unit, the format is a fixed-byte sector of 524-bytes. The data portion of the sector remains at 512-bytes. AS/400 and iSeries headers use eight additional bytes. A 2-byte sequence number and a 2-byte longitudinal redundancy check (LRC) complete the extra bytes. The storage unit LIC uses the sequence number and LRC. The storage unit does not transfer them to the host system.

Most fixed-block disk architectures use a fixed-byte sector of 512-bytes. This includes most UNIX systems, including AIX. When used in an storage unit, the format of a DDM has a fixed-byte sector of 524-bytes. The 524-byte sector format enables the storage unit to connect to a wide range of host systems and share data between them.

The 524-byte sector on the DDM is independent of the sector size exposed to the host for a given device type emulation. Most LUNs for open-systems hosts are exposed with a 512-byte sector.

The IBM AS/400 and iSeries host systems use eight bytes at the start of the sector. UNIX host systems do not use these eight bytes when you attach them to the storage unit. The data portion of the sector remains at 512-bytes for all host systems. A 2-byte sequence number and a 2-byte LRC increase the size of the sector to 524-bytes.

Chapter 10. Obtaining services for a storage unit

The following are IBM services that you can obtain to benefit the processing associated with your storage unit.

Hardware problems

The storage unit is capable of remote error notification and remote support for those machines that are under warranty or a maintenance agreement. An IBM service support representative (SSR) configures your storage unit for remote service during installation.

Data migration

IBM provides a service through Global Services to help you with your data migration needs. Contact your IBM representative for more details.

Command Line Interface (CLI)

IBM provides a service through Global Services to help you with using the DS6000 CLI in your system environment. Contact your IBM representative for more details.

Chapter 11. Data migration from a UNIX-based host system to a DS6000 storage unit

For UNIX-based host systems, you can use a variety of methods for copying or moving data from one disk drive to another.

The UNIX-based host sees the storage unit as one or more generic DDMs. You can use the following methods to migrate data to the storage unit from open-system hosts that are running UNIX:

- Volume management methods
- Direct copy method
- Backup and restore methods
- Dump and restore commands as well as other commands for example the **tar** command

Migrating data to a DS6000 storage unit using volume management methods

The UNIX volume manager method for migrating data is very similar to the method that is used by AIX systems. It involves the use of commands or a combination of commands that copy and move the data.

The following methods are available for the UNIX volume manager. The method you choose depends on your operating environment.

The **cplv** method

Use the **cplv** command to make entire copies of logical volumes. You can issue the **cplv** command without disrupting access to data that is contained within the logical volume that it is copying. However, there is one drawback to using this command. Active logical volumes might not be copied when you use this command. You must ensure that your logical volumes are closed before you run this command.

To ensure consistency and limit the problems that are associated with this command, proceed with the following process:

1. Close your logical volumes either by unmounting the file system where they are built on, or by shutting down any database that has an open raw logical volume.
2. Run the **cplv** command.
3. Update the system configuration file, */etc/filesystems*, to include the relevant configuration data on the new logical volume and file system.
4. Issue the **fsck** command to run the file system integrity checker to ensure data consistency within the new logical volumes.

The **migratepv** method

This is an ideal method for moving data without disrupting users. Use the **migratepv** command to create a mirror of each logical volume that is contained within the physical volume. Issuing this command also synchronizes both copies. The benefit of this command is that you can run it on an active system.

You might notice some performance degradation due to the automatic nature of the creation and the synchronization of the copy. This process writes each

physical partition and locks it from access by any other process. This can slow down access to the data, but it ensures data integrity.

The `mklvcopy`, `splitlvcopy` method

This method is ideal for creating a copy of logical volumes. Use the `mklvcopy` command to ensure data integrity by creating a mirror copy of the data and synchronizing it automatically. Do not run the `splitlvcopy` command or the `cplv` command on an active logical volume. If processes are updating the data while the split is taking place, the consistency of the data on both copies cannot be guaranteed. After you run the `splitlvcopy` command, update the system configuration files. Include the relevant configuration data regarding the new logical volume and file system. Then issue the `fsck` to run the file system integrity checker to ensure data consistency within the new logical volume.

The `mklvcopy`, `rmlvcopy` method

This method is ideal for migrating active logical volumes when a slight performance loss is acceptable. This method creates and removes mirrors automatically, ensuring data integrity.

Migrating data using the direct copy method

Use the following information as a guide for determining when to use the direct copy method to migrate data for a UNIX operating system.

This method suffers from the same drawback as using the `cplv` and `splitlvcopy` commands on logical volumes. You can use this method on active file systems, but data consistency between the original and new copies cannot be guaranteed. Use the `cpio -p` command only on file systems that are in a quiescent state to guarantee consistency between the copy and the original. This will cause some disruption of service to users to occur.

Migrating data using backup and restore methods

Use the following information as a guide for determining when to use backup and restore methods to migrate data.

All backup and restore methods require that the file systems or logical volumes that you are backing up be in a quiescent state. Typically, you run backups after hours when there is minimal use of the system and you can shut down databases.

Some databases require that you export the data before you move it between file systems or logical volumes. You must then import the data on to the new file system or logical volume. You might have to reconfigure the database so that it points to the new data locations.

Migrating data from an eServer i5 400 or iSeries host system to the DS6000

Use the following information as a guide to determine how to migrate data from an IBM eServer i5 or iSeries host system to the DS6000.

When you create the eServer i5 or iSeries volume, you can create it as a protected or unprotected volume. This creation enables you to see the protected and unprotected models. Unprotected models can be software mirrored.

DS6000 supports 2107 device types with model A81-A87 (unprotected) and A01-A07 (protected) and you need a level of i5/OS or OS/400 that supports these. The model numbers correspond to 8.56 GB (A01/A81), 17.54 GB (A02/A82), 35.16 GB (A05/A85), 36 GB (A03/A83), 70.56 GB (A84/A04), 141.12GB (A86/A06), and 282.25 GB (A87/A07).

IBM eServer i5 or iSeries hosts require a separate device address for each drive in the subsystem. The DS6000 meets this requirement by reporting unique addresses for each virtual drive that is defined to the eServer i5 or iSeries host. Up to a maximum of 32 LUNS per iSeries fibre-channel adapter are supported by the DS6000. If the multipathing option (only available on i5/OS, V5R3 and above) is selected, then a maximum of 16 LUNs per adapter is recommended.

Because the eServer i5 or iSeries host does not support 7133 drawers, you have no existing 7133 drawers to reformat. If you have an existing disk subsystem that you are replacing with a DS6000, you must migrate the data to the DS6000. Use your existing host utilities for the data migration.

You can select from several methods to migrate data to the DS6000:

- You can use the logical add and remove functions.
- You can use save methods and restore methods with tape devices.

You can also use these methods if you remove an existing disk subsystem before you install the DS6000.

Note: From a DS6000 logical configuration viewpoint, all iSeries volumes are RAID 5 and are protected. When you create the iSeries volume, you can create it as a protected or unprotected volume. This creation enables you to see the protected and unprotected models. Unprotected models can be software mirrored.

Chapter 12. Migrating data between DS6000 storage units

Migrating data between DS6000 storage units requires the use of Global Copy or IBM System Storage Metro Mirror. In many cases the migration of data also requires that you move or offload workloads.

Migrating data between storage units

Migrating data between storage units requires the use of Global Copy or IBM System Storage Metro Mirror. Perform this process to migrate data between storage units.

1. Establish paths between all Site A LSSs and Site B LSSs.
2. Establish all necessary volume pairs between the Site A storage units and the Site B storage units. You can use either the Global Copy or the IBM System Storage Metro Mirror feature.
3. Convert the pairs to IBM System Storage Metro Mirror after the bulk copy is complete if you use Global Copy.
4. Ensure that all remote mirror and copy volumes are in duplex state.
5. Quiesce the applications before you switch to the new volumes.
6. End all remote mirror and copy pairs across all storage units.
7. End all the remote mirror and copy paths from the Site A storage units to the Site B storage units.
8. Resume all applications that point to devices at the Site B storage units.

Moving workloads when migrating data between storage units

Moving workloads when migrating data between storage units requires the use of Global Copy or IBM System Storage Metro Mirror. Perform this process to move workloads between storage units.

1. Establish paths between all Site A LSSs and the Site B LSSs.
2. Establish all necessary volume pairs between the Site A storage units and the Site B storage units. You can use either Global Copy or IBM System Storage Metro Mirror.
If you use Global Copy, convert the pairs to IBM System Storage Metro Mirror after the bulk copy is complete.
3. Ensure that all remote mirror and copy volumes are in duplex state.
4. Quiesce all of the applications.
5. End all remote mirror and copy pairs across all ESSs.
6. End all remote mirror and copy paths.
7. Establish remote mirror and copy paths from the Site B storage units to the Site A storage units.
8. Establish all IBM System Storage Metro Mirror pairs from the Site B storage units to the Site A storage units.
9. Suspend all remote mirror and copy pairs. This causes the storage units to maintain a changed-track bitmap for all suspended remote mirror and copy primary volumes.
10. Resume all the Site A applications. The Site A applications use the Site B storage units disks.

11. Resume all the Site A applications that use the Site A storage units disks.

Offloading workloads when migrating data between storage units

Offloading workloads when migrating data between storage units requires the use of Global Copy or IBM System Storage Metro Mirror.

1. Establish paths between all Site A LSSs and Site B LSSs.
2. Establish all critical volume pairs between Site A storage units and Site B storage units, using either Global Copy or IBM System Storage Metro Mirror.
3. If you use Global Copy, convert the pairs to IBM System Storage Metro Mirror after the bulk copy is complete.
4. Ensure that all remote mirror and copy volumes are in duplex state at a point in time.
5. Issue database commands or file system commands to flush host buffers to disk, and quiesce the database or the file system.
6. Invoke FlashCopy for all volumes that are associated with the database.
7. Resume operations of the database or the file system.

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATIONS "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been

estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

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 System Storage 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 System Storage 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 System Storage 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.

Trademarks

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

- AIX
- DB2
- DFSMS/MVS
- DFSMS/VM
- DS4000
- DS6000
- DS8000
- e (logo)
- Enterprise Storage Server
- ES/9000
- ESCON
- FICON
- FlashCopy
- Graphically Dispersed Parallel Sysplex
- HACMP
- i5/OS
- IBM
- IntelliStation
- MVS/ESA
- Netfinity
- NetVista
- Operating System/400
- OS/400
- RS/6000
- S/390
- Seascape
- SNAP/SHOT
- SP
- System/390
- System p5
- System Storage
- Versatile Storage Server
- Virtualization Engine
- VSE/ESA
- z/Architecture
- z/OS
- z/VM
- zSeries

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions

Permissions for the use of these publications is granted subject to the following terms and conditions.

Personal Use: You may reproduce these Publications for your personal, non commercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these Publications, or any portion thereof, without the express consent of IBM.

Commercial Use: You may reproduce, distribute and display these Publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these Publications, or reproduce, distribute or display these Publications or any portion thereof outside your enterprise, without the express consent of IBM.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the Publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the Publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING

BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Electronic emission notices

This section contains the electronic emission notices or statements for the United States and other countries.

Federal Communications Commission (FCC) statement

This equipment has been tested and complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors, or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device might not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conform à la norme NMB-003 du Canada.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European community contact:

IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Telephone: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

Germany compliance statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit.

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 89/336/EWG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 89/336/EWG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 18. September 1998 (bzw. der EMC EG Richtlinie 89/336) für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japanese Voluntary Control Council for Interference (VCCI) class A statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korean Ministry of Information and Communication (MIC) statement

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.

Taiwan class A compliance statement

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

VS07171L

Index

Numerics

524-byte sector, disk formatting 5, 21

A

accessibility 32

B

backup and restore commands 13

C

commands

- backup and restore 13
- cpio 18
- cplv 15
- dump and restore 13
- find 18
- lslv -l 16
- lsvg -p rootvg 16
- migratepv 16
- migratepv -l 16
- mklvcopy 16
- scopy 11
- xcopy 11

copying

- logical volume 15

cpio commands 18

cplv command 15

D

data migration

- associated with physical volumes 16
- backup and restore 26
- backup and restore methods 13
- between storage servers 29
- copying a logical volume 15
- direct copy 18
- from iSeries 26
- from S/390 host systems 9
- from Unix systems 25
- from Windows host systems 11
- from zSeries host systems 9
- logical volume management
 - software 15
- migratepv commands 16
- mirroring 16
- moving workloads when migrating
 - data between storage units 29
- offloading workloads when migrating
 - data between storage units 30
- preparing for 3
- reformatting existing disk drive
 - modules 5
- replacing existing storage
 - considerations 5
- selecting method 5, 7

DDM

- formatting 21

direct copy method 26

disk formatting, 524-byte sector 5, 21

dump and restore commands 13

F

find commands 18

K

keyboards

- accessibility features 32

L

legal

- terms and conditions 34

logical volume manager

- software 15

lslv -l commands 16

lsvg -p rootvg commands 16

M

migratepv -l commands 16

migratepv commands 16

migrating data

- associated with physical volumes 16
- backup and restore 26
- backup and restore methods 13
- between storage servers 29
- copying a logical volume 15
- direct copy 18
- from iSeries 26
- from S/390 host systems 9
- from Unix systems 25
- from Windows host systems 11
- from zSeries host systems 9
- logical volume management
 - software 15
- migratepv commands 16
- mirroring 16
- moving workloads when migrating
 - data between storage units 29
- offloading workloads when migrating
 - data between storage units 30
- preparing for 3
- reformatting existing disk drive
 - modules 5
- replacing existing storage
 - considerations 5
 - selecting method 7

mklvcopy command 16

S

scopy commands 11

T

Trademarks 33

X

xcopy commands 11



Printed in USA