IBM TotalStorage® DS6000

Scenarios

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Scenarios

Note:
Before using this information and the product it supports, read the information in "Notices" on page 11.

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   1000

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   1001

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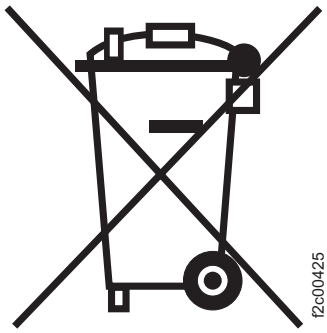

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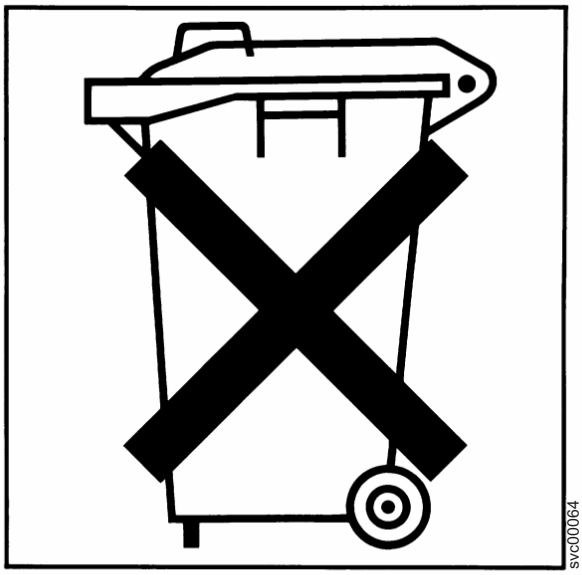

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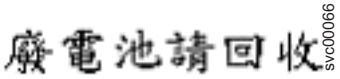

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Chapter 1. Scenarios

The topics in this section provide scenarios that are related to the DS6000. By working with these scenarios, you can complete processes that involve real-time and simulated configurations, as well as Copy Services. **Note:** For the command-line interface, go to the Command-line interface category in the navigation.

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Chapter 2. Copy Services scenarios

This section contains examples of scenarios to help you with data copying solutions.

There are two primary types of Copy Services functions: point-in-time copy (FlashCopy) and remote mirror and copy (PPRC). Generally, FlashCopy is used for data duplication and remote mirror and copy is used for data migration and disaster recovery.

Note: Disaster recovery scenarios are documented in the Recovering section of this InfoCenter.

You can use the following scenarios to create data duplication by using the following functions:

- Global Mirror
- FlashCopy and remote mirror and copy features

Creating data duplication copies

You can use remote mirror and copy and point-in-time copy features not only for creating disaster recovery and data migration solutions, but also for creating point-in-time consistent data backups.

You can use the following scenarios as a guide for controlling and creating consistent point-in-time data backups at your recovery site:

- Creating a FlashCopy onto a Metro Mirror volume pair
- Creating data consistency at your remote site using Global Copy and FlashCopy functions

Creating a full volume FlashCopy and subsequent refresh copy on a Metro Mirror volume pair

This scenario allows you to create a FlashCopy relationship where the target volume is also a Metro Mirror source volume. This process enables you to create a full or incremental point-in-time copy at a local site and then mirror that data to a source Metro Mirror volume at a remote location. You can also create a volume pair using the Global Copy mode.

Before you begin, ensure that the licenses for the remote mirror and copy and point-in-time copy features are activated. Then, create Fibre Channel Protocol (FCP) paths between the volume pairs at the local and remote sites.

If you create new FlashCopy target volumes to serve as production volumes, you can use this procedure to mirror those updates to a Metro Mirror volume at a remote site. Later, you can refresh that relationship again so only changes are copied to your remote site.

The FlashCopy operation can be a full volume or incremental point-in-time copy to an existing source volume of a Metro Mirror relationship. The Metro Mirror volume pair can be in a duplex pending or full duplex state.

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The first time you perform a full-volume FlashCopy operation, the entire Metro Mirror source volume must be copied to the remote site, as if to establish a new pair. Afterward, if you perform a refresh copy, only the changes have to be sent to your remote site. Therefore, it might take less time to synchronize the Metro Mirror volumes at the remote site. Be aware that the Metro Mirror volume pair might reach full duplex status or the FlashCopy background processes might end before the copied data is sent to your remote site.

Because this scenario uses FlashCopy and Metro Mirror operations, an understanding of which terms belong to which function is helpful. Consider the following terms:

FlashCopy

Background copy
A physical copy of all tracks from the source volume to the target volume.

Point-in-time logical copy
A logical copy or *snapshot* of a volume at a point in time. This allows a backup or mirroring application to run concurrently with the system.

Resync copy
A *resync* of a FlashCopy relationship allows only changed data to be copied to the target volume after the initial FlashCopy operation.

Remote mirror and copy

Production or local site
A site where the production applications run.

Remote or target site
A site that has the mirrored data of the production site.

Perform the following steps using the DS Storage Manager. You can also use the DS CLI to perform Copy Services functions.

1. **Full-volume copy:** Use the following steps to create a full-volume FlashCopy on a Metro Mirror source volume at a local site:
   a. Create a Metro Mirror volume pair from the local to the remote site.
   b. Create a FlashCopy volume pair using the target volume that is already a source volume for a Metro Mirror volume pair. If you wish to create an incremental copy of the volume pair, ensure that you select the **change recording** and **persistent** options when you create the FlashCopy operation.
   c. On the FlashCopy copy options page of the DS Storage Manager, select the **FlashCopy target on existing Metro Mirror source** option to allow updates that were copied onto a Metro Mirror volume pair to drain and to have the point-in-time copy made and sent to the remote site. The following example illustrates this process:
      - A FlashCopy operation is created from Volume A1 (the existing FlashCopy source) to Volume A2 (the FlashCopy target and the Metro Mirror source volume).
      - Volume A2 now contains the point-in-time logical copy of the data that was flashed from Volume A1.
      - The point-in-time copy on Volume A2 is then copied to Volume B2 (the Metro Mirror target volume). Therefore, the information on A volumes contain the same information as your B volumes.

Note: Be aware that if you created a FlashCopy operation using the source volume of a Global Copy volume pair and the logical copy finishes, the pair stays in a duplex pending (or suspended) state as long as flashed data is being transferred to the remote site. At this time, the remote site will be inconsistent if a disaster occurs. Also, if the volume pair was duplex before the FlashCopy operation, then the state will change to Duplex Pending.

2. **Incremental copy:** Use the following steps to copy only changes to the remote site:
   a. Select the existing FlashCopy relationship that you created in step 1.
   b. From the action drop down, select **Refresh target volume.** Only FlashCopy pairs that were created with the persistent option and change recording enabled are available for selection.
   c. Select the following copy options. The **Initiate background copy** option is optional.
      - **FlashCopy target on existing Metro Mirror source** to allow updates that were copied onto a Metro Mirror volume pair to drain and to have only changes sent to the remote site.
      - **Inhibit writes to the target volume** to ensure that writes are not allowed on the target volume during the FlashCopy so that the target volume is not a corrupted incremental backup.
      - **Enable change recording** to ensure that change recording is maintained for the volume pair.

This scenario can be illustrated as follows:

- At your production site, all your A volumes (volume A1—volume A2) are shadowed at your remote location for disaster recovery.
- As part of your normal processing, you periodically perform a FlashCopy operation against volume A1 to volume A2.
- The data that is copied to volume A2 is also copied remotely to volume B2 (your Metro Mirror target volume). Therefore, all of your B volumes contain the same data as your A volumes.

Creating data consistency at a remote site using Global Copy and FlashCopy functions

You can combine Global Copy and FlashCopy® functions to create a consistent copy of your target volume at a remote site.

Before you begin, ensure that the feature licenses for the remote mirror and copy and the point-in-time copy are activated. Before you can create any Remote Mirror and Copy pairs, you must first set up the paths between the source and the target LSSs.

For this scenario, assume that Site A is your production site. You wish to create a consistent copy of your data at Site B (your remote site) using Global Copy and FlashCopy functions for purposes such as backups, testing, or recovery solutions.

Perform the following steps using the DS Storage Manager. You can also use the DS CLI to perform Copy Services functions.

1. **At Site A, establish consistency at the volume level:**
   a. Create a volume pair using Global Copy mode. Consider the following guidelines:

- When you create a Global Copy volume pair, it is not synchronized. The volume pair is in a pending state throughout the Global Copy processing. While in this mode, the target volumes are not in a consistent state and cannot be used for disaster recovery.
- The volume pair will remain in the duplex pending condition, not reaching the full-duplex state until instructed to do so (i.e., by issuing a mkpprcpair command with the -mmir option).

b. Run in Global Copy mode until you require a consistent copy of data.

c. To establish consistency, synchronize the volume pair. This process copies pending tracks and potential updates to be transmitted synchronously. This process ensures that the target volume is current with the source volume, at a point in time.

d. Wait for the volume pair to reach full-duplex state by viewing the volume properties. You can monitor this activity by continuously displaying the Metro Mirror relationship properties page on the DS Storage Manager or by setting up automation to monitor when the volume pair is in a full duplex state.

e. At this point, quiesce host I/O to create a consistent point-in-time copy of all suspended volume pairs.

2. **Freeze updates to source and target LSSs** To have a consistent copy, you must either quiesce host I/O or issue freeze and run requests. Freeze operations are done on an LSS basis. It ensures that volumes on the target LSSs are consistent with the source LSS volumes. Updates made to the source volume LSSs after the freeze are not reflected on the target LSS volumes. You can issue freeze commands from the command line interface or by using automated software. (Automation software is not provided with the storage unit; it must be supplied by the user. However, IBM has offerings to assist with this automation. For more information, contact your IBM storage representative.)

   When I/O updates are *frozen* to the volumes across the source LSS, the following conditions occur:

   - The write operations to source and target volumes on the LSSs are temporarily queued.
   - The established paths between the LSS pairs are disabled.

3. **Resume operations after the freeze** This step also occurs through the use of automation software. This operation allows I/O activity to resume for the volume pairs across the LSSs. The pairs remain suspended but not offline.

4. **At Site B, copy the target volume using FlashCopy:** To create a copy of the volumes, perform the following steps:

   a. Vary the target volumes online.

   b. Use FlashCopy to copy the target volume to another volume.

5. **At Site A, restart your applications:**

   a. Resynchronize the source and target volume pair. This process copies any changed tracks to target volumes.

   b. If you issued the freeze and run requests, you must also reestablish the paths.

Chapter 3. Data migration

Migrating data between storage units requires the use of the Global Copy or the Metro Mirror mode or a logical volume manager.

Migrating data using Global Copy or Metro Mirror

Migrating data between storage units requires the use of the Global Copy or Metro Mirror function.

Note: Follow the steps that are outlined in this process whether you are migrating data from an ESS to a DS6000 storage unit or between two storage units. You must install DS CLI on your server to allow the DS6000 storage unit to communicate with the ESS. More than likely, you will also need to write new scripts.

1. Establish paths between all Site A LSSs and Site B LSSs.
2. Establish all necessary volume pairs between the storage unit A and the storage unit B. You can use either the Global Copy or the Metro Mirror function.
3. Convert the volume pairs to 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 storage unit A to storage unit B.
8. Resume all applications that point to devices at the storage unit B site.

Migrating data using a logical volume manager

The logical volume manager (LVM) software migrates data at a single logical volume level, a physical volume (DDM) level, or the entire contents of a volume group. The LVM software is different between the operating systems that use it. However, the concepts and commands are similar enough to support this scenario.

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

- Copying
- Mirroring
- Migrating

You must determine which command and combination of commands are most effective to migrate your data.

1. Determine if you are migrating a single logical volume.
2. Use the **cplv** command to copy the logical volume and create a new logical volume or overwrite an existing logical volume.

   Note: Depending on your logical volume manager software, the use of options is necessary to complete this process. Refer to the documentation that accompanies your software for the exact details.
3. Determine if you have a volume group made up of several logical volumes.

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4. Use the **mklvcopy** command to mirror the volumes.

   Note: Depending on your logical volume manager software, the use of options is necessary to complete this process. Refer to the documentation that accompanies your software for the exact details.
5. Determine if you are migrating physical volumes.
6. Use the **migratepv** command to migrate data that is associated with physical volumes.

   Note: Depending on your logical volume manager software, the use of options is necessary to complete this process. Refer to the documentation that accompanies your software for the exact details.

   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

Chapter 4. Adding storage to your machine

This scenario describes how to add storage (in terabytes) to an existing licensed feature such as the point-in-time copy.

For this scenario, assume you initially purchased a 2244 point-in-time feature (2244–PTC) for 25 terabytes (TB). After several months, you need an additional 20 TB for your point-in-time copy operations. To increase storage, you must purchase and activate a larger license. This is a nondisruptive activity and does not require that you reboot your machine.

1. You order two of feature 7203 (10 TB each of 2244–PTC) against the serial number of the 2244 Model PTC license currently on your machine. These features will be the additional 2244 features that will increase your point-in-time copy authorization level.
2. After you have ordered the features, you receive confirmation from IBM that these new features have been processed.
3. Connect to the IBM-supported Disk Storage Feature Activation (DSFA) Web site at http://www.ibm.com/storage/dsfa to retrieve an activation code for the licensed feature. This new code represents the total capacity that you now have licensed (or 45 TB). It licenses the original 25 TB plus the additional 20 TB that you just ordered.
4. After you obtain the activation codes for the licensed feature, enter it into the Web-based DS Storage Manager. You replace the existing activation code with the new activation code.
5. After the activation code is installed successfully, you now have 45 TB of 2244–PTC capacity.

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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 Paragraf 5 des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 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

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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

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