Volume Group Relocation Guide

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Chapter 1: Understanding Concepts, Restrictions, and Requirements of Pool Relocation

The topics in this section provide information you need to plan and prepare for pool relocation.

ATTENTION Possible hardware damage – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

Pool Relocation

ATTENTION Possible loss of data – If you physically move a storage array or storage array components, you can cause data loss. This loss includes controllers that are not part of a pool, controller modules that are not part of a pool, and array modules or drive modules after they have been installed and configured as part of a pool.

Use pool relocation to move drives and drive modules within the same storage array or move them to different storage arrays. The following features of SANtricity ES Storage Manager support volume copy relocation.

- A single, updated configuration database takes advantage of the 512-MB existing DACstore (which provides the foundation needed for logical unit numbers [LUNs] that are larger than 2 TB), RAID Level 6, increased partitions, and drives larger than 2 TB. Additionally, the single, updated configuration database provides a way to manage migration scenarios.
- Exported state, Contingent state, and Forced state are used for various conditions when migrating a pool from the source storage array to the destination storage array. The Export Pool Wizard is used before migrating the pool from the source storage array. The Import Pool Wizard is used after migrating pools to the destination storage array. For information, see the topics under "Exporting and Importing a Pool."

A warning message appears when migrating configured pools if the number of volumes being added overruns the maximum number of volumes allowed.

Upgrade and Downgrade Restrictions for RAIDCore 1 and RAIDCore 2

RAIDCore 1 does not have an export feature. Therefore, you can remove the drives or place them offline and then remove them from the source storage array. When placing the drives in the destination storage array that supports RAIDCore 2, the drives will appear in the Exported state or the Contingent state. Additionally, the drives will be unusable and will remain in the Exported state or Contingent state until they are imported using the import function.

RAIDCore 2-to-RAIDCore 1 migration is not supported. RAIDCore 1 does not know about RAIDCore 2, and the metadata on the RAIDCore 2 drives has a DACstore number that has a later version so that the drives show up as Unassigned or Failed in RAIDCore 1.

Software Restrictions and Firmware Restrictions

This section describes the supported software versions and firmware versions. This section also describes restrictions that apply to specific versions of the storage management software.

Firmware Requirements for Source Storage Arrays and Destination Storage Arrays

You can manage the source storage array in a pool relocation procedure with the latest maintenance version of the firmware.

The procedures in these topics were written assuming that the destination storage array is managed with SANtricity ES Storage Manager 10.75 with firmware version 7.75 or later. If the destination storage array is managed with a previous version of the firmware, refer to the *Pool Relocation Customer Support Guide* for the previous version.

Persistent Reservations Are Not Preserved in Volumes or Pools (Storage Management Software Version 8.4*x* and Later)

When you move a volume or a pool that was configured with a persistent reservation, the reservation information and the registration information are not preserved.

Any reservation information or registration information that exists on a volume or a pool is automatically deleted when the destination storage array is relocated. For information about persistent reservations, refer to the online help topics in the Array Management Window.

Support for 256 Volumes Per Partition (Storage Management Software Version 8.4*x* and Later)

NOTE Possible loss of data access – If you try to map a volume to a logical unit number (LUN) that exceeds the restriction on these operating systems, the host is unable to access the volume.

Many hosts are able to have 256 LUNs mapped per storage domain, but the number varies with the type of operating system. Consider if you move a volume or a pool from a storage array that supports 256 volumes per storage domain to a storage array that does not support 256 volumes. In this case, the host cannot access any volumes that have been mapped to LUNs greater than what the operating system supports. For information about the number of LUNs that are supported by each operating system, refer to the online help topics.

The pools or the volumes that are associated with the LUN mappings remain intact. However, the pools or the volumes are not available.

To recover from this situation, perform one of these actions:

- If a volume is no longer needed, delete the volume.
- If a LUN is available in the range that the operating system supports, remap the volume to a supported LUN.
- Map the volume to a different storage domain by using a LUN that the operating system supports.

General Restrictions of Pool Relocation

Several general restrictions apply that are not based on the controller firmware level or the version of SANtricity ES Storage Manager.

Moving Drive Modules from Multiple Storage Arrays into a Single Storage Array

If you move drive modules from multiple, different storage arrays into a single destination storage array, you must move all of the drive modules from the same storage array as a group into the new destination storage array.

Make sure that all of the drive modules for a single group have been moved to the destination storage array before you move the next group of drive modules.

If the drive modules are not moved as a group to the destination storage array, the newly relocated pools might not appear in the Array Management Window.

Moving Drives to a Storage Array with No Current Drive Modules

If you import multiple drives or an entire drive module into a destination storage array that does not have any drive modules, you must make sure that the power to the controller module or the array module in the destination storage array has been turned off before you attempt the relocation.

After you turn on the power to the destination storage array and it successfully recognizes the newly relocated drives or drive modules, you can add more drives or drive modules without turning off the power to all of the drive modules.

If you move an entire drive module that has the DC power option, keep in mind that there are special requirements for disconnecting and reconnecting DC power to the drive module.

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

Hitachi Drives Installed in a Just a Bunch of Disks (JBOD) Drive Module Reports Drives as Missing

If you change module IDs on Hitachi drives that are installed into a JBOD drive module, you must restart the system. If you do not restart the system, the module IDs are *not* added to the loop, and the system reports the drives as missing or absent.

Missing Volumes and Offline Volumes Appear After Pool Relocation

If you move pools or volumes from one storage array to another, the volumes appear to be absent or can unexpectedly appear Offline.

To prevent this situation, make sure that all of the volumes that you move are taken offline before you try to physically relocate them to the destination storage array.

Excessive Pool Relocation

NOTE Do not relocate pools and volumes in an excessive manner into the same storage array.

Excessive pool relocation can be defined as follows: when the total number of volumes on the destination storage array plus the number of volumes that are relocated to the destination storage array exceed the total number of volumes that can be managed by the controllers in the destination storage array.

When excessive pool relocation occurs, these conditions occur on the destination storage array:

- All pre-existing standard RAID volumes on the destination storage array are kept.
- All standard RAID volumes relocated to the destination storage array are kept.
- If hot pool relocation occurs, access to pre-existing volumes on the destination storage array is maintained.

If excessive pool relocation occurs, the pools or the volumes that moved to the destination storage array do not appear in the Array Management Window. In addition, they are not shown by the host, even though the definitions are kept in the configuration. Critical Major Event Log (MEL) events are not generated. The Array Management Window does not show that an excess pool relocation has occurred.

If pre-existing volumes on the destination storage array are deleted, the excess volumes *might* become visible in the Array Management Window, and the excess volumes also become visible to the host. Usually, the status of the excess volumes after they become visible is the same status they had before you moved the excess volumes to the destination storage array. These excess volumes might show a Failed status. You can recover them if you manually put the pool online in the Array Management Window.

Maximum Number of Drives in a Storage Array

When you relocate drives, pools, or drive modules to a destination storage array, make sure that the new configuration does not exceed the maximum number of drives that are supported by the controllers in the destination storage array.

ATTENTION Possible data loss or corruption – If you exceed the number of drives by importing more drives than the storage array supports, data loss or data corruption can occur.

Volumes Might Become Unstable After Drives Have Been Relocated

Pools or volumes that are moved from one storage array to the destination storage array can have timing issues.

When you insert drives into the destination storage array, wait at least two minutes before you insert each drive. If you do not wait two minutes, the storage array can become unstable.

Solid State Disk (SSD) Drives

The option to use Solid State Disk (SSD) drives in place of conventional drives is available as a premium feature with some hardware. The CSM200 drive module and the ST2501 M2 drive module can have SSD drives. If you relocate a pool that includes SSD drives, the destination hardware must support those drives.

Drive Firmware Restrictions

Relocation of drives from a drive module with a 1-Gb/s data transfer rate to a drive module with a 2-Gb/s data transfer rate is restricted to drives with specific drive firmware levels.

ATTENTION Possible data loss or corruption – Perform a hot pool relocation whenever possible. This action makes sure that any pools or volumes that you move to different destination storage arrays are correctly recognized and managed by the new storage array.

For information about the drive firmware, refer to the Compatibility Matrix, which is available in the LSI Knowledge Database.

Premium Feature Restrictions

Premium features are not in the standard configuration of storage management software. Premium features require a feature key file to enable each specific premium feature. Before you can move pools or volumes, you must first enable the required premium features on the destination storage array.

After you move a volume or a pool that uses premium features to the destination storage array, an Out of Compliance error message might appear. For procedures to correct the error, refer to the Recovery Guru.

The following table lists the premium features that are available for all current releases of the storage management software.

NOTE Support for 256 volumes per partition is not considered a premium feature because this support was introduced as a supported feature in Version 8.40 of the storage management software.

Table 1 Premium Features Available by Release

Premium Feature	Release When the Premium Feature Became Available
Storage Domains	All versions of the storage management software
Snapshot Volume	SANtricity Storage Manager Version 8.00
Data Replicator Software	SANtricity Storage Manager Version 8.20 (SANtricity Storage Manager Version 9.10 for the 6130 array module)
Volume Copy	SANtricity Storage Manager Version 8.40
Drive Security	SANtricity ES Storage Manager Version 10.6
Enterprise Key Manager	SANtricity ES Storage Manager Version 10.7
Solid State Disk Support	SANtricity ES Storage Manager Version 10.7
T10 Protection Information	SANtricity ES Storage Manager Version 10.75

Snapshot Volumes (Storage Management Software Version 8.*x* and Later)

NOTE If you have created a snapshot volume of a base volume, in some cases, the base volume and the snapshot repository volume can reside in different pools. If you want to keep the data in the snapshot volume, you must locate and move all of the pools that contain snapshot repository volumes that are associated with the snapshot volume. If you do not move all of the associated volumes, the snapshot volume becomes unusable in both the source storage array and the destination storage array.

When you create a snapshot volume, you can allocate capacity for the associated snapshot repository volume in the same pool as the base volume. You can also use free capacity on a different pool.

Situations can occur where not all of the associated components of the snapshot volume are moved to the destination storage array, which result in failed volumes or absent volumes. Problems with volume ownership might also occur while you relocate snapshot volume components that are located in different pools.

These sections describe the conditions that result when you move pools that contain some or all of the snapshot volume components.

Moving All of the Snapshot Volume Components

If you move a pool that contains all of the snapshot volume information (base volume, snapshot volume, and snapshot repository volume) from the source storage array to a destination storage array, various conditions can occur.

NOTE These conditions also occur when multiple pools that contain all of the snapshot volume components are moved at one time.

These conditions occur on the *source* storage array:

- The controller firmware keeps full knowledge of the snapshot volume in the source storage array.
- The base volume and the snapshot repository volumes appear as missing volumes or absent volumes.
- Write requests to the snapshot volume cause the snapshot volume to fail.
- Read requests to the snapshot volume can cause the snapshot volume to fail or can cause the host I/O request to fail.
- If you reinstall the physical drives into the original drive module, the affected base volume, snapshot volume, and snapshot repository volumes return to the state they were in before the drives were removed.

These conditions occur on the *destination* storage array:

- The controller firmware puts full knowledge of the snapshot volume onto the destination storage array.
- The snapshot volume is set to the same status as it was on the source storage array.

Moving a Base Volume and a Snapshot Volume without the Associated Snapshot Repository Volume

If you move a pool that contains a base volume and snapshot volume from the source storage array to the destination storage array, various conditions occur.

NOTE In this case, the associated snapshot repository volume stays on the source storage array.

These conditions occur on the *source* storage array:

- The controller firmware keeps full knowledge of the snapshot volume in the source storage array.
- The base volume appears as an absent volume.
- Host I/O requests to the base volume fail.
- Write requests to the snapshot volume can cause the snapshot volume to fail.
- Read requests to the snapshot volume can succeed or can cause the host I/O to fail.

These conditions occur on the *destination* storage array:

- The controller firmware puts full knowledge of the snapshot volume on to the destination storage array.
- The snapshot repository volume appears as an absent volume.
- Write requests to the snapshot volume can cause the snapshot volume to fail.
- Read requests to the snapshot volume can fail the snapshot volume.
- If the snapshot repository volume is added to the system later, the snapshot volume stays failed.

Moving a Snapshot Repository Volume without the Base Volume and the Snapshot Volume

If you move a pool that contains a snapshot repository volume from the source storage array to a destination storage array, various conditions occur.

NOTE In this case, the associated base volume and the snapshot volumes stay on the source storage array.

These conditions occur on the *source* storage array:

- The controller firmware keeps full knowledge of the snapshot volume in the source storage array.
- The snapshot repository volume appears as an absent volume.
- Host I/O to the base volume is permitted, but writes to the base volume cause the snapshot volume to fail.
- Read requests to the snapshot volume can fail the snapshot volume or can cause the host I/O to fail.
- If the physical drives are replaced into the original drive module and the snapshot volume remains in an Optimal status, the affected volumes are brought back to the state they were in before the snapshot repository volume was moved. The affected volumes include the base volume, the snapshot volume, and the snapshot repository volume. The snapshot volume becomes fully operational.

These conditions occur on the *destination* storage array:

- The controller firmware puts full knowledge of the snapshot volume onto the destination storage array.
- The base volume and the snapshot volume appear as absent volumes.
- Host I/O requests to the base volume fail in the destination storage array because the base volume is not present.
- Write requests to the snapshot volume can cause the snapshot volume to fail.
- Read requests to the snapshot volume can succeed or can cause the host I/O to fail.

Controller Ownership Changes During Relocation

During the pool relocation process, you must make sure that controller ownership remains the same for all of the pools that contain associated snapshot volume components.

When pools are relocated to a different storage array, controller ownership is assigned to controller A by default. If a change in controller ownership occurs on the destination storage array before all of the snapshot volume components are relocated, a dual-controller ownership situation might occur. The situation where neither controller A nor controller B has ownership can also occur.

A change in controller ownership can result from a forced failover or can be the result of a manual change.

For example, a pool that contains the base volume and the snapshot volume is moved to the destination storage array. The pool is owned by controller A by default. A forced failover occurs on the destination storage array, which changes the controller ownership of the pool to controller B. When the pool that contains the associated snapshot repository volume is moved to the destination storage array, it is owned by controller A by default. This process results in a dual-ownership situation. Both controller A and controller B attempt to assume ownership of all of the snapshot volume components.

To prevent dual-controller ownership or no-controller ownership situations, make sure that the second pool is not moved to the destination storage array until the controller ownership of the first pool is changed back to controller A.

After both pools are moved, you can change the controller ownership to controller B for all pools.

Data Replicator Software (Storage Management Software Version 8.20 and Later)

Before you relocate volumes that participate in a mirror relationship, you must remove the mirror relationship between the primary volume and the secondary volume. This action prevents orphan mirrors on the remote storage array. For instructions about how to remove mirror relationships, refer to the topics under *SANtricity ES Storage Manager Data Replicator Software* , the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD, or the online help topics in the Array Management Window.

If drives that contain mirror repository volumes are moved from a source storage array that is managed by SANtricity Storage Manager 8.20 or later to a destination storage array that is managed by SANtricity Storage Manager 8.00, the mirror repository volumes are not deleted. You must return the drives to the source storage array and deactivate the Data Replicator Software premium feature before you attempt the relocation.

When you move mirror repository volumes from the source storage array to a destination storage array, the mirror repository volume is automatically deleted and cannot be returned to the source storage array.

If the absent volume in the source storage array is deleted and the pool is reinstalled in the source storage array, the primary volume or the secondary volume appears as a standard volume with no mirroring properties.

Volume Copy (Storage Management Software Version 8.4*x* and Later)

Before you relocate pools that contain volume copies from the source storage array to a destination storage array, make sure that any copy pairs associated with the volumes that you move are removed. You must also make sure that any copy pairs associated with the volumes that you move are removed for a single source volume or a target volume in a copy pair.

For information about how to remove copy pairs, refer to the topics under *SANtricity ES Storage Manager Volume Copy*, the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD, or the online help topics in the Array Management Window.

If a pool that contains copy pairs is removed and reinstalled into the same storage array for security, you do not need to remove the copy pairs before relocation. In this case, make sure that any volume copies with a status of In Progress or Pending are stopped before you move the pool. If you perform this check, failure of the volume copies is prevented. For information, see "Exporting and Importing a Pool."

SafeStore Drive Security

Drive Security is a premium feature that prevents unauthorized access to the data on a Encryption Services (ES) drive that is physically removed from the storage array. Controllers in the storage array have a *security key*. Secure drives have hardware support for encryption and decryption and provide secure access to data only through a controller that has the correct security key. All of the controllers in a storage array must have the same security key.

To move security-enabled drives to a new storage array for additional capacity, you can first use the **Secure Erase** option to erase the drives.

To move a pool that includes a security-enabled volume to a new storage array without loss of data, you must also install the security key from the original storage array into the new storage array. Installing a new security key in a storage array that previously had a different security key might result in data becoming inaccessible. If the new storage array has a different security key installed and already has a security-enabled volume, changing the security key will prevent access to the existing security-enabled volume.

Security capable drives can be used in volumes that are not security-enabled without enabling the drive security feature. In that case, pools containing such drives can be relocated without regard for the security key.

T10 Protection Information

The T10 Protection Information (PI) premium feature checks for and corrects errors that might occur as data is communicated between a host and a storage array. PI is implemented using the SCSI direct-access block-device protection information model.

Only certain configurations of hardware that includ DA-capable drives support the DA premium feature. When you install the DA premium feature on a storage array, SANtricity ES Storage Manager provides options to use DA with certain operations. For example, you can create a pool that includes DA-capable drives, and then create a volume within that pool that is DA-enabled.

When you move a pool that includes a DA-enabled volume, the destination storage array must have the DA premium feature installed to continue using the feature. If the feature is not installed on the destination storage array, data will still be accessible on the volume without the error checking provided by DA.

Solid State Disk (SSD) Drives

The option to use Solid State Disk (SSD) drives in place of conventional drives is available as a premium feature with some hardware. The CSM200 drive module and the ST2501 M2 drive module can have SSD drives. If you relocate a pool that includes SSD drives, the destination hardware must support those drives.

Requirements for Moving Configured Hardware

Before you move any configured hardware, you must make sure that all of the requirements to move the drives or the drive modules have been met. To make sure that all the requirements are met, complete all of the tasks in this section.

> **ATTENTION Possible data loss or corruption** – Export a pool whenever possible. This action makes sure that any pools or volumes that you move to different destination storage arrays are correctly recognized and managed by the new storage array.

Checking the Version of the Enterprise Management Window

Make sure that the version of SANtricity ES Storage Manager that you use to open the Array Management Windows for the source storage array and the destination storage array is supported.

1. Open the Enterprise Management Window.
2. Select **Help >> About**.

   The **About SANtricity ES Storage Manager** window appears.
3. Write down the version number of the Enterprise Management Window.
4. Click **OK**.
5. Go to "Checking the Version of the Array Management Window."

Checking the Version of the Array Management Window

Make sure that the version of SANtricity ES Storage Manager that you use to manage both the source storage array and the destination storage arrays is supported.

1. Open the Enterprise Management Window, if necessary.
2. Select the source storage array in the **Device Tree**, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.
3. Select **Help >> About**.

   The **About SANtricity ES Storage Manager** window appears.
4. Make sure that the version number of the Array Management Window is not restricted. For restrictions, see "Software Restrictions and Firmware Restrictions."
5. Click **OK**.
6. Repeat step 2 through step 5 for the destination storage array.
7. Go to "Creating Storage Array All Support Data Collections."

Creating Storage Array All Support Data Collections

Create and save a storage array all support data collection for each source storage array and each destination storage array that is affected by the relocation procedure.

A storage array all support data collection provides a view of the current configuration and contains a description of all the components and properties of a storage array.

All of the files gathered are compressed into a single archive in a zipped format.

1. To create a storage array all support data collection for the source storage array, perform these actions:

    a. Open the Enterprise Management Window, if necessary.

    b. Select the source storage array in the **Device Tree**, and start its Array Management Window.

        If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

    c. From the **Logical/Physical** tab, select the storage array root node.

    d. Select **Advanced >> Troubleshooting >> Collect All Support Data**.

        The **Collect All Support Data** dialog appears.

    e. In the **Specify filename** text box, either enter a name for the file to be saved, or browse to a previously saved file to overwrite an existing file.

    f. Click **Start**.

        A dialog shows the progress of the processing.

    g. After all of the support files have been gathered and archived, click **OK**.

2. Repeat step 1 for the destination storage array.

3. Go to "."

Checking the Version of the Controller Firmware

Make sure that the controller firmware version for all of the source storage arrays and the destination storage arrays affected by the relocation is later than the required level. The version number is listed in the Summary section of the storage array all support data collection. For more information about data collections, see "Creating Storage Array All Support Data Collections."

Based on the version of the controller firmware, perform one of these actions:

- **The version of the controller firmware is correct for the storage management software** – Go to "Checking the Host Types."

- **The version of the controller firmware is not correct for the storage management software version** – Upgrade the controller firmware to an appropriate version, and go to "Checking the Host Types." For information about restrictions, see "Software Restrictions and Firmware Restrictions."

Checking the Host Types

Make sure that the host types defined for the destination storage array are the same as the host types defined for the source storage array. The operating system is listed in the Mappings section of the storage array all support data collection.

ATTENTION Possible loss of data when you move pools created with SANtricity ES Storage Manager Version 10.10 – You cannot move a pool from a storage array that is managed with SANtricity ES Storage Manager Version 10.10 to a storage array that is managed by an earlier version of SANtricity ES Storage Manager. The configuration about the drives might be overwritten, and data loss can occur.

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1. Based on the type of relocation you want to do, perform one of these actions:

    — **The operating system is the same on the hosts that are connected to the source storage array and the destination storage array** – Go to step 2.

    — **The operating system is different for the hosts that are connected to the source storage array and the destination storage array** – You can move drives to another storage array to gain additional capacity (data is not preserved). Go to "Moving a Drive Module to a Different Storage Array – Data Is Preserved."

2. Use one these options to move the drives and the drive modules:

— **Move the drives to another storage array to be used for additional capacity (data is not preserved)** – Go to "Moving a Drive Module to a Different Storage Array – Data Is Preserved."

— **Export and import pools (data is preserved)** – Go to "Exporting and Importing a Pool."

— **Move configured volumes to another storage array (data is preserved)** – Go to "Moving a Drive Module to a Different Storage Array – Data Is Preserved."

— **Move a drive module from one storage array to another (data is preserved)** – Go to "Moving a Drive Module to a Different Storage Array – Data Is Preserved."

Chapter 2: Moving Drives to a New Storage Array for Additional Capacity – Data Is Preserved

NOTE Data is *not* preserved when you move drives to a new storage array to obtain additional capacity.

This procedure removes all data and configuration information from the drives so that you have unconfigured drives that can be reused.

Relocation Process Overview

ATTENTION Possible loss of data – When you delete a pool and its volumes, all data is removed, which includes snapshot volumes and associated snapshot repository volumes. The associated volumes return to an Unassigned status. *You cannot cancel this operation after it starts.* Use this option only if you do not want to keep the data or volume information on the drives.

You can move drives from one storage array to a destination storage array to add unconfigured capacity to the destination storage array. You must remove all pool information and volume information from the drives while they reside on the source storage array. This action prepares the drives so that they come online automatically in the destination storage array and are ready to configure for use.

To move drives from one storage array to another to add unconfigured capacity, perform the following procedures:

1. Check the status of the source storage array and the destination storage array.
2. Delete the pools from the source storage array.
3. Remove the drives from the source storage array.
4. Install the drives in the destination storage array.
5. Initialize the drives in the destination storage array.
6. Delete a pool in the destination storage array.

When the procedure is completed, the drives are ready to configure and use.

Relocation Procedure

Complete the procedures in these sections to move drives from a source storage array to a new destination storage array for additional capacity.

Checking the Status of the Source Storage Array and the Destination Storage Array

1. Make sure that the requirements to move the drives have been met.

    For information, see "Understanding Concepts, Restrictions, and Requirements of Pool Relocation."

NOTE Depending on the size of the storage array, a full backup could take several hours or several days.

2. Make sure that the data that must be preserved on the pool in the source storage array has been backed up and transferred to another pool.

3. Make sure that empty drive slots are available in the destination storage array.

4. Open the Enterprise Management Window.

5. Select the storage array in the Device table, and start its Array Management Window.

6. In the Physical pane, make sure that the same number of empty drive slots exist as the number of drives that you want to move.

NOTE Before you can delete the volumes and the pool, the pool and its associated standard volumes and snapshot repository volumes must have a status of Optimal in the Logical pane of the Array Management Window.

7. Check the status of the pool and its related volumes on the source storage array.

   To view a message that describes the status, move your mouse pointer over the pool or volume in the Logical pane.

8. Based on the status of the pool and volumes, perform one of these actions:

   — **The status is Optimal** – Go to step 11.

   — **The status is Optimal - Operation in Progress** – Go to step 9.

   — **The status is Failed or Degraded** – If a volume or snapshot repository volume appears with a Failed status or a Degraded status, go to step 10.

9. If the Optimal - Operation in Progress indicator appears, perform these actions:

   a. Wait for the volume modification operation to complete, which includes these processes:

   — Defragmentation

   — Copyback

   — Initialization

   — Dynamic segment sizing

   — Dynamic reconstruction

   — Dynamic RAID-level migration

   — Dynamic capacity expansion

   — Dynamic volume expansion

   b. Make sure that the status of the pool and the volume is Optimal.

   c. Go to step 11.

10. Perform these actions:

   a. Use the Recovery Guru to diagnose the problem and to present the appropriate recovery procedure.

   b. Perform the recovery procedure.

   c. Make sure that the volume has a status of Optimal.

   d. Go to step 11.

NOTE You can assign global hot spares on the source storage array, but they cannot be in use for the specified pool. The status of a global hot spare that is assigned but is not in use is Standby/Optimal. If you move the mouse over a global hot spare in the Physical pane of the Array Management Window, a message appears that describes the status.

11. Make sure that global hot spares are not in use for drives in the pool that you move from the *source* storage array.

   a. From the Logical pane, select the appropriate pool.

   b. In the Physical pane, make sure that blue association dots do not appear underneath any global hot spare.

   c. Go to "Deleting the Pools from the Source Storage Array."

Deleting the Pools from the Source Storage Array

ATTENTION Possible loss of data – If you delete a pool and its volumes, all data is removed, which includes snapshot volumes and associated snapshot repository volumes. The associated drives return to an Unassigned status. *You cannot cancel this operation after it starts.* Use this option only if you do not want to retain the data or the volume information about the drives.

NOTE To permanently remove any information about the deleted volumes, you must restart the host system.

This procedure prepares the drives to come online automatically in the destination storage array to be ready to configure and use.

NOTE If mirror repository volumes exist in the pool, and you delete the pool, the action does not remove the mirror repository volumes. You must deactivate the Data Replicator Software premium feature first. For information, refer to the topics under *SANtricity ES Storage Manager Data Replicator Software* , The corresponding PDF document on the SANtricity ES Storage Manager Installation DVD, or the online help topics in the Array Management Window.

1. Stop I/O activity to the pool on the source storage array, and unmount all file systems.
2. Physically locate the drives assigned to the pool that you want to delete by turning the LED on to each drive.
   a. From the Logical pane of the Array Management Window for the source storage array, select the appropriate pool.

      A blue association dot appears under each drive in the pool in the Array Management Window.
   b. Select **Pool >> Locate**.

      The **Locate Pool** dialog appears, and the drive LEDs blink above or below the drives in the storage array.
3. Physically mark the drives in the storage array.
4. To stop the blinking LEDs, in the **Locate Pool** dialog, click **OK**.
5. From the Logical pane, select the pool that you want to delete.
6. Select **Pool >> Delete**.
7. In the **Delete Pool** dialog, select one or more pools.
8. Click **Delete**.
9. In the **Confirm Delete Pool** dialog, type `yes` to confirm the removal of the selected pools and any associated volumes.
10. Click **OK**.
    — In the Physical pane, the status of all of the associated assigned drives in the selected pool changes to an Unassigned status.
    — In the Logical pane, the pool and all of its associated volumes are deleted and their icons are removed.
      ● If there is a current Unconfigured Capacity node, the raw capacity of the drives is added to it.
      ● If an Unconfigured Capacity node did not exist before the deletion operation of the pool, a new Unconfigured Capacity node is added to the Logical pane. The raw capacity of the drives is added to it.
11. Go to "Removing the Drives from the Source Storage Array."

Removing the Drives from the Source Storage Array

ATTENTION Possible hardware damage – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

1. Create a storage array all support data collection.

   For information about creating a storage array all support data collection, see "Creating Storage Array All Support Data Collections."

   a. Save the storage array all support data collection.
   b. Open and view the storage array all support data collection files.

2. Put on antistatic protection.

ATTENTION Possible damage to drives – If you bump drives against another surface, the drive mechanism or connectors can be damaged. To avoid damage when you remove or install a drive, always place your hand under the drive CRU to support its weight. Do not touch the electronics on the drive.

3. Open the lever on the first drive CRU, and pull the drive out of the drive module approximately 5 cm (2 in.) to disengage the drive.

4. Wait at least two minutes for the drive to spin down.

   The status of the drive changes from Unassigned to an empty drive slot in the Physical pane of the Array Management Window.

5. Repeat step 3 through step 4 for each drive that must be removed.

6. After the drives have spun down, remove them from the drive module. Put the drives on an antistatic, cushioned surface away from magnetic fields.

   Make sure that you put your hand under each drive to support its weight when you remove it from the drive module.

7. To maintain correct airflow, insert blank drive CRUs into any empty drive slots in the drive modules in the source storage array.

NOTE To maintain correct airflow in the drive module, you must fill all of the drive slots. If you do not have drives for the drive slots, insert blank drive CRUs.

8. Go to "Installing the Drives in the Destination Storage Array."

Installing the Drives in the Destination Storage Array

NOTE If all of the pool information and the volume information was not removed from the drives on the source storage array, unexpected pools can appear in the Logical pane of the Array Management Window. This condition occurs after the drives are installed in the destination storage array. Remove the pool information and the volume information to return the drives to an Unassigned status.

NOTE Wait at least two minutes for the controller to write information before you reinstall a drive. If you install more than one drive and the controller is not given enough time to recognize each drive, the storage array can enter into an Unstable status. If time is not available, you must restart both controllers, which forces the controller to write the information to the DACstore.

1. Install the drives, one at a time, into the destination storage array.

    a. Install the drive in one complete motion by inserting it all the way into the slot in the drive module.

    b. Lower (close) the lever to lock the drive securely in place.

    c. Before you install the next drive, wait until the status of the empty drive slot changes to Unassigned in the Physical pane of the Array Management Window.

2. Based on the status of the drive, perform one of these actions:

    — **The status of the drive changes to Unassigned** – Repeat step 1 to install all of drives, and go to step 4.

    — **The status of the drive does not change to Unassigned** – Go to step 3.

3. If the status of the drive does not appear as Unassigned in the Physical pane of the Array Management Window, perform these steps:

    a. Open the lever, and pull the drive out of the drive module approximately 5 cm (2 in.).

    b. Wait at least two minutes for the drive to spin down.

    c. Reinstall the drive in one complete motion by inserting it all the way into the slot.

    d. Lower (close) the lever to lock the drive securely in place.

NOTE If the drive does not appear in the Array Management Window, the drive might be defective. Remove the drive, and replace it with another drive.

    e. Before you install the next drive, wait at least two minutes until the drive appears in the Array Management Window.

    f. Repeat step a through step e until the status of all of the drives appears as Unassigned. Go to step 4.

4. Based on what appears in the Logical pane of the Array Management Window, perform one of these actions:

    — **The capacity of the drives is added successfully to the Unconfigured Capacity node** – If the capacity of the drives was added to the Unconfigured Capacity node in the Logical pane of the Array Management Window, the drives have been moved successfully and are ready to be configured. To complete the relocation process, configure the drives. For information about how to create pools and volumes, refer to the online help topics in the Array Management Window.

    — **Unexpected pools appear** – If unexpected pools appear in the Logical pane of the Array Management Window, the pool information and the volume information might not have been removed from the drives completely. You must remove the pool information and the volume information completely to return the drives to an Unassigned status and for the capacity of the drives to be added to the Unconfigured Capacity node. Go to step 5.

5. Based on the status of the unexpected pool, perform one of these actions:

    — **The pool is offline** – Go to "Initializing the Drives in the Destination Storage Array."

    — **The pool is online** – Go to "Deleting a Pool in the Destination Storage Array."

Initializing the Drives in the Destination Storage Array

When volumes that were previously part of a multi-drive pool are relocated from one storage array to another, the pools can appear Offline in the Logical pane of the Array Management Window. This situation occurs because the pool information and the volume information about the drives are incomplete.

To resolve the problem, you must initialize the drives. This action erases the pool information and the volume information and returns the selected drives to an Unassigned state. When you put the drives into an Unassigned state, you add new capacity or additional unconfigured capacity to the storage array.

When the drives are initialized, the status of the drives changes to Unassigned. If a current Unconfigured Capacity node exists, the raw capacity of the drives is added to it. Otherwise, a new Unconfigured Capacity node is added to the Logical pane with the raw capacity of the drives added to it. When you initialize the drives, all of the data is removed from the drives.

> **NOTE** If the status of the unexpected pools is Optimal, you must delete the pool. Go to "Deleting a Pool in the Destination Storage Array."

After you have completed the procedure, the drives come online and are ready to be configured and used.

1. Make sure that the status of the pool and its associated volumes is Offline.

   These entities show an Offline status:

   — **The pool and the volume** – If you move the mouse pointer over the pool or the volume in the Logical pane of the Array Management Window, a message shows the status as Offline.

   — **The drive needs attention** – If you move the mouse pointer over the drives in the Physical pane of the Array Management Window, a message shows the status as Offline.

> **ATTENTION Possible loss of data** – If you initialize a drive, all of the volume information is deleted, and the selected drives return to an Unassigned status. *You cannot cancel this operation after it starts.*

2. From the Physical pane, select the drives that you want to initialize.

   To select multiple drives, hold down the **Ctrl** key, and select the drives.

3. Select **Advanced >> Recovery >> Initialize >> Drive**.

4. To start the drive initialization process, type `yes`, and click **OK**.

   When the storage arrays initialize, each volume icon shows as Operation in Progress in the Logical pane. After the storage array initializes, the Array Management Window shows these conditions:

   — In the Physical pane, the status of the drives changes to Unassigned.

   — In the Logical pane, the pool and all of its associated volumes are deleted, and their icons are removed.

     • If a current Unconfigured Capacity node exists, the raw capacity of the drives is added to it.

     • If an Unconfigured Capacity node did not exist before the drive initialization operation, a new Unconfigured Capacity node is added to the Logical pane. The raw capacity of the drives is added to it.

5. To complete the relocation process, configure the drives.

   For information about how to create pools and volumes, refer to the online help topics in the Array Management Window.

Deleting a Pool in the Destination Storage Array

> **NOTE** If the status of the unexpected pools is *Offline*, you must initialize the drives. Go to "Initializing the Drives in the Destination Storage Array."

> **NOTE** You must restart the host system to permanently remove any information about the deleted volumes.

If unexpected pools appear with a status of Optimal in the Logical pane after you have initialized the drives in the destination storage array, you must delete all of the pools and any associated volumes. This action removes the pool information and the volume information.

When you delete the pools, the status of the drives that made up the capacity of the pool changes to an Unassigned status. If a current Unconfigured Capacity node exists, the raw capacity of the drives is added to it. Otherwise, a new Unconfigured Capacity node is added to the Logical pane that contains the raw capacity of the drives. All of the data is removed from the drives.

1. From the Logical pane, select the pool that you want to delete.
2. Select **Pool >> Delete**.

ATTENTION Possible loss of data – If you delete a pool and its volumes, this action removes all of the data, which includes any snapshot volumes or snapshot repository volumes. The associated drives return to an Unassigned status. *You cannot cancel this operation after it starts.*

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3. In the **Delete Pool** dialog, select one or more pools.
4. Click **Delete**.
5. In the **Confirm Delete Pool** dialog, type yes to confirm the removal of the pools.
6. Click **OK**.
   — In the Physical pane, the status of all of the associated assigned drives in the selected pool changes to an Unassigned status.
   — In the Logical pane, the pool and all of its associated volumes are deleted, and their icons are removed.
      • If a current Unconfigured Capacity node exists, the raw capacity of the drives is added to it.
      • If an Unconfigured Capacity node did not exist before the pool deletion operation, a new Unconfigured Capacity node is added to the Logical pane. The raw capacity of the drives is added to it.
7. To complete the relocation process, configure the drives.

   For information about how to create pools or volumes, refer to the online help topics in the Array Management Window.

Chapter 3: Exporting and Importing a Pool

For specific information about the export process and the import process, refer to the online help topics in the Array Management Window.

Pool relocation lets you export a pool so that you can import the pool to a different storage array. You can also export a pool so that you can store the data offline.

ATTENTION Possible loss of data access – You must export a pool before you move the pool or import the pool.

Exporting a Pool

The export pool operation prepares the drives in the pool for removal. You can remove the drives for offline storage, or you can import the pool to a different storage array. After you complete the export pool operation, all of the drives are offline. Any associated volumes or Free Capacity nodes no longer appear in the storage management software.

Non-Exportable Components

You must remove any non-exportable components before you can complete the export pool procedure. You must remove these components:

- Persistent reservations
- Host-to-volume mappings
- Volume copy pairs
- Snapshot volumes and snapshot repository volumes
- Remote mirror pairs
- Mirror repositories

Showing Pool Export Dependencies

The `exportDependencies` command shows a list of dependencies for the drives in a pool that you want move from one storage array to a destination storage array.

For information about how to show pool export dependencies, refer to the online help topics in the Array Management Window.

Starting Pool Export

The `export` command moves a pool into an Exported state so that you can remove the drives that comprise the pool and reinstall the drives in a destination storage array.

NOTE Within the pool, you cannot move volumes that are associated with the premium features from one storage array to another storage array.

For information about how to start pool export, refer to the online help topics in the Array Management Window.

Importing a Pool

The import pool operation adds the exported pool to the destination storage array. After you complete the import pool operation, all of the drives have Optimal status. Any associated volumes or Free Capacity nodes now appear in the storage management software that is installed on the destination storage array.

Non-Importable Components

Some components cannot be imported during the import pool procedure. These components are removed during the procedure:

- Persistent reservations
- Host-to-volume mappings
- Volume copy pairs
- Snapshot volumes and snapshot repository volumes
- Remote mirror pairs
- Mirror repositories

Showing the Pool Import Dependencies

The `importDependencies` command shows a list of dependencies for the drives in a pool that you want to move from one storage array to a destination storage array.

For information about how to show the pool import dependencies, refer to the online help topics in the Array Management Window.

Starting Pool Import

The `import` command moves a pool into a Optimal status to create a newly introduced pool that is available to the destination storage array. The pool must be in an Exported state or a Contingent state before running this command. Upon successfully running the command, the pool is operational.

NOTE Within the pool, you cannot move volumes that are associated with the premium features from one storage array to a destination storage array.

For information about how to start the pool import, refer to the online help topics in the Array Management Window.

Chapter 4: Moving a Pool to a Different Storage Array – Data Is Preserved

Relocation Process Overview

> **ATTENTION Possible data loss or corruption** – Perform the hot pool relocation whenever possible. This action makes sure that any pools or volumes that you move to different destination storage arrays are correctly recognized and managed by the new storage arrays.

> **NOTE** Use the procedures listed below only when you move a pool from one storage array to another (data is preserved).

To move a pool from one storage array to another, perform these procedures. Each procedure has a separate topic with detailed steps.

1. Locate the drives in the pool.
2. Check the status of the source storage array and the destination storage array.
3. Remove the copy pairs.
4. Remove the mirror relationships.
5. Delete a snapshot volume.
6. Check the NVSRAM bit for the destination storage array.
7. Change the NVSRAM bit for the destination storage array (if needed).
8. Remove the drives from the source storage array.
9. Delete a missing volume.
10. Install the drives into the destination storage array.
11. Define new storage domains.
12. Complete the pool relocation.

Locating the Drives in a Pool

The drives that comprise a pool usually are located in multiple drive modules in a storage array. If you move a pool from one storage array to another storage array, you are required to identify which drives to relocate to the destination storage array. You are also required to identify which pools will stay in the source storage array.

1. Based on whether snapshot volumes exist in the pool, perform one of these actions:
   — **Snapshot volumes exist in the pool** – Go to step 2.
   — **Snapshot volumes *do not* exist in the pool** – Go to step 4.

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NOTE If you have created a snapshot volume of a base volume, in some cases, the snapshot repository volume and base volume might reside in different pools. If you want to keep the data in the snapshot volume, you must locate and move all of the pools that contain snapshot repository volumes that are associated with the snapshot volume. If you do not move all of the associated volumes, the snapshot volume will become unusable in both storage arrays.

2. Locate the snapshot repository volume that is associated with the snapshot volume in the pool that you want to move.

    a. Open the Enterprise Management Window.

    b. Select the source storage array in the **Device** table, and start its Array Management Window.

        If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

    c. From the Logical pane, right-click a snapshot volume, and select **View Associated Components** from the pop-up menu.

3. In the **Volume - Associated Components** dialog, make sure that the snapshot repository volume is in the same pool as the snapshot volume, and perform one of these actions:

    — **The snapshot repository volume is in a different pool** – Repeat step 2 for the pool that contains the snapshot repository volume. When you have completed these tasks for all of the pools, go to step 4.

    — **The snapshot repository volume is in the same pool** – Go to step 4.

4. Physically locate the drives in the selected pool by activating the LED on each drive.

    a. In the Logical pane, select the pool.

        A blue association dot appears under each drive in the pool in the Array Management Window.

    b. Select **Pool >> Locate**.

        The **Locate Pool** dialog appears, and the Drive LEDs blink above or below the drives in the storage array.

5. Physically mark the drives in the storage array to identify whether the drive is part of a pool that stays in the source storage array or whether the drive is part of a pool that you want to move to the destination storage array.

6. To stop the blinking LEDs, in the **Locate Pool** dialog, click **OK**.

7. Repeat step 1 through step 6 for all of the pools that you want to remove from the storage array.

8. Go to "Checking the Status of the Source Storage Array and the Destination Storage Array."

Checking the Status of the Source Storage Array and the Destination Storage Array

1. Make sure that the requirements to move the drives have been met.

    For information, see "Understanding Concepts, Restrictions, and Requirements of Pool Relocation."

NOTE Depending on the size of the storage array, a full backup could take several hours or several days.

2. Make sure that the data that must be preserved on the pool in the source storage array has been backed up.

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3. Determine whether the pool that you move from the source storage array contains volumes that participate in a volume copy.

   a. Open the Enterprise Management Window.

   b. Select the source storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c. In the Logical pane, look for any volumes that are a source volume or a target volume that you want to participate in a volume copy.

4. Based on whether volumes that participate in a volume copy exist in the pool, perform one of these actions:

   — **Volumes that participate in a volume copy exist in the pool** – Go to "Removing the Copy Pairs." When you have removed the volume copies from the source storage array, return to step 5 in this procedure.

   — **Volumes that participate in a volume copy *do not* exist in the pool** – Go to step 5.

5. Determine whether the pool that you move contains mirror relationships.

   a. Open the Enterprise Management Window.

   b. Select the source storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c. In the Logical pane, look for any volumes that are identified with a label as a primary volume or a secondary volume.

6. Based on whether mirror relationships exist in the pool, perform one of these actions:

   — **Mirror relationships exist in the pool** – Go to "Removing the Mirror Relationships." If you remove the mirror relationships from the storage array, you prevent orphan mirrors in the secondary storage array. When you have removed the mirror relationships, return to step 7 in this procedure.

   — **Mirror relationships *do not* exist in the pool** – Go to step 7.

7. Determine whether the pool that you will move contains snapshot volumes.

   a. Open the Enterprise Management Window.

   b. Select the source storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c. In the Logical pane, look for any volumes that are identified with a label as a snapshot volume.

8. Based on whether snapshot volumes exist in the pool, perform one of these actions.

   — **Snapshot volumes exist in the pool** – Go to step 9.

   — **Snapshot volumes *do not* exist in the pool** – Go to step 10.

NOTE If you have created a snapshot volume of a base volume, and you do not want to keep the data in the snapshot volume, delete the snapshot volume before you move the pool.

9. Determine whether the snapshot volumes contain data that you want to keep, and perform one of these actions:

   — **Delete the snapshot volumes** – Go to "Deleting a Snapshot Volume." When you have deleted the snapshot volumes, return to step 10 in this procedure.

   — **Retain the snapshot volumes** – Go to step 10.

10. Make sure that the number of drives in the pool that you want to move is correct.

   a. Open the Enterprise Management Window.

   b. Select the source storage array in the **Device** table, and start its Array Management Window.

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If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c.   In the Logical pane, select the pool.

       A blue association dot appears under each drive in the pool in the Array Management Window.

   d.   Repeat step a through step c for all of the pools that you want to move to the destination storage array.

11. Make sure that empty drive slots are available in the destination storage array.

   a.   Open the Enterprise Management Window.

   b.   Select the destination storage array in the **Device** table, and start its Array Management Window.

       If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c.   In the Physical pane, make sure that the same number of empty drive slots are available as the number of drives that you want to move.

12. Check the status of the pool and its associated volumes in the *source* storage array.

To view a message that describes the status, move your mouse pointer over the pool or the volume in the Logical pane.

13. Based on the status indicator, perform one of these actions:

   — **The status is Optimal or Contingent** – Go to step 16.

   — **The status is Optimal - Operation in Progress** – Go to step 14.

   — **The status is Failed or Degraded** – Go to step 15.

14. If the Optimal - Operation in Progress indicator appears, perform these actions:

   a.   Wait for the volume modification operation to complete, which includes these processes:

   — Defragmentation

   — Copyback

   — Initialization

   — Dynamic segment sizing

   — Dynamic reconstruction rate

   — Dynamic RAID-level migration

   — Dynamic capacity expansion

   — Dynamic volume expansion

   b.   Make sure that the status of the pool and the status of the volume are Optimal or Contingent.

   c.   Go to step 16.

15. If a volume or a repository volume shows a Failed status or Degraded status, perform these actions:

   a.   Use the Recovery Guru to diagnose the problem and present the appropriate recovery procedure.

   b.   Make sure that the volume has a status of Optimal or Contingent.

   c.   Go to step 16.

16. Make sure that global hot spares are not in use for drives in the pool that you move from the *source* storage array.

   a.   Open the Enterprise Management Window.

   b.   Select the source storage array in the **Device** table, and start its Array Management Window.

       If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c.   In the Logical pane, select the appropriate pool.

   d.   In the Physical pane, make sure that blue association dots *do not* appear underneath any global hot spares.

17. Based on the status of any global hot spares, perform one of these actions:

    — **Global hot spares are in use for a drive in the pool** – Use the Recovery Guru to diagnose the problem and to show the appropriate recovery procedure. Perform the recovery procedure, and make sure that global hot spares are not in use. Go to step 18.

    — **Global hot spares are *not* in use for a drive in the pool** – Go to step 18.

18. Repeat step 1 through step 17 for all of the pools that you want to move.

19. Go to "Checking the NVSRAM Bit for the Destination Storage Array."

Removing the Copy Pairs

Before you move volumes that participate in a volume copy to a different destination storage array, make sure that any copy pairs are removed. This verification prevents absent volumes on the destination storage array.

NOTE This option does not delete the source volume or the target volume. Data on the volumes is not affected. As a result of this operation, you can select the target volume as a source volume or a target volume for a new volume copy.

1. Open the Enterprise Management Window.

2. Select the source storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. Select **Volume >> Copy >> Copy Manager**.

   The **Copy Manager** dialog appears.

4. Select one or more copy pairs in the table.

   To select multiple copy pairs, either press **Ctrl** and the left mouse button, or press **Shift** and the left mouse button.

5. Select **Copy >> Remove Copy Pairs**.

   The **Remove Copy Pairs** dialog appears.

6. Click **Yes**.

   The volume copy is removed.

7. Close Copy Manager.

8. To complete the checking of the status of the source storage array, return to step 5 in "Checking the Status of the Source Storage Array and the Destination Storage Array."

Removing the Mirror Relationships

Before you relocate volumes that participate in a mirror relationship, you must remove the mirror relationship between the primary volumes and the secondary volumes. This action prevents orphan mirrors on the remote storage array.

NOTE This option does not delete the primary volume, the secondary volume, or the mirror repository volumes that support mirroring for the storage arrays. Data on the volumes is not affected. As a result of this operation, the primary volume and the secondary volume become standard, host accessible, non-mirrored volumes.

NOTE

1. Open the Enterprise Management Window.

2. Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. In the Logical pane, select the primary volume or the secondary volume that is participating in the mirror relationship.

4. Select **Volume >> Remote Volume Mirroring >> Remove Mirror Relationship**.

    The **Remove Mirror Relationship** dialog appears.

5. From the **Select one or more mirrored pairs** list, select the mirrored volume pairs for which you want to remove the mirror relationship.

    To select multiple mirrored pairs, either press **Ctrl** and the left mouse button, or press **Shift** and the left mouse button. To select all of the mirrored pairs, click the **Select All** button.

6. Click **OK**.

    The **Remove Mirror Relationship - Confirmation** dialog appears.

7. Click **Yes**.

    The **Remove Mirror Relationship - Progress** dialog appears. When the mirror relationship is removed, the volumes in the mirrored pairs that you selected are no longer part of a mirror relationship. All data on the volumes stays intact and available. Secondary volumes become accessible by hosts that are mapped to them.

8. To complete the checking of the status of the source storage array, return to step 7 in "Checking the Status of the Source Storage Array and the Destination Storage Array."

Deleting a Snapshot Volume

ATTENTION Possible loss of data – If you delete a snapshot volume, all data is removed on the volume, and the associated snapshot repository volume is deleted. This action occurs even if the snapshot repository volume is not located in the same pool. *You cannot cancel this operation after it starts.*

NOTE Depending on the size of the storage array, a full backup could take several hours or several days.

NOTE A pool and its associated standard volumes and snapshot repository volumes must have a status of Optimal in the Logical pane of the Array Management Window before you can delete them.

NOTE A snapshot volume must have a status of Optimal or Contingent before you can delete it.

1. Back up any data on the volume.

2. Stop I/O activity to the destination storage array, and unmount all file systems.

3. Open the Enterprise Management Window.

4. Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

NOTE You cannot delete a volume that is part of a pool that contains a drive that is performing a copyback operation.

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5. Make sure that the status of the snapshot volume is Optimal, Disabled, or Failed. If the volume has a different status, correct any problems with the volume before you continue with this procedure.

6. In the Logical pane, select the snapshot volume that you want to delete.

7. Select **Volume >> Delete**.

    To select multiple snapshot volumes, either press **Ctrl** and the left mouse button, or press **Shift** and the left mouse button.

    The **Delete Volumes** dialog appears.

8. Click **Delete**.

    A confirmation dialog appears.

9. Type yes, and click **OK**.

    The **Delete Volume - Progress** dialog appears while the snapshot volume and its associated snapshot repository volume are deleted. The free capacity in the pool increases or additional unconfigured capacity becomes available.

    For information about snapshot volumes, refer to the online help topics in the Array Management Window.

10. If additional snapshot volumes are to be deleted, repeat step 5 through step 9.

11. If you see a system error message that relates to the deleted volume, either reconfigure your host system, or restart your host system. These actions permanently remove any system information about the volume.

12. To complete the checking of the status of the source storage array, return to step 10 in "Checking the Status of the Source Storage Array and the Destination Storage Array."

Checking the NVSRAM Bit for the Destination Storage Array

You must check the setting of the Disable Drive Migration feature bit (bit 1 in offset x35) in the NVSRAM on the destination storage array before you can move the drives. Use the **Script Editor** dialog in the Enterprise Management Window to check the setting.

Before you install pools that contain data that must be preserved, you must clear the Disable Drive Migration feature bit (set it to 0) on the destination storage array.

1. Open the Enterprise Management Window, if necessary.

2. Select the destination storage array in the Device Tree view or the Device table.

3. Select **Tools >> Execute Script**.

4. In the upper pane of the **Script Editor** dialog, type these statements. Press **Enter** after each statement.

    ```
    show controller [a] NVSRAMByte [0x35];
    show controller [b] NVSRAMByte [0x35];
    ```

5. To run the script, from the menu bar on the **Script Editor** dialog, select **Tools >> Execute Only**.

    ```
    Controller "a" NVSRAM offset 0x35 = byte_value.
    Controller "b" NVSRAM offset 0x35 = byte_value.
    ```

    In these commands, $byte\_value = 0$ enables drive migrations, or $byte\_value = 1$ disables drive migrations.

    The current hexadecimal value of the Disable Drive Migration feature bit appears in the lower pane of the **Script Editor** dialog.

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6. Depending on the *byte_value* that is returned from each controller, perform one of these actions:

   — **The byte value returned from each controller is 0x00** – The Disable Drive Migration feature bit is cleared. Go to "Changing the NVSRAM Bit for the Destination Storage Array."

   — **The byte value returned from each controller is any value other than 0x00** – You must determine the value of the Disable Drive Migration feature bit by using the Disable Drive Migration feature bit as bit 1 of this NVSRAM offset. If you do not know how to perform this operation, contact the next level of support for more information.

Changing the NVSRAM Bit for the Destination Storage Array

Before you install the drives from the source storage array into the destination storage array, you must clear the Disable Drive Migration feature bit (set it to 0) on the destination storage array. Use the **Script Editor** in the Enterprise Management Window to change the setting.

NOTE After you clear the Disable Drive Migration feature bit (set it to 0), you must power off and power on the entire storage array of the controller module or the array module.

1. Stop I/O activity to the destination storage array, and unmount all file systems.

2. Is the **Script Editor** dialog Open?

   — **Yes** – Select **File >> New Script**. Go to step 6.

   — **No** – Go to step 3.

3. Open the Enterprise Management Window, if necessary.

4. Select the destination storage array in the Device Tree view or the Device table.

5. Select **Tools >> Execute Script**.

6. Type these statements in the upper window in the **Script Editor** dialog. Press **Enter** after each statement.

   ```
   set controller [a] NVSRAMByte [0x35] = 0x00;
   set controller [b] NVSRAMByte [0x35] = 0x00;
   ```

7. To run the script, from the menu bar on the **Script Editor** dialog, select **Tools >> Execute Only**.

8. Turn off the power to the controller module or the array module.

9. Wait 20 seconds, and turn on the power to the controller module or the array module.

NOTE After you turn on the power to the controller module or the array module, wait for the controllers to finish booting before proceeding to the next step.

10. To show the current hexadecimal values for the Disable Drive Migration feature bit, type these statements in the upper pane of the **Script Editor** dialog. Press **Enter** after each statement.

    ```
    show controller [a] NVSRAMByte [0x35];
    show controller [b] NVSRAMByte [0x35];
    ```

11. To run the script, from the menu bar on the **Script Editor** dialog, select **Tools >> Execute Only**.

12. Make sure that the current hexadecimal value of the Disable Drive Migration feature bit is set to 0.

    The current hexadecimal value of the Disable Drive Migration feature bit appears in the lower pane of the **Script Editor** dialog.

13. To close the **Script Editor** dialog, select **File >> Exit**.

14. To close the confirmation dialog and to return to the Enterprise Management Window, click **No**.

15. Go to "Removing and Relocating the Drives."

Removing the Drives from the Source Storage Array

If the pool contains snapshot volumes, and the base volume and snapshot repository volumes are located in different pools, move the volumes in this order:

■ First, remove the pool with the base volume from the storage array.

■ Second, remove the pool with the snapshot repository volume.

You will need blank drive CRUs to replace the drives that you remove.

ATTENTION Possible hardware damage – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

1. Create a storage array all support data collection for the source storage array affected by the procedure.
   a. Save the storage array all support data collection.
   b. Open and view the storage array all support data collection files.

   For information about creating a storage array all support data collection, see "Creating Storage Array All Support Data Collections."

2. Put on antistatic protection.

ATTENTION Possible damage to drives – If you bump drives against another surface, the drive mechanism or connectors can be damaged. To avoid damage when you remove or install a drive, always put your hand under the drive CRU to support its weight. Do not touch the electronics on the drive.

3. Open the lever on the drive CRU, and pull the drive out of the drive module approximately 5 cm (2 in.).

4. Wait a minimum of two minutes for the drive to spin down.

   The status of the drive changes from Unassigned to an empty drive slot in the Physical pane of the Array Management Window.

5. Repeat step 3 through step 4 for each drive CRU that must be removed.

6. After the drive has spun down, remove it from the drive module, and put it on an antistatic, cushioned surface away from magnetic fields.

   Make sure that you put your hand under each drive to support its weight when you remove it from the drive module.

NOTE To maintain correct airflow in the drive module, you must fill all of the drive slots. If you do not have drives for the drive slots, insert blank drive CRUs.

7. Insert blank drive CRUs into the empty drive slots.

NOTE After a pool has been removed from the storage array, you might see absent volumes in the Logical pane of the Array Management Window. For information about absent volumes, refer to the online help topics in the Array Management Window.

8. Determine if any missing volumes are associated with the pools that you have removed.
   a. Open the Enterprise Management Window.
   b. Select the source storage array in the **Device** table, and start its Array Management Window.

      If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.
   c. In the Logical pane, see if any missing volumes are associated with the pool that you want to move to the destination storage array.

    d.   Use the storage array all support data collection to identify the World Wide Identifier (WWID) for the volume.

9.   Based on the status of any missing volumes, perform one of these actions:

    —   **The missing volumes are associated with a pool that you want to move to the destination storage array** – Go to "Deleting a Missing Volume." When you have deleted the missing volumes, return to step 8 in this procedure.

    —   **The missing volumes are not associated with a pool that you want to move to the destination storage array** – Go to step 10.

10. To move multiple pools, repeat step 3 through step 10.

11. Go to "Installing the Drives into the Destination Storage Array."

Deleting a Missing Volume

1.   Open the Enterprise Management Window, if necessary.

2.   Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3.   In the Logical pane, locate the missing volume.

4.   Use the storage array all support data collection to identify the World Wide Identifier (WWID) for the volume.

ATTENTION Data loss can occur if you delete an absent volume – If you delete a missing volume, you permanently remove the volume from the configuration. Any associated snapshot volumes, repository volumes, or volume-to-LUN mappings are also deleted. Do *not* delete missing volumes before you confirm that the volumes are no longer required.

5.   Make sure that the missing volume is no longer needed. If you delete the missing volume, you permanently remove the volume from the configuration.

6.   Delete any missing volumes that are associated with the pool that you want to move to the destination storage array.

    a.   In the Logical pane, select a missing volume.

    b.   Select **Volume >> Delete**.

        The **Delete Volumes** dialog appears.

    c.   Click **Delete**.

        The **Confirm Delete Volume(s)** dialog appears.

    d.   To permanently delete the missing volume from the configuration, type `yes`, and click **OK**.

        If this volume is the last missing volume under the Missing Volumes Group node, the Missing Volumes Group node also is removed.

7.   If additional missing volumes must be deleted, repeat step 3 through step 6.

8.   If system error messages that relate to the deleted volume appear, either reconfigure your host system or restart your host system to permanently remove any system information about the volume.

9.   To complete the procedure to remove drives from the source storage array, return to step 8 in "Removing the Drives from the Source Storage Array."

Installing the Drives into the Destination Storage Array

When you complete this procedure, the drives come online automatically in the storage array.

NOTE Pool numbering on the destination storage array might change after all of the drives in the pool are installed. The controller automatically assigns pool numbering for current pools and relocated pools.

If you have created a snapshot volume of a base volume, in some cases, the snapshot repository volume and the base volume might reside in different pools. If you want to keep the data in the snapshot volume, you must locate and move all of the pools that contain the snapshot repository volumes that associated with the snapshot volume. If you do not move all of the associated volumes, the snapshot volume will become unusable in both storage arrays.

1. Open the Enterprise Management Window.
2. Select the destination storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. Make sure that empty drive slots are available in the Physical pane of the Array Management Window for the destination storage array.

ATTENTION Possible hardware damage – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

4. Put on antistatic protection.
5. Remove the blank drive CRUs from the empty drive slots.

ATTENTION Possible damage to drives – If you bump drives against another surface, the drive mechanism or connectors can be damaged. To avoid damage when you remove or install a drive, always put your hand under the drive CRU to support its weight. Do not touch the electronics on the drive.

6. Install the drive CRUs, one at a time, into the destination storage array.
   a. Install each drive in one complete motion by inserting it all the way into the slot.
   b. Lower (close) the lever to lock the drive securely into place.

NOTE Wait at least two minutes for the controller to write information before you reinstall a drive. If you install more than one drive and the controller is not given enough time to recognize each drive, the storage array can enter into an Unstable status. If time is not available, you must restart both controllers, which forces the controllers to write the information.

   The pool and its associated volumes will show an Offline status in the Array Management Window until all of the drives in the pool are replaced.

NOTE Snapshot volumes do *not* have an Offline status indicator.

   These entities show an Offline status:

   — **The pool, the volume, and the snapshot repository volume** – If you move the mouse pointer over the pool or the volume in the Logical pane of the Array Management Window, a message shows the status as Offline.
   — **The drive needs attention** – If you move the mouse pointer over the drives in the Physical pane of the Array Management Window, a message shows the status as Offline.

7. Depending on whether the drive appears in the Physical pane of the Array Management Window, perform one of these actions:

— **The drive appears in the Physical pane** – The drive shows a Needs Attention status. Go to step 9.

— **The drive does not appear in the Physical pane** – Go to step 8.

8. Reinstall the drive.

    a. Open the lever, and pull the drive out of the drive module approximately 5 cm (2 in.).

    b. Wait at least two minutes for the drive to spin down.

    c. Install the drive in one complete motion by inserting it all the way into the slot.

    d. Lower (close) the lever to lock the drive securely in place.

    e. Wait another two minutes until the drive appears in the Array Management Window before you install the next drive.

        The drives show a Needs Attention status in the Physical pane of the Array Management Window until all of the drives from the pool are installed.

9. Repeat step 5 through step 7 until all of the drives from the pool are installed.

NOTE The pool shows an Offline status until all of the drives are installed. When you install the last drive in the pool, the volume can show a Failed status temporarily while the controller is updating. When the update is completed, the pool comes back online automatically with an Optimal status.

10. When all of the drives have been installed, make sure that the pool is back online by checking the status indicators in the Array Management Window.

    — **The pool, the volume, and the snapshot repository volume show Optimal status** – If you move the mouse pointer on the pool or volume in the Logical pane of the Array Management Window, a message shows the status. A snapshot volume has an Optimal status indicator or a Contingent status indicator.

    — **The drive shows Assigned status and Optimal status** – If you move the mouse pointer on the drive in the Physical pane of the Array Management Window, a message shows the status.

11. When the pool is back online, go to "Defining New Storage Domains."

Defining New Storage Domains

Perform these steps if you had used Storage Domains to define volume-to-LUN mappings for a volume that has been moved to the destination storage array.

NOTE Storage Domains is a premium feature that you must enable before you create or change volume-to-LUN mappings.

1. Based on the status of storage domains, perform one of these actions:

    — **Storage domains were deleted** – If storage domains were deleted while the pool resided in the source storage array, you must create new storage domains when the pool is relocated to the destination storage array. If new storage domains are not defined, hosts connected to the destination storage array are not able to detect the volumes in the new pool. Go to step 3.

    — **Volume-to-LUN mappings were changed to the Default Group** – Go to step 2.

2. If you changed the host group for specific volume-to-LUN mappings to the Default Group while the pool resided in the source storage array, perform one of these actions:

    — **You will use default mappings** – The Default Group for the destination storage array detects the volumes when you install the pool in the destination storage array. Any hosts or host groups in the Default Group of the destination storage array can access the volumes. Go to "Completing the Pool Relocation."

    — **You will use Storage Domains** – You can map a specific host or hosts to the volumes in the destination storage array. Go to step 3.

3. To define a new storage domain, perform these actions:

   a. Select a volume in the Topology pane of the **Mappings** tab.

   b. To create a new volume-to-LUN mapping, select **Mappings >> Define >> Storage Domains**.

   c. Follow the instructions on each dialog, and click **Next** when you are ready to move to the next dialog.

   d. To complete the volume-to-LUN mapping, click **Finish**.

   A dialog shows the progress of the processing.

   e. To return to the **Mappings**, click **OK**.

4. Depending on whether you have additional volumes to map to hosts or host groups, perform one of these actions:

   — **You have additional volumes to map to hosts or host groups** – Repeat step 3.

   — **You are finished mapping volumes to hosts or host groups** – Go to step 5.

5. Run the host hot_add utility, if applicable for your operating system.

6. Go to "Completing the Pool Relocation."

Completing the Pool Relocation

1. Mount any file systems, if applicable, for the operating system.

2. Start the host applications that are associated with the volumes.

3. Create a storage array all support data collection for the source storage array that is affected by the procedure.

   a. Save the storage array all support data collection.

   b. Open and view the storage array all support data collection files.

   For information about creating a storage array all support data collection, see "Creating Storage Array All Support Data Collections."

4. Repeat step 3 for the destination storage array.

Chapter 5: Moving a Drive Module to a Different Storage Array – Data Is Preserved

Relocation Process Overview

NOTE Data *is* preserved when you successfully follow the procedures listed in this section to move a drive module from the source storage array to a different destination storage array.

NOTE If you are moving a drive module that has the DC power option, the destination storage array must be cabled for DC power.

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

To move a drive module with pools from one storage array to another storage array, perform these procedures, which are described in detail in the corresponding topics:

1. Locate the drives in a pool.
2. Check the status of the source storage array and the destination storage array.
3. Remove the copy pairs.
4. Remove the mirror relationships.
5. Delete a snapshot volume.
6. Check the NVSRAM bit on the destination storage array.
7. Change the NVSRAM bit on the destination storage array.
8. Remove and relocate the drives in the source storage array.
9. Remove the drive module from the source storage array.
10. Turn on the power to the source storage array.
11. Delete a missing volume.
12. Install the drive module into the destination storage array.
13. Install the drives into the destination storage array.
14. Define new storage domains.
15. Complete the pool relocation.

ATTENTION Possible loss of data or data corruption – Perform a hot pool relocation whenever possible. This action makes sure that any pools or volumes that you move to different destination storage arrays are correctly recognized and managed by the new storage array.

Locating the Drives in a Pool

The drives that include a pool usually are located in multiple drive modules in a storage array. If you move a drive module from one storage array to another storage array, you are required to identify which pools that you want to relocate to the destination storage array. You are also required to identify which pools will remain in the source storage array.

You must move the drives that remain in the source storage array to drive modules that will remain within the source storage array. The drives that you want to move to the destination storage array will be installed after the drive module has been moved to the destination storage array.

1. Based on whether snapshot volumes exist in the pool, perform one of these actions:
    — **Snapshot volumes exist in the pool** – Go to step 2.
    — **Snapshot volumes do *not* exist in the pool** – Go to step 4.

NOTE If you have created a snapshot volume of a base volume, in some cases, the snapshot repository volume and the base volume might reside in different pools. To keep the data in the snapshot volume, you must locate and move all of the pools that contain the snapshot repository volumes that are associated with the snapshot volume. If you do not move all of the associated volumes, the snapshot volume will become unusable in both storage arrays.

2. Locate the snapshot repository volume that is associated with the snapshot volume in the pool that you want to move.
    a. Open the Enterprise Management Window.
    b. Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.
    c. From the Logical pane, right-click a snapshot volume, and select **View Associated Components** from the pop-up menu.
    d. In the **Volume - Associated Components** dialog, see if the snapshot repository volume is in the same pool as the snapshot volume.

3. Based on the location of the snapshot repository volume, perform one of these actions:
    — **The snapshot repository volume is in a different pool** – Repeat step 2 for the pool that contains the snapshot repository volume. When you have completed these tasks for all of the pools, go to step 4.
    — **The snapshot repository volume is in the same pool** – Go to step 4.

4. Physically locate the drives in the selected pool by activating the Locate LED on each drive.
    a. Open the Enterprise Management Window, if necessary.
    b. Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.
    c. From the Logical pane, select the pool.

    A blue association dot appears under each drive in the pool in the Array Management Window.
    d. Select **Pool >> Locate**.

    The **Locate Pool** dialog appears, and the Locate LEDs blink above or below the drives in the storage array.

5. Physically mark the drives in the storage array to identify whether the drive is part of a pool that stays in the source storage array or whether the drive is part of a pool that you want to move to the destination storage array.

6. To stop the blinking LEDs, in the **Locate Pool** dialog, click **OK**.

7. Repeat step 1 through step 6 for all of the pools that you want to remove from the source storage array.

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Checking the Status of the Source Storage Array and the Destination Storage Array

8.   Go to "Checking the Status of the Source Storage Array and the Destination Storage Array."

Checking the Status of the Source Storage Array and the Destination Storage Array

1.   Make sure that the requirements to move the drives have been met.

For information, see "Understanding Concepts, Restrictions, and Requirements of Pool Relocation."

NOTE Depending on the size of the storage array, a full backup could take several hours or several days.

2.   Make sure that the data that must be preserved on the pool in the source storage array has been backed up.

3.   Make sure that an empty drive module slot is available in the destination storage array.

4.   Determine whether the pool that you will move from the source storage array contains the volumes that you want to participate in a volume copy.

a.   Open the Enterprise Management Window.

b.   Select the source storage array in the **Device** table, and start its Array Management Window.

If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

c.   In the Logical pane, look for any volumes that are a source volume or a target volume that you want to participate in a volume copy.

5.   Based on whether volumes that participate in a volume copy exist in the pool, perform one of these actions:

—   **The volumes that participate in a volume copy exist in the pool** – Go to "Removing Copy Pairs." When you have removed the volume copies from the source storage array, return to step 6 in this procedure.

—   **The volumes that participate in a volume copy do not exist in the pool** – Go to step 6.

6.   Determine whether the pool that you want to move contains mirror relationships.

a.   Open the Enterprise Management Window.

b.   Select the source storage array in the **Device** table, and start its Array Management Window.

If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

c.   In the Logical pane, look for any volumes that are identified with a label as a primary volume or a secondary volume.

7.   Based on whether mirror relationships exist in the pool, perform one of these actions:

—   **Mirror relationships exist in the pool** – Go to "Removing the Mirror Relationships." If you remove mirror relationships from the source storage array, you prevent orphan mirrors on the secondary storage array. When you have removed the mirror relationships, return to step 8 in this procedure.

—   **Mirror relationships do not exist in the pool** – Go to step 8.

8.   Determine whether the pool that you want to move contains snapshot volumes.

a.   Open the Enterprise Management Window.

b.   Select the source storage array in the **Device** table, and start its Array Management Window.

If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

c.   In the Logical pane, look for any volumes that are identified with a label as a snapshot volume.

9.   Based on whether snapshot volumes exist in the pool, perform one of these actions:

—   **Snapshot volumes exist in the pool** – Go to step 10.

—   **Snapshot volumes do not exist in the pool** – Go to step 11.

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NOTE If you have created a snapshot volume of a base volume and you do not want to keep the data in the snapshot volume, delete the snapshot volume before you move the pool.

10. Determine whether the snapshot volumes contain data that you want to keep, and perform one of these actions:
    — **Delete the snapshot volumes** – Go to "Deleting a Snapshot Volume." When you have deleted the snapshot volumes, return to step 11 in this procedure.
    — **Retain the snapshot volumes** – Go to step 11.

11. Check the number of drives in the pools that will remain in the source storage array and the number of drives in the pools that you want to move to the destination storage array.
    a. Open the Enterprise Management Window.
    b. Select the source storage array in the **Device** table, and start its Array Management Window.
       If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.
    c. In the Logical pane, select the pool.
       A blue association dot appears under each drive in the pool in the Array Management Window.
    d. Repeat step a through step c for all of the pools that you will move to the destination storage array.

12. Make sure that enough empty drive slots are available in the source storage array to accommodate the drives in the pools that will remain in the source storage array.

NOTE A pool and its associated standard volumes and snapshot repository volumes must have a status of Optimal in the Logical pane of the Array Management Window before they can be deleted.

13. Check the status of the pool and its associated volumes in the source storage array.
    To view a message that describes the status, move your mouse pointer over the pool or the volume in the Logical pane.

14. Based on the status of the pool and the volumes, perform one of these actions:
    — **The status is Optimal** – Go to step 17.
    — **The status is Optimal - Operation in Progress** – Go to step 15.
    — **The status is Failed or Degraded** – Go to step 16.

15. If the Optimal - Operating in Progress indicator appears, perform these actions:
    a. Wait for the volume modification operation to complete, which includes these processes:
    — Defragmentation
    — Copyback
    — Initialization
    — Dynamic segment sizing
    — Dynamic reconstruction
    — Dynamic RAID-level migration
    — Dynamic capacity expansion
    — Dynamic volume expansion
    b. Make sure that the statuses of the pool and the volume are Optimal.
    c. Go to step 17.

16. If a volume or a snapshot repository volume shows a Failed status or a Degraded status, perform these actions:
    a. Use the Recovery Guru to diagnose the problem and to show the appropriate recovery procedure.
    b. Perform the recovery procedure.
    c. Make sure that the volume has a status of Optimal.

    d.   Go to step 17.

NOTE You can have global hot spares assigned on the source storage array, but they cannot be in use for the specified pool. The status of a global hot spare that is assigned but not in use is Standby/Optimal.

If you move the mouse over a global hot spare in the Physical pane of the Array Management Window, a message describes the status.

17. Make sure that global hot spares are not in use for the drives in the pool that you move from the source storage array.

    a.   Open the Enterprise Management Window.

    b.   Select the source storage array in the **Device** table, and start its Array Management Window.

        If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

    c.   In the Logical pane, select the appropriate pool.

    d.   In the Physical pane, make sure that blue association dots do not appear underneath any global hot spares.

18. Based on the status of any global hot spares, perform one of these actions:

    — **Global hot spares are in use for a drive in the pool** – Use the Recovery Guru to diagnose the problem and to show the appropriate recovery procedure. Perform the recovery procedure, and make sure that global hot spares are not in use. Go to step 19.

    — **Global hot spares are not in use for a drive in the pool** – Go to step 19.

19. Repeat step 1 through step 18 for all of the pools that you want to move.

20. Go to "Checking the NVSRAM Bit for the Destination Storage Array."

Removing Copy Pairs

Before you move volumes to participate in a volume copy to the destination storage array, make sure that any copy pairs are removed. This action prevents absent volumes on the destination storage array.

NOTE This option does not delete the source volume or the target volume. Data on the volumes is not affected. As a result of this operation, you can select the target volume as a source volume or a target volume for a new volume copy.

1. Open the Enterprise Management Window.

2. Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. Select **Volume >> Copy >> Copy Manager**.

    The **Copy Manager** dialog appears.

4. Select one or more copy pairs in the table.

    To select multiple copy pairs, either press **Ctrl** and the left mouse button, or press **Shift** and the left mouse button.

5. Select **Copy >> Remove Copy Pairs**.

    The **Remove Copy Pairs** dialog appears.

6. Click **Yes**.

    The volume copy is removed.

7. Close the Copy Manager.

8. To complete the verification of the status of the source storage array, return to step 6 in "Checking the Status of the Source Storage Array and the Destination Storage Array."

Removing the Mirror Relationships

Before you relocate volumes to participate in a mirror relationship, you must remove the mirror relationship between the primary volumes and the secondary volumes. This action prevents orphan mirrors from existing on the remote storage array.

NOTE This option does not delete the primary volume, the secondary volume, or the mirror repository volumes that support mirroring for the storage arrays. Data on the volumes is not affected.

NOTE

As a result of this operation, the primary volume and the secondary volume become standard, host accessible, non-mirrored volumes.

1. Open the Enterprise Management Window.

2. Select either the primary storage array or the secondary storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. In the Logical pane, select the primary volume or the secondary volume that is participating in the mirror relationship.

4. Select **Volume >> Remote Volume Mirroring >> Remove Mirror Relationship**.

    The **Remove Mirror Relationship** dialog appears.

5. From the **Select one or more mirrored pairs** list, select the mirrored volume pairs for which you want to remove the mirror relationship.

    To select multiple mirrored pairs, either press **Ctrl** and the left mouse button, or press **Shift** and the left mouse button. To select all of the mirrored pairs, click the **Select All** button.

6. Click **OK**.

    The **Remove Mirror Relationship - Confirmation** dialog appears.

7. Click **Yes**.

    The **Remove Mirror Relationship - Progress** dialog appears. When the mirror relationship is removed, the volumes in the mirrored pairs that you selected are no longer part of a mirror relationship. All data on the volumes stays intact and available. Secondary volumes become accessible by hosts that are mapped to them.

8. To complete the verification of the status of the source storage array, return to step 8 in "Checking the Status of the Source Storage Array and the Destination Storage Array."

Deleting a Snapshot Volume

ATTENTION Possible loss of data – If you delete a pool and its drives, all data is removed, which includes snapshot volumes and their associated snapshot repository volumes. The associated drives return to an Unassigned status. *You cannot cancel this operation after it starts.* Use this option only if you do not want to keep the data or the volume information about the drives.

NOTE Depending on the size of the storage array, a full backup could take several hours or several days.

1. Back up any data on the volume.
2. Stop I/O activity to the source storage array, and unmount all of the file systems.

   You cannot delete a volume that is part of a pool that contains a drive that is performing a copyback operation.
3. Open the Enterprise Management Window.
4. Select the source storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.
5. Make sure that the status of the snapshot volume is Optimal or Failed.
6. In the Logical pane, select the snapshot volume that you want to delete.
7. Select **Volume >> Delete**.

   To select multiple snapshot volumes, either press **Ctrl** and the left mouse button, or press **Shift** and the left mouse button.

   The **Delete Volumes** dialog appears.
8. Click **Delete**.

   A confirmation dialog appears.
9. Type yes, and click **OK**.

   For information about snapshot volumes, refer to the online help topics in the Array Management Window.

   The **Delete Volume - Progress** dialog appears while the snapshot volume and its associated snapshot repository volume are deleted. The free capacity in the pool increases or additional unconfigured capacity becomes available.
10. If additional snapshot volumes are to be deleted, repeat step 5 through step 9.
11. If you see a system error message that relates to the deleted volume, either reconfigure your host system, or restart your host system to permanently remove any system information about the volume.
12. To complete the verification of the status of the source storage array, return to step 11 in "Checking the Status of the Source Storage Array and the Destination Storage Array."

Checking the NVSRAM Bit for the Destination Storage Array

You must check the setting of the Disable Drive Migration feature bit (bit 1 in offset x35) in the NVSRAM on the destination storage array before you can move the drives. Use the **Script Editor** dialog in the Enterprise Management Window to check the setting.

Before you install pools that contain data that must be preserved, you must clear the Disable Drive Migration feature bit (set it to 0) on the destination storage array.

1. Open the Enterprise Management Window, if necessary.
2. Select the destination storage array in the Device Tree view or the Device table.

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3. Select **Tools >> Execute Script**.

4. In the upper pane of the **Script Editor** dialog, type these statements. Press **Enter** after each statement.

```
show controller [a] NVSRAMByte [0x35];
show controller [b] NVSRAMByte [0x35];
```

5. To run the script, from the menu bar on the **Script Editor** dialog, select **Tools >> Execute Only**.

The current hexadecimal value of the Disable Drive Migration feature bit appears in the lower pane of the **Script Editor** dialog.

```
Controller "a" NVSRAM offset 0x35 = byte_value.
Controller "b" NVSRAM offset 0x35 = byte_value.
```

In these commands, *byte_value = 0* enables drive migrations, or *byte_value = 1* disables drive migrations.

6. Depending on the value of *byte_value* that is returned from each controller, perform one of these actions:

— **The byte value returned from each controller is 0x00** – The Disable Drive Migration feature bit is cleared. Go to "Changing the NVSRAM Bit for the Destination Storage Array."

— **The byte value returned is any value other than 0x00** – You must determine the Disable Drive Migration feature bit value by using the Disable Drive Migration feature bit as bit 1 of this NVSRAM offset. If you do not know how to perform this operation, contact the next level of support for instruction.

Changing the NVSRAM Bit for the Destination Storage Array

Before you install the drives from the source storage array into the destination storage array, you must clear the Disable Drive Migration feature bit (set it to 0) on the destination storage array. Use the **Script Editor** in the Enterprise Management Window to change the setting.

NOTE After you clear the Disable Drive Migration feature bit (set it to 0), you must power off and power on the entire storage array of the controller module or the array module.

1. Stop I/O activity to the destination storage array, and unmount all file systems.

2. Is the **Script Editor** dialog Open?

— **Yes** – Select **File >> New Script**. Go to step 6.

— **No** – Go to step 3.

3. Open the Enterprise Management Window, if necessary.

4. Select the destination storage array in the Device Tree view or the Device table.

5. Select **Tools >> Execute Script**.

6. Type these statements in the upper window in the **Script Editor** dialog. Press **Enter** after each statement.

```
set controller [a] NVSRAMByte [0x35] = 0x00;
set controller [b] NVSRAMByte [0x35] = 0x00;
```

7. To run the script, from the menu bar on the **Script Editor** dialog, select **Tools >> Execute Only**.

8. Turn off the power to the controller module or the array module.

9. Wait 20 seconds, and turn on the power to the controller module or the array module.

NOTE After you turn on the power to the controller module or the array module, wait for the controllers to finish booting before proceeding to the next step.

10. To show the current hexadecimal values for the Disable Drive Migration feature bit, type these statements in the upper pane of the **Script Editor** dialog. Press **Enter** after each statement.

```
show controller [a] NVSRAMByte [0x35];
show controller [b] NVSRAMByte [0x35];
```

11. To run the script, from the menu bar on the **Script Editor** dialog, select **Tools >> Execute Only**.

12. Make sure that the current hexadecimal value of the Disable Drive Migration feature bit is set to 0.

    The current hexadecimal value of the Disable Drive Migration feature bit appears in the lower pane of the **Script Editor** dialog.

13. To close the **Script Editor** dialog, select **File >> Exit**.

14. To close the confirmation dialog and to return to the Enterprise Management Window, click **No**.

15. Go to "Removing and Relocating the Drives."

Removing and Relocating the Drives

In some cases, the drives that comprise a pool might be split between a drive module that you are moving and another drive module that will remain in the source storage array. This procedure applies to two such situations:

■ A drive module that you are moving contains some drives that belong to a pool that will remain in the source storage array. Move those drives to another drive module in the source storage array.

■ A pool you are moving to the destination storage array has some drives in a drive module that you are moving and others in a drive module that will remain in the source storage array. Move the drives that are needed for the pool that you are moving. Move those drives from the drive module that remains in the source storage array to a drive module in the destination storage array.

If the drive trays you are moving contain all of the drives used by the pools you are moving and contain no drives used by other pools, go to "Moving the Drive Modules from the Source Storage Array to the Destination Storage Array."

If the pool contains snapshot volumes and the base volume and the snapshot repository volumes are located in different pools, the preferred order to move the volumes is as follows:

■ First, remove the pool with the base volume from the storage array.

■ Second, remove the pool with the snapshot repository volume.

1. Create a storage array all support data collection for the source storage arrays affected by the procedure.

    a. Save the storage array all support data collection.

    b. Open and view the storage array all support data collection files.

    For information about creating a storage array all support data collection, see "Creating Storage Array All Support Data Collections."

2. Stop I/O activity to the source storage array, and unmount all of the file systems. You can relocate drive modules in two ways:

    — **Cold drive module relocation** – Go to step 3.

    — **Warmdrive module relocation** – Go to step 5.

3. Turn off the power to the controller module or the array module.

4. Turn off the power to the drive modules.

ATTENTION Possible hardware damage – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

5. Put on antistatic protection.

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> **ATTENTION Possible damage to drives** – Bumping drives against another surface can damage the drive mechanism or connectors. To avoid damage when removing or installing a drive, always place your hand under the drive CRU to support its weight. Do not touch the electronics on the drive.

6. Open the lever on the drive CRU that you want to relocate, and pull the drive out of the drive module.

    Make sure that you put your hand under the drive to support its weight when you remove it from the drive module.

7. Put the drive on an antistatic, cushioned surface away from magnetic fields.

8. Repeat step 6 through step 7 for each drive that you want to move.

9. Install the drive into a empty drive slot. Install the drive in one complete motion by inserting it all the way into the slot, and then lowering (closing) the lever to lock the drive securely into place.

10. Repeat step 9until all of the drives have been relocated.

> **NOTE** To maintain correct airflow in the drive module, you must fill all of the drive slots. If you do not have a drive for a drive slot, insert a blank drive CRUs in that slot.

11. Insert blank drive CRUs into all empty drive slots in the drive modules.

12. Go to "Moving the Drive Modules from the Source Storage Array to the Destination Storage Array."

Moving the Drive Modules from the Source Storage Array to the Destination Storage Array

> **ATTENTION Possible hardware damage** – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

> **NOTE** If components of your storage array have the DC-power option, keep in mind that the procedures for disconnecting and connecting power cables for those components are different. For information on DC power connections, refer to the topics under Storage Array Installation that apply to your storage array or the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

1. Did you perform the procedure in "Removing and Relocating the Drives"?
    — **Yes -** Go to step 7.
    — **No -** Go to step 1.

2. Create a storage array all support data collection for the source storage arrays affected by the procedure.
    a. Save the storage array all support data collection.
    b.   Open and view the storage array all support data collection files.

    For information about creating a storage array all support data collection, see "Creating Storage Array All Support Data Collections."

3. Stop I/O activity to the source storage array, and unmount all of the file systems.

4. Turn off the power to the controller module or the array module.

5. Turn off the power to the drive modules.

> **ATTENTION Possible hardware damage** – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

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6. Put on antistatic protection.

⚠ **WARNING** (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

7. Disconnect the power cords.
8. Disconnect and label the drive interface cables between the drive module that you want to move and the drive modules that will remain in the source storage array.
9. Remove the side covers from the front of the drive module, if needed.
10. Use a screwdriver to unsnap the front bezel from the mounting pins on the drive module.
11. Install mounting rails in the cabinet of the destination storage array, if needed.
12. Remove the mounting screws from the drive module.

   Depending on the weight of your drive module, you may need more than one person to move the drive module.

WARNING (W08) **Risk of bodily injury** –

>18 kg (39.7 lbs)

Two persons are required to safely lift the component.

WARNING (W09) **Risk of bodily injury** –

>35 kg (70.5 lbs)

Three persons are required to safely lift the component.

13. Pull the drive module out of the cabinet, and move the drive module to the destination storage array. Move any associated hardware, such as mounting screws, bezel and end caps, with the drive module.
14. Set the Module ID switches on the drive module, if necessary. For instructions for your drive module model, refer to the topics under Storage Array Installation that apply to your storage array or the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.
15. At the front of the destination cabinet, set the drive module on the mounting rails, and slide it all the way into the cabinet.
16. Secure the drive module in the cabinet.

   a. Align the front mounting holes on each side of the drive module with the mounting holes on the front of the mounting rails.
   b. Secure the front of the drive module to the cabinet rails by inserting screws into the bottom holes.
   c. Secure the rear of the drive module with two screws, one on each side.

17. Reinstall all of the associated hardsware that you moved in step 13.

18. Repeat step 1 through step 13 until all of the drive modules have been moved.

19. Cable the drive connections in the source storage array for the new configuration of drive modules. For the correct cabling configuration, refer to the topics under *Hardware Cabling* or to the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

20. Cable the drive connections in the destination storage array for the new configuration of drive modules. For the correct cabling configuration, refer to the topics under *Hardware Cabling* or to the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

21. Go to "Turning On the Power to the Source Storage Array."

Turning On the Power to the Source Storage Array

NOTE Some controller modules or array modules do not acknowledge any attached drive modules that are turned on after the power is turned on to the controller module or the array module. You must turn on the power to the drive modules before you turn on the power to the controller module or the array module.

1. Make sure that all interface cables and power cords are connected securely to the controller module or the array module and any attached drive modules.

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

2. Turn on the Power switches to all of the drive modules that are connected to the controller module or the array module.

3. After all of the drives in the drive modules have started, turn on both Power switches on the rear of the controller module or the array module.

    The green and amber LEDs on the front and rear of the drive modules and the controller modules or array modules blink during the power-on process.

    The battery CRU in the controller module or the array module might take up to 15 minutes to complete its self-test. For detailed information on LED indications while a battery is recharging, refer to the topics under Storage Array Installation that apply to your storage array or to the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

4. Check the LEDs on the front and rear of the controller module or the array module and the drive modules.

    Under normal operating conditions, all green Power LEDs are on and all amber Service Action Required LEDs are off. For detailed views and descriptions of each of the LEDs, refer to the topics under Storage Array Installation that apply to your storage array or to the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

5. Open the Enterprise Management Window, if necessary.

6. Select the source storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

NOTE After a pool has been removed from the storage array while still powered on, you can see missing volumes in the Logical pane of the Array Management Window. For information about missing volumes, refer to the online help topics in the Array Management Window.

NOTE If the storage array was powered off during the drive module relocation, the source storage array does not show the missing volumes in the Logical pane of the Array Management Window.

7. Determine whether any missing volumes are associated with the pools that you have removed.

   a. Open the Enterprise Management Window.

   b. Select the source storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

   c. In the Logical pane, check whether any missing volumes are associated with the pools that were relocated to the destination storage array.

   d. Use the storage array all support data collection to identify the World Wide Identifier (WWID) for the volume.

8. Based on the status of any missing volumes, perform one of these actions:

   — **The missing volumes are associated with a pool that you moved to the destination storage array** – Go to "Deleting a Missing Volume." After you have deleted the missing volume, return to step 7 in this procedure.

   — **The missing volumes are *not* associated with a pool that you moved to the destination storage array** – Go to step 9.

9. Make sure that all of the pools are online with Optimal status by checking the status indicators in the Array Management Window:

   — **The pool, the volume, and the snapshot repository volume show Optimal statuses** – If you move the mouse pointer over the pool or the volume in the Logical pane of the Array Management Window, a message describes the status. A snapshot volume will have an Optimal status indicator or a Contingent status indicator.

   — **The drive shows Assigned and Optimal statuses** – If you move the mouse pointer over the drive in the Physical pane of the Array Management Window, a message describes the status.

10. Based on the status of the pool and the volume, perform one of these actions:

   — **The status is Optimal** – Go to "Installing the Drives into the Destination Storage Array."

   — **The status is Optimal - Operation in Progress** – Go to step 11.

   — **The status is anything other than Optimal or Optimal - Operation in Progress** – Go to step 12.

11. The Optimal - Operation in Progress status indicator appears. Perform these actions:

   a. Wait for the volume modification operation to complete, which includes these processes:

   — Defragmentation

   — Copyback

   — Initialization

   — Dynamic segment sizing

   — Dynamic reconstruction

   — Dynamic RAID-level migration

   — Dynamic capacity expansion

   — Dynamic volume expansion

   b. Make sure that the pool and the volumes have Optimal statuses.

   c. Go to "Installing the Drives into the Destination Storage Array."

12. Check the status of the pools, and perform one of these actions:

   — **The pools are Offline** – Make sure that the status indicators are Optimal for the pool and associated volumes. Go to "Installing the Drives into the Destination Storage Array."

   — **Use the Recovery Guru to diagnose the problem and present the appropriate recovery procedure** – Perform the recovery procedure, and make sure that the status indicators are Optimal for the pool and its associated volumes. Go to "Installing the Drives into the Destination Storage Array."

Deleting a Missing Volume

Complete this procedure to delete a missing volume that is associated with a pool that you want to relocate to the destination storage array.

1. Open the Enterprise Management Window, if necessary.

2. Select the destination storage array in the **Device** table, and start its Array Management Window.

   If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. From the Logical pane, locate the missing volume.

4. Use the storage array all support data collection to identify the World Wide Identifier (WWID) for the volume.

ATTENTION Possible loss of data – If you delete a missing volume, this action permanently removes the volume from the configuration. Any associated snapshot volumes, snapshot repository volumes, or volume-to-LUN mappings are also deleted. Do *not* delete any missing volumes before you confirm that the volumes are no longer required. For information about absent volumes, refer to the online help topics in the Array Management Window.

5. Make sure that the missing volume is no longer required. If you delete the missing volume, you permanently remove it from the configuration.

6. Delete any missing volumes that are associated with the pool that you want to move to the destination storage array.

   a. Select a missing volume in the Logical pane.

   b. Select **Volume >> Delete**.

      The **Delete Volumes** dialog appears.

   c. Click **Delete**.

      The **Confirm Delete Volume(s)** dialog appears.

   d. To permanently delete the missing volume from the configuration, type `yes`, and click **OK**.

      If this is the last absent volume under the Missing Volumes Group node, the Missing Volumes Group node also is removed.

7. If you must delete other missing volumes, repeat step 3 through step 6.

8. If system error messages that relate to the deleted volume appear, reconfigure your host system or restart your host system to permanently remove any system information about the volume.

9. To complete the procedure to remove drives from the source storage array, return to step 6 in "Moving the Drive Modules from the Source Storage Array to the Destination Storage Array."

Installing the Drive Modules into the Destination Storage Array

ATTENTION Possible hardware damage – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

NOTE If components of your storage array have the DC-power option, keep in mind that the procedures for disconnecting and connecting power cables for those components are different. For information on DC power connections, refer to the topics under Storage Array Installation that apply to your storage array or the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

1. Put on antistatic protection.

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2. Connect the drive interface cables between the current drive modules in the destination storage array and the newly installed drive module. For the correct cabling configuration, refer to the topics under *Hardware Cabling* or to the corresponding PDF document on the SANtricity ES Storage Manager Installation DVD.

3. To maintain power redundancy, connect each power supply in the drive module to a separate power source in the cabinet.

> ⚠ **WARNING** (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

4. For each additional drive module to be moved, repeat step 2 through step 3.

5. Turn on the power to the drive modules.

6. Start the Array Management Window for the storage array.

    The newly installed drive module is visible in the Physical pane with empty drive slots.

7. Go to "Installing the Drives into the Destination Storage Array."

Installing the Drives into the Destination Storage Array

When you complete this procedure, the drives come online automatically in the storage array.

> **NOTE** Pool numbering on the destination storage array might change after all of the drives in the pool are installed. The controller automatically assigns pool numbering for current pools and relocated pools.

If you have created a snapshot volume of a base volume, in some cases, the snapshot repository volume and the base volume might reside in different pools. If you want to keep the data in the snapshot volume, you must locate and move all of the pools that contain the snapshot repository volumes that associated with the snapshot volume. If you do not move all of the associated volumes, the snapshot volume will become unusable in both storage arrays.

1. Open the Enterprise Management Window.

2. Select the destination storage array in the **Device** table, and start its Array Management Window.

    If the Array Management Window for the selected storage array is already open on the storage management station, a second Array Management Window does not open.

3. Make sure that empty drive slots are available in the Physical pane of the Array Management Window for the destination storage array.

> **ATTENTION Possible hardware damage** – To prevent electrostatic discharge damage to the module, use proper antistatic protection when handling module components.

4. Put on antistatic protection.

5. Remove the blank drive CRUs from the empty drive slots.

> **ATTENTION Possible damage to drives** – If you bump drives against another surface, the drive mechanism or connectors can be damaged. To avoid damage when you remove or install a drive, always put your hand under the drive CRU to support its weight. Do not touch the electronics on the drive.

6. Install the drive CRUs, one at a time, into the destination storage array.

    a. Install each drive in one complete motion by inserting it all the way into the slot.

    b. Lower (close) the lever to lock the drive securely into place.

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NOTE Wait at least two minutes for the controller to write information before you reinstall the next drive. If you install more than one drive and the controller is not given enough time to recognize each drive, the storage array can enter into an Unstable status. If time is not available, you must restart both controllers, which forces the controllers to write the information.

The pool and its associated volumes will show an Offline status in the Array Management Window until all the drives in the pool are replaced.

NOTE Snapshot volumes do *not* have an Offline status indicator.

These entities show an Offline status:

— **The pool, the volume, and the snapshot repository volume** – If you move the mouse pointer over the pool or the volume in the Logical pane of the Array Management Window, a message shows the status as Offline.

— **The drive needs attention** – If you move the mouse pointer over the drives in the Physical pane of the Array Management Window, a message shows the status as Offline.

7. Depending on whether the drive appears in the Physical pane of the Array Management Window, perform one of these actions:

    — **The drive appears in the Physical pane** – The drive shows a Needs Attention status. Go to step 9.

    — **The drive does not appear in the Physical pane** – Go to step 8.

8. Reinstall the drive.

    a. Open the lever, and pull the drive out of the drive module approximately 5 cm (2 in.).
    b. Wait at least two minutes for the drive to spin down.
    c. Install the drive in one complete motion by inserting it all the way into the slot.
    d. Lower (close) the lever to lock the drive securely in place.
    e. Wait another two minutes until the drive appears in the Array Management Window before you install the next drive.

    The drives show a Needs Attention status in the Physical pane of the Array Management Window until all of the drives from the pool are installed.

9. Repeat step 5 through step 7 until all of the drives from the pool are installed.

NOTE The pool shows an Offline status until all of the drives are installed. When you install the last drive in the pool, the volume can show a Failed status temporarily while the controller is updating. When the update is completed, the pool comes back online automatically with an Optimal status.

10. When all of the drives have been installed, make sure that the pool is back online by checking the status indicators in the Array Management Window.

    — **The pool, the volume, and the snapshot repository volume show Optimal status** – If you move the mouse pointer on the pool or volume in the Logical pane of the Array Management Window, a message shows the status. A snapshot volume has an Optimal status indicator or a Contingent status indicator.

    — **The drive shows Assigned status and Optimal status** – If you move the mouse pointer on the drive in the Physical pane of the Array Management Window, a message shows the status.

11. When the pool is back online, go to "Defining New Storage Domains."

Defining New Storage Domains

Perform these steps if you had used Storage Domains to define volume-to-LUN mappings for a volume that has been moved to the destination storage array.

NOTE Storage Domains is a premium feature that you must enable before you create or change volume-to-LUN mappings.

1. Based on the status of storage domains, perform one of these actions:
    — **Storage domains were deleted** – If storage domains were deleted while the pool resided in the source storage array, you must create new storage domains when the pool is relocated to the destination storage array. If new storage domains are not defined, hosts connected to the destination storage array are not able to detect the volumes in the new pool. Go to step 3.
    — **Volume-to-LUN mappings were changed to the Default Group** – Go to step 2.

2. If you changed the host group for specific volume-to-LUN mappings to the Default Group while the pool resided in the source storage array, perform one of these actions:
    — **You will use default mappings** – The Default Group for the destination storage array detects the volumes when you install the pool in the destination storage array. Any hosts or host groups in the Default Group of the destination storage array can access the volumes. Go to "Completing the Pool Relocation."
    — **You will use Storage Domains** – You can map a specific host or hosts to the volumes in the destination storage array. Go to step 3.

3. To define a new storage domain, perform these actions:
    a. Select a volume in the Topology pane of the **Mappings** tab.
    b. To create a new volume-to-LUN mapping, select **Mappings >> Define >> Storage Domains**.
    c. Follow the instructions on each dialog, and click **Next** when you are ready to move to the next dialog.
    d. To complete the volume-to-LUN mapping, click **Finish**.
        A dialog shows the progress of the processing.
    e. To return to the **Mappings** tab, click **OK**.

4. Depending on whether you have additional volumes to map to hosts or host groups, perform one of these actions:
    — **You have additional volumes to map to hosts or host groups** – Repeat step 3.
    — **You are finished mapping volumes to hosts or host groups** – Go to step 5.

5. Run the host hot_add utility, if applicable for your operating system.
6. Go to "Completing the Pool Relocation."

Completing the Pool Relocation

1. Mount any file systems, if applicable, for the operating system.
2. Start the host applications that are associated with the volumes.
3. Create a storage array all support data collection for the source storage array that is affected by the procedure.
    a. Save the storage array all support data collection.
    b. Open and view the storage array all support data collection files.

    For information about creating a storage array all support data collection, see "Creating Storage Array All Support Data Collections."

4. Repeat step 3 for the destination storage array.

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