

# Quantum<sup>®</sup>

## Upgrade Guide

# Quantum StorNext QS/QD Storage SANtricity 11.20



StorNext QS/QD Storage SANtricity 11.20 Upgrade Guide, 6-68299-01 Rev A, May 2015, Product of USA.

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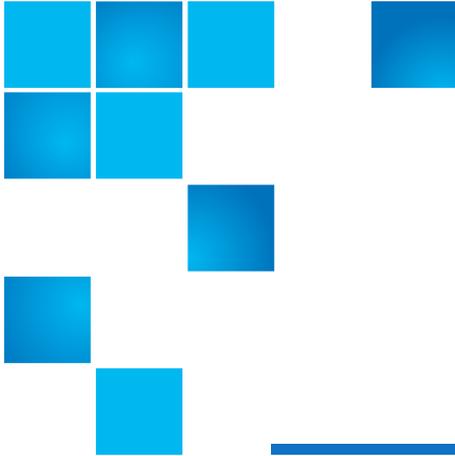


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# About this guide

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This guide includes information about how to upgrade storage management software, controller firmware and NVSRAM, and ESM firmware in your storage array. It has information about preparing to upgrade and about compatibility and system requirements for various upgrade options. For each supported operating system, this guide has procedures for installing or uninstalling SANtricity Storage Manager. It also includes procedures for upgrading hardware by replacing controllers in base systems.

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## Intended audience

This guide is intended for storage customers and technicians.

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**NOTE:** This guide is based on the assumption that your storage cabinet is already installed within your location.

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## Prerequisites

Prerequisites for installing and using this product include knowledge of:

- Servers and computer networks
- Network administration
- Storage system installation and configuration
- Storage area network (SAN) management and direct attach storage (DAS)
- Fibre Channel (FC) and Ethernet protocols

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# Document conventions and symbols

**Table 1** Document conventions

Convention	Element
<a href="#">Blue text</a>	Cross-reference links and e-mail addresses
<a href="#">Blue, underlined text</a>	Web site addresses
<b>Bold text</b>	<ul style="list-style-type: none"><li>• Key names</li><li>• Text typed into a GUI element, such as into a box</li><li>• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes</li></ul>
<i>Italic text</i>	Text emphasis
Monospace text	<ul style="list-style-type: none"><li>• File and directory names</li><li>• System output</li><li>• Code</li><li>• Text typed at the command-line</li></ul>
<i>Monospace, italic text</i>	<ul style="list-style-type: none"><li>• Code variables</li><li>• Command-line variables</li></ul>
<b>Monospace, bold text</b>	Emphasis of file and directory names, system output, code, and text typed at the command-line

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 **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

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 **IMPORTANT:** Provides clarifying information or specific instructions.

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**NOTE:** Provides additional information.

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 **TIP:** Provides helpful hints and shortcuts.

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# Upgrade Software/Firmware

This chapter provides the information on the preparation for upgrading your software and firmware.

## Preparing to Upgrade Your Software or Firmware

The following table shows the supported upgrade paths for base systems for storage management software version 11.20 and controller firmware (CFW) version 8.20.

**Table 2** Supported Trays and Software Upgrade Paths

Base System	Installed Storage Management Software Version	Supported Upgrades CFW
QS1200/QS2400/QD6000	10.80 or later to 11.20	7.80.xx.xx to 8.20.xx.xx 7.83.xx.xx to 8.20.xx.xx 7.84.xx.xx to 8.20.xx.xx 7.86.xx.xx to 8.20.xx.xx
QD7000	10.86 or later to 11.20	7.86.xx.xx to 8.20.xx.xx

**NOTE:** To make sure that your failover driver is compatible with the new hardware, firmware, and software, refer to the Multipath Drivers Guide.

For the RHEL and SLES operating systems using the DM-MP multipath driver, if you are upgrading the storage array controller firmware from version 7.8 (or an earlier version), you might need to change the host type in the storage partition mapping. Refer to the Multipath Drivers Guide for information about which host type to select.





# Controller FW and NVSRAM

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This chapter provides the information on upgrading controller firmware and NVSRAM.

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## Upgrading Controller Firmware and NVSRAM

Obtain a copy of the installation files to upgrade controller firmware and NVSRAM from [Quantum Support](#). Save the files on the management station where you will perform the upgrade. Check the information in the “readme” file that is included in the .zip archive with the controller firmware and NVSRAM to make sure whether you need to upgrade.

In the SANtricity **Enterprise Management Window**, double-click the icon for the storage array to upgrade.

- 1 The **Array Management Window** for the storage array appears.
- 2 Check that the storage array has **Optimal** status.
- 3 Save a support bundle for the storage array.
  - a In the **Array Management Window**, select **Monitor > Health > Collect Support Data Manually**.
  - b Enter a file path for the archive file in the **Specify filename** text box.
  - c Click **Start**.

There might be some delay while the data is saved and storage array performance might be slowed during that interval.
  - d Click **OK**.
- 4 Select **Upgrade > Controller Firmware > Upgrade**.
- 5 In the **Pre-Upgrade Check** dialog, click **OK**.
- 6 Does an **Event Log Error Verification** dialog appear?
  - If yes, select **Monitor > Reports > Log**, resolve any listed events, clear the log, and then go to [step 7](#).
  - If no, continue with [step 7](#).
- 7 In the **Download Controller Firmware** dialog, click **Select File** for the controller firmware, locate and select the controller firmware upgrade file that you want to download, and then click **OK** in the **Select File** dialog.
- 8 Do you choose to upgrade the NVSRAM while you upgrade the controller firmware?

The recommend option is to upgrade NVSRAM while you upgrade controller firmware.

- If yes, select the check box labeled **Transfer NVSRAM file with controller firmware** and then go to [step 9](#).
- If no, continue with [step 10](#).

**9** Click **Select File** for the NVSRAM, locate and select the NVSRAM upgrade file that want to download, and then click **OK** in the **Select File** dialog.

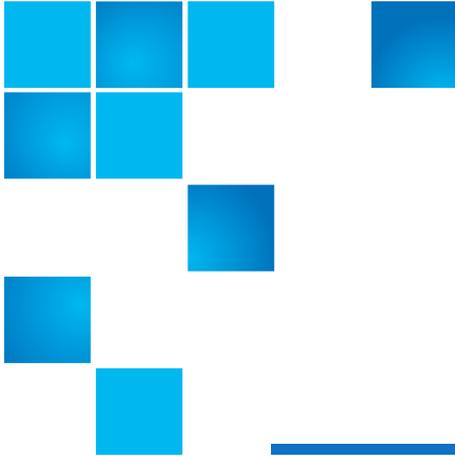
**10** Click **Transfer**.

The **Confirm Download** dialog appears.

**11** In the **Confirm Download** dialog, click **Yes**.

The **Downloading** dialog appears. This dialog tracks progress while the installation proceeds.

**12** In the **Downloading** dialog, when check marks appear beside each step of the update process, click **Close**.



## Chapter 3

# ESM Firmware

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This chapter provides the information on upgrading the ESM firmware.

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## Upgrading the ESM Firmware

Obtain a copy of the installation files to upgrade ESM firmware from [Quantum Support](#). Save the files on the management station where you will perform the upgrade. Check the information in the “readme” file that is included in the .zip archive with the ESM firmware to make sure whether you need to upgrade.

The following steps describe how to upgrade the firmware one expansion unit at a time. At [step 3](#), you might, as an alternative, choose to upgrade all or some subset of the expansion units at once.

- 1 In the SANtricity **Enterprise Management** window, double-click the icon for the storage array to upgrade. The **Array Management** window for the storage array appears.
- 2 Select **Upgrade Firmware > ESM Firmware**.

The **Download Environmental (ESM) Card Firmware** dialog appears.

- 3 In the **Download Environmental (ESM) Card Firmware** dialog, select the first expansion unit on the list that you have not yet upgraded.
- 4 In the **Download Environmental (ESM) Card Firmware** dialog, click **Select File**, locate and select the file that you want to download, and then click **OK**.

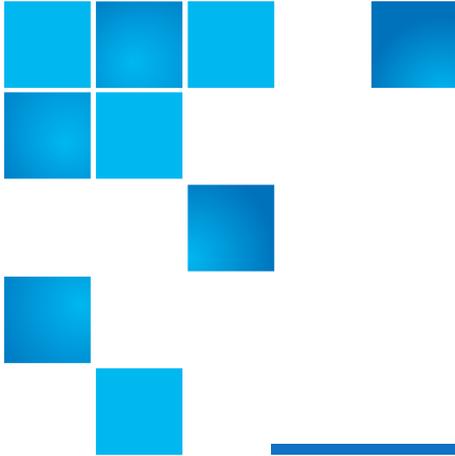
If you change the default selection for **File of type** to **All Files** or **All Firmware Files**, the **ESM Firmware Compatibility Warning** dialog might appear. If this occurs, review any warning messages before you proceed.

- 5 In the **Download Environmental (ESM) Card Firmware** dialog, click **Start**.

The **Confirm Download** dialog appears.

- 6 In the **Confirm Download** dialog, type “yes” in the text box and then click **OK**.
- 7 When the **Transfer complete** message appears, click **Close** in the **Download Environmental (ESM) Card Firmware** dialog.
  - If there are additional expansion units in the storage array that require an ESM firmware upgrade, go to [step 2](#).
  - If you have upgraded the ESM firmware for all of the expansion units in the storage array, you have completed this task.





## Chapter 4

# Drive Firmware

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Drive firmware controls the low-level operating characteristics of a disk drive. Periodically, the drive manufacturers release updates to drive firmware to add new features, improve performance, and fix defects.

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## Types of Drive Firmware Downloads

Each firmware image file contains information about the drive type on which the firmware image runs. The specified firmware image can be downloaded only to a compatible drive. Different firmware download methods are available depending on the type and state of the volume group or disk pool to which that drive belongs as described in the following list.

- **Online:** If the volume group or disk pool supports redundancy and is Optimal, you can use the Online method to download the drive firmware. The Online method downloads firmware while the storage array is processing I/O. You do not have to stop I/O to the associated volumes using these drives. These drives are upgraded one at a time. If the drive is not assigned to a volume group or disk pool (or is a standby Hot Spared), then its firmware may be updated by the Online or the Parallel method.

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**NOTE:** During an online drive firmware download, if a volume transfer takes place during the rapid reconstruction process, the system initiates a full reconstruction on the volume that was transferred. This operation might take a considerable amount of time.

Generally, a full reconstruction operation requires approximately 15 to 20 seconds per gigabyte for RAID 5 or RAID 6. Actual full reconstruction time depends on several factors, including the amount of I/O activity occurring during the reconstruction operation, the number of drives in the volume group, the rebuild priority setting, and the drive performance.

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- **Parallel:** If the volume group or disk pool does not support redundancy (RAID 0), or is degraded, you must use the Parallel method to download the drive firmware. The Parallel method downloads firmware only while all I/O activity is stopped. You must stop all I/O to any associated volumes using these drives. If the drive is not assigned to a volume group or disk pool (or is a standby Hot Spared), then its firmware may be updated by the Online method or the Parallel method.
  - **All:** You can choose All to download firmware to all the drives included in the selection list, regardless of the state of the volume group or disk pool. The selection list can contain a mixture of redundant and non-redundant volume group or disk pool drives or SSD cache drives, therefore the

system downloads firmware to all these drives using the Parallel method. All I/O to the volumes using these drives must be stopped before the firmware download begins.

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## Guidelines

Keep these important guidelines in mind when you update the drive firmware to avoid the risk of application errors:

- Downloading firmware incorrectly could result in damage to the drives or loss of data. Perform downloads only under the guidance of your Technical Support Representative.
- If using the Parallel download method, stop all I/O to the volume group containing the drives before starting the download.
- Make sure that the firmware that you download to the drives is compatible with the drives that you select.
- Do not make any configuration changes to the storage array while downloading the firmware.
- Firmware on RAID 0 volume group drives can only be updated using the Parallel method.

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## Steps to Upgrade the Drive Firmware

Use the **Upgrade Drive Firmware** option to upgrade compatible drives in the storage array with the latest firmware version.

- 1 From the Array Management Window, select **Upgrade > Drive Firmware**.

The **Download Drive Firmware - Add Packages** dialog appears, which shows a list of firmware files that are currently in use by the drives on the storage array.

- 2 Select **View Associated Drives** to view the drives that are currently using the firmware files listed.
- 3 To select the latest firmware, click **Add**, and do the following:
  - a Navigate to the directory that contains the firmware files that you want to download and select up to four firmware files.
  - b Click **OK**. The system updates the Packages to be transferred information area with the firmware files you selected.

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**NOTE:** Selecting more than one firmware file to update the firmware of the same drive might result in a file conflict error. If a file conflict error occurs, an error dialog appears. To resolve this error, click **OK** and remove all other firmware files except the one that you want to use for updating the firmware of the drive.

To remove a firmware file, select the firmware file in the Packages to Be Transferred information area, and click **Remove**. In addition, you can only select up to four (4) drive firmware packages at one time.

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- 4 Click **Next** to view the **Download Drive Firmware - Select Drives** dialog. The following actions occur:

- All drives are scanned for configuration information and upgrade eligibility.
  - You are presented with a selection (depending on what variety of drives you have in the storage array) of compatible drives that can be upgraded with the firmware you selected. The drives capable of being updated as an online operation are displayed by default.
  - The selected firmware for the drive appears in the **Proposed Firmware** information area. If you must change the firmware, click **Back** to return to the previous dialog.
- 5 From the Drive upgrade capability drop-down, filter the drives based on whether they can support an online or parallel download operation or both (all):
- **Online** (default) - Shows the drives that can support a firmware download while the storage array is processing I/O. You do not have to stop I/O to the associated volumes using these drives. These drives are upgraded one at a time.
  - **Parallel** - Shows the drives that can support a firmware download only while all I/O activity is stopped. You must stop all I/O to any associated volumes using those drives when you select this download type. Drives that do not have redundancy must be processed as a parallel operation. This requirement includes any drive associated with SSD cache, a RAID 0 volume group, or any disk pool or volume group that is degraded. Offline drives must also be processed as a parallel operation.
  - **All** - Shows a combination of drives that can support both an online firmware download operation and a parallel firmware download operation. This option includes any drive associated with SSD cache, a RAID 0 volume group, or any disk pool or volume group that is degraded. If you select "All" as the download type, the firmware files are downloaded as a parallel operation. All I/O to the volumes using these drives must be stopped before the firmware download begins.
- 6 In the Compatible Drives table, select the drives for which you want to download the selected firmware files. Choose one of the following actions:
- **For one or more drives** – In the Compatible Drives table, select each drive you want to update.
  - **For all compatible drives listed in the table** – Click **Select all**.
- 7 Click **Finish**.
- The **Confirm Download** dialog appears.
- 8 To start the firmware download, type yes in the text box.
- 9 Click **OK**.
- 10 The drive firmware download begins, and the following actions occur:
- Download Drive Firmware - Progress dialog opens, indicating the status of the firmware transfer for all drives. The drive firmware download operation will take between 30 seconds to 2.5 minutes per drive to complete.
  - The status of each drive participating in the download appears in the Transfer Progress column of the Devices updated area.
- During the firmware download process, you can do the following:
- Click **Stop** to stop the firmware download in progress. Any firmware downloads currently in progress are completed. Any drives that have attempted firmware downloads show their individual status. Any remaining drives are listed with a status of Not attempted.
  - Click **Save As** to save a text report of the progress summary. The report saves with a default .log file extension. If you want to change the file extension or directory, change the parameters in the **Save Drive Download Log** dialog.
- 11 After the drive firmware download operation completes, perform one of these actions:

- To close the **Drive Firmware Download Wizard** – Click **Close**.
- To start the wizard again – Click **Transfer More**.

## Viewing the Progress of the Drive Firmware Download

Use the Download Drive Firmware - Progress dialog to monitor the progress of the drive firmware download. The Drives updated area contains a list of drives that are scheduled for firmware downloads and the transfer status of each drive's download.

### Firmware Download Operation

Generally, an online drive firmware download operation will take between 30 seconds to 2.5 minutes per drive to complete. Actual online download time depends on several factors, including the amount of I/O activity occurring during an online download operation, the I/O load on the storage array, the number of drives that are participating in the download, and the drive performance.

Parallel drive firmware download operation can take up to 90 seconds to complete.

### Status of the Drive Firmware Download

The progress and status of each drive that is participating in the download appears in the Transfer Progress column of the Drives updated area. When monitoring the progress of the firmware download, keep in mind the following:

When an online drive firmware download operation is in-progress, a progress bar appears indicating both the status of the firmware file transfer and the rapid reconstruction process.

During an online drive firmware download, if a volume transfer takes place during the rapid reconstruction process, the system initiates a full reconstruction. The progress bar shows "Reconstruction in progress" as the download status. This operation might take a considerable amount of time.

**Table 3** Status of the Drive Firmware Download

Transfer Progress Status	Definition
Pending	This status is shown for an online firmware download operation that has been scheduled but has not yet started.
In progress	The firmware is being transferred to the drive.
Reconstruction in progress	This status is shown if a volume transfer takes place during the rapid reconstruction of a drive. This is typically due to a controller reset or failure and the controller owner transfers the volume. The system will initiate a full reconstruction of the drive.
Failed - partial	The firmware was only partially transferred to the drive before a problem prevented the rest of the file from being transferred.
Failed - invalid state	The firmware is not valid.
Failed - other	The firmware could not be downloaded, possibly because of a physical problem with the drive.

**Table 3** Status of the Drive Firmware Download

<b>Transfer Progress Status</b>	<b>Definition</b>
Not attempted	The firmware was not downloaded, which may be due to a number of different reasons such as the download was stopped before it could occur, or the drive did not qualify for the update, or the download could not occur due to an error.
Successful	The firmware was downloaded successfully.





# Storage Management Software

This chapter provides information on upgrading the storage management software.

## Upgrading Storage Management Software

Before you upgrade SANtricity Storage Manager, check which version of SANtricity Storage Manager is currently installed on your storage array, and understand the upgrade path from that version to version 11.20. Decide which SANtricity Storage Manager options you need to install.

### Installation Options

Install only the packages that are required for the type of installation you are performing. The Java Access Bridge is installed automatically with all options. See [Table 4](#).

**Table 4** Storage Management Software Packages

Software Package	Description and Usage
SMclient	This package contains the graphical user interface for managing the storage array. This package also contains an optional monitor service that sends alerts when a critical problem exists with the storage array.
SMagent	The storage management software that is installed only on a host machine to enable in-band management. <sup>1</sup>
SMruntime	The operating system (OS) -specific storage management software that installs the appropriate Java runtime environment (JRE), which allows Java files to be displayed.
Redundant Dual Active Controller (RDAC)/Multi-Path Proxy (MPP)	A multi-path failover driver, that is installed on Linux hosts. This software package manages the I/O paths into the controllers in the storage array. If a problem exists on the path or a failure occurs on one of the controllers, the driver automatically reroutes the request from the hosts to the other controller in the storage array. For information about other supported failover drivers for your operating system, refer to the Multipath Drivers Guide. <b>Note:</b> RDAC is not supported for Red Hat Enterprise Linux versions 7.x or Suse Linux Enterprise Server versions 12.x.
MPIO DSM	The device specific module (DSM) for Microsoft MPIO.

**Table 4** Storage Management Software Packages

Software Package	Description and Usage
SMutil	This package contains utilities that let the operating system recognize the volumes that you create in the storage array and to view the OS-specific device names for each volume.
SMprovider	The storage management software interface to the Volume Shadow Copy Service (VSS) and Virtual Disk Service (VDS) technologies (these technologies are included with Microsoft's .NET framework).
SMinstaller	A package that manages the installation of SANtricity Storage Manager.

<sup>1</sup>In-band management is a method for managing a storage array in which the controllers are managed from a storage management station attached to a host that is running host-agent software. The host-agent software receives communication from the storage management client software and passes it to the storage array controllers along the input/output (I/O) path. The controllers also use the I/O connections to send event information back to the storage management station through the host.

## Installation Options

Table 5 provides installation options and related software packages.

**Table 5** Installation Options and Related Software Packages

Installation Option	Runtime	SMclient	SMutil	Sagent	Failover Driver <sup>1</sup>
Typical (Full Installation)	x	x	x	x	Depends on the operating system
Management Station <sup>2</sup>	x	x			
Host	x		x		Depends on the operating system
Custom	x	Optional	Optional	Optional	Optional

<sup>1</sup>If you select the Typical or Host Installation options, a failover driver might be installed, depending on your operating system. The RDAC/MPP driver is included with the Linux version of the SMinstaller. The MPIO DSM driver is included with the Windows version of SMinstaller.

<sup>2</sup>A management station is a computer that runs storage management software to monitor and manage the storage arrays on a network.

## Checking Current Version of Storage Management Software

You can check the version of your storage management software from SANtricity by selecting **EMW > Help > About**. To check the version of the current storage management software from the command line, type the command that corresponds to your operating system, and press **Enter**. The <package name> placeholder refers to the name of the software package (SMclient, SMruntime, SMutil, etc.) that is installed.

- In the AIX operating system, type the command `lspp -L <package name>`, and press **Enter**.
- In the HP-UX operating system, type the command `swlist | grep SM*`, and press **Enter**.

- In the Linux operating system, type the command `rpm -qi <package name>`, and press **Enter**.
- In the Solaris operating system, type the command `pkginfo -l <package name>`, and press **Enter**.

In the Windows operating system, perform these steps.

- 1 Select **Start > Run**.
- 2 Type `regedit`, and press **Enter**.
- 3 Select **HKEY\_LOCAL\_MACHINE > SOFTWARE > Wow6432Node > storage > SMIInstaller**.

The host software versions are listed under the storage directory.

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## Steps to Upgrade Storage Management Software

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**IMPORTANT:** If you are upgrading the storage management software on an I/O-attached Windows host for a storage array that has controller firmware version 7.80 (or a release prior to version 7.80), change the order of the following steps. Before you perform [step 6](#) to install the storage management software, perform [step 8](#) to upgrade the controller firmware and NVSRAM on the storage array to version 8.20.

---

These steps are required for a successful upgrade to storage management software version 11.20 and controller firmware version 8.20. Perform the steps in order.

- 1 Make sure that the base systems in your storage array are compatible with the software level and the firmware level to which you are upgrading and that the current version of the storage management software can be upgraded directly to SANtricity Storage Manager Version 11.20.
- 2 Check that the host bus adapters (HBAs), switches, driver versions, and firmware levels are supported.

Refer to your storage vendor for compatibility information and for specific hardware restrictions.

- 3 Start the existing storage management software with the procedure for your operating system.
- 4 Make sure that the hardware and operating systems on all attached hosts and management stations meet the minimum system requirements to work with your upgraded storage array.  
Refer to the System Requirements topics for each operating system in this document.
- 5 Make sure that your failover driver is compatible with the new hardware, firmware, and software. Refer to the topics in Multipath Drivers Guide.

If you select the Host option when you run the SANtricity installer, the Windows DSM is installed.

- 6 Install storage management software version 11.20 using the instructions for your operating system (OS). OS-specific instructions are given in subsequent chapters of this document.
- 7 Make sure that the installation was successful. Use the procedure in this document for your operating system to start the storage management software.
- 8 Update the controller firmware and NVSRAM.  
See the steps in [Upgrading Controller Firmware and NVSRAM](#).
- 9 Update the ESM firmware.  
See the steps in [Upgrading the ESM Firmware](#).

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**NOTE:** Starting with SANtricity Storage Manager Version 10.83, a storage array can use asymmetric logical unit access (ALUA). ALUA enables a base system to service I/O requests through either controller in a duplex configuration. Additional steps are required for VMware configurations. See Upgrade Instructions for Asymmetric Logical Unit Access (ALUA) with the VMware OS for instructions.

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**10** Confirm that the Default Operating System or Defined Host Operating Systems are set correctly in Storage Partition Mapping.

**11** To verify that the storage array has an Optimal status, select **Monitor > Health > View Health (Recovery Guru)**. If one or more managed devices has a Needs Attention status, follow the instruction in the Recovery Guru. If Optimal status is not restored, contact your Technical Support Representative.

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## Upgrade Instructions for Solaris OS

Use the procedures in this chapter to upgrade the storage management software on the Solaris operating system.

### System Requirements for Solaris

Review these specifications to make sure that your system meets the minimum general requirements. See [Table 6](#).

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**NOTE:** Solaris supports only Fibre Channel host connections.

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**Table 6** System Requirements for Solaris

Item	Specification
Operating system version for I/O attached hosts	<ul style="list-style-type: none"> <li>Solaris 10 u11</li> <li>Solaris 11.1</li> <li>Solaris 11.2</li> </ul>
Processor support	Oracle Sparc, Intel Xeon 32 bit, Intel Xeon 64 bit, AMD Opteron 32 bit, AMD Opteron 64 bit
Base systems	QS1200, QS2400, QD6000, QD7000
iSCSI Host Adapters	NICs, CNAs, LoM (only with Solaris 11.x)
Fibre Channel Host adapters	Emulex: 8 Gb/s: LPE12000, LPE12002, LPE12004
	Qlogic: 8 Gb/s: QLE2560, QLE2562, QLE2564
	Oracle: 8 Gb/s: SG-XPCIE1FC-EM8-Z, SG-XPCIE2FC-EM8-Z, SGXPCIE1FC- QF8-N, SG-XPCIE2FC-QF8-N
Host Connection Configurations	<ul style="list-style-type: none"> <li>Direct connect</li> <li>Fabric</li> </ul>
Rootboot supported?	Yes, where supported by the HBA
Local File systems supported	Oracle provides the list of supported file systems. Refer to Oracle's list of file systems for official support.

**Table 6** System Requirements for Solaris

Item	Specification
SCSI driver	sd/ssd/Leadville
I/O path failover and mode	<ul style="list-style-type: none"> <li>• Solaris 10 u11MPxIO (TPGS/ALUA or non-TPGS)</li> <li>• Solaris 11.1 MPxIO (TPGS/ALUA)</li> <li>• Solaris 11.2 MPxIO (TPGS/ALUA)</li> </ul>
Node failover	<ul style="list-style-type: none"> <li>• Oracle Solaris Cluster 4.2 (Sol 11.2)</li> <li>• Oracle Solaris Cluster 4.1 (Sol 11.1)</li> <li>• Oracle Solaris Cluster 3.3 U2 (Sol 10 u11)</li> </ul>
Providers	SMI-S

## Installing Storage Management Software on Solaris OS

Use this procedure to install the storage management software packages on the Solaris OS. When you install the new software, earlier versions of the software are automatically removed as part of that process.

For this procedure, you must first obtain an installation file that is specific to your operating system and to the release level of the storage management software from [Quantum.com](http://Quantum.com).

In the following steps, the installation file is identified as `SMIA-SOLX86-11.20.00nn.nnnn.bin` (for the Intel x86 platform) or `SMIA-SOL-11.20.06nn.nnnn.bin` (for the SPARC platform). The characters `nn.nnnn` are, in practice, alphanumeric characters: for example, `SMIA-SOLX86-11.20.0000.0178.bin`.

- 1 Make sure that you have root privileges, which are required to install the software.
- 2 Download or copy the installation file, `SMIA-SOLX86-11.20.nnnn.nnnn.bin` or `SMIASOL-11.20.nnnn.nnnn.bin`, to a directory on your host.

To download the installation file, navigate to [Quantum.com](http://Quantum.com) Support Site and download the SANtricity Storage Manager 11.20.06.nnnn.nnnn and Related Software package for your Solaris platform.

- 3 Change your current directory to the installation directory by typing `cd <install>` on the command line and then pressing **Enter**.

`<install>` is the name of the directory on your server to which you downloaded the installation file.

- 4 Change the file permissions for the installer using the `chmod 777 SMIA-SOL*.bin` command.

This action allows you to run the installer.

- 5 Execute the installer using the `./SMIA-SOL*.bin` command.

The following messages appear in the console window:

```
Preparing to install...
```

```
Extracting the JRE from the installer archive...
```

```
Unpacking the JRE...
```

```
Extracting the installation resources from the installer archive...
```

```
Configuring the installer for this system's environment...
```

```
Launching installer...
```

After the software is loaded, the **Introduction** window appears.

6 Click **Next**.

The **License Agreement** window appears.

7 Select the option that accepts the terms of the License Agreement.

8 Click **Next**.

The **Select Installation Type** window appears.

9 Based on the type of installation you are performing, select one of these options.

The steps in this procedure describe a typical (full) installation.

- **Typical (Full Installation)** – This selection, which is the default, installs all of the packages on the system. Choose this option if you do not know which installation type to select.
- **Management Station** – This selection installs the software that is needed to configure, manage, and monitor a storage array. This option is for your workstation or management computer.
- **Host** – This selection installs the storage array server software. Use this type of installation for the host (server) that is connected to the storage array.
- **Custom** – This selection lets you customize the features to be installed.

The installation type that you select is highlighted in blue text.

10 Click **Next**.

A **Software Incompatibility Detected** screen may appear if there is a previous version of the SANtricity software installed on your system. If this is the case, click **OK** to override the pre-existing version.

The **Pre-Installation Summary** window appears.

11 Click **Install**.

The **Installing** window appears while the software is loading. When the software is loaded, the **Install Complete** window appears.

---

**IMPORTANT:** If you cancel an installation before the installation completes or while the progress bar is still visible, the installation stops prematurely. The software creates an installation log. You must manually uninstall the software. If you cancel the installation before the progress bar is visible, you do not need to uninstall the software.

---

12 To exit the installation program, click **Done**.

Several files and program packages are installed to the `/opt/SMgr` directory and the `/opt/StorageManager` directory.

13 If you have volumes mapped to the server from a previous installation of the SANtricity software, run `devfsadm - C`, `devfsadm`, and `cfgadm -aL`.

These commands ensure that the server continues to have access to the mapped volumes.

14 Solaris uses the native MPx10 for failover. After installing the host package, see the *Multipath Drivers Guide* to enable MPx10 on the host.

## Checking Installation on Solaris OS

After you have completed installing the software packages, check that they installed successfully.

1 At the prompt, type this command, and press **Enter**:

```
pkginfo -l <package name>
```

In this command, *<package name>* is the name of a package that you installed.

2 To determine which software packages reside on your system, type this command at the prompt.

```
pkginfo | grep SM
```

Look for the storage management software packages, such as SMagent, SMclient, SMutil, and SMruntime.

3 From the `/opt/StorageManager` directory, review any error messages from the error message log, and correct the problem. If the problem persists, contact your Technical Support Representative.

4 For each package you installed, repeat step 1 through step 2.

5 Start the storage management software. At the prompt, type this command, and press **Enter**:

```
SMClient
```

After the client software starts, the **Enterprise Management Window** and these dialogs appear:

- **Select Addition Method**
- **Enterprise Management Window Task Assistant**

Refer to the online help topics in storage management software for more information about how to manage your storage array.

## Uninstalling Storage Management Software on Solaris OS

If you have installed the storage management software but you have determined that you must uninstall it, perform this procedure.

---

**NOTE:** Uninstalling the software is not the same as removing previous versions of the software.

---

1 To change to the Uninstall directory, from the `/opt/StorageManager` directory, type this command, and press **Enter**:

```
cd "Uninstall SANtricity"
```

2 From the Uninstall SANtricity directory, type this command, and press **Enter**:

```
./Uninstall_SANtricity
```

The **Uninstall** window appears.

3 Click **Next**.

The **Uninstall Options** window appears. You can choose either to perform a complete uninstallation or to select specific packages to uninstall individually.

4 Either select the packages that you want to uninstall, or select a complete uninstallation.

5 Click **Next**.

While the software is uninstalling, the **Uninstall** window appears. When the procedure has completed, the **Uninstall Complete** window appears.

6 Click **Done**.

The uninstallation process is complete.

# Upgrade Instructions for Linux OS

Use the procedures in this chapter to upgrade the storage management software on the Linux operating system.

## System Requirements for Linux

Review these specifications in [Table 7](#) to make sure that your system meets the minimum general requirements.

**Table 7** System Requirements for Linux

Component	With Non-InfiniBand Host Connections	With InfiniBand Host Connections
Operating system version for I/O attached hosts	<ul style="list-style-type: none"><li>• RHEL 7.1 (IOP)</li><li>• RHEL 7.0</li><li>• RHEL 6.5</li><li>• RHEL 6.4</li></ul>	<ul style="list-style-type: none"><li>• RHEL 7.0</li><li>• RHEL 6.5</li><li>• RHEL 6.4</li></ul>
	<ul style="list-style-type: none"><li>• SLES 12 (IOP)</li><li>• SLES 11 SP4 (IOP)</li><li>• SLES 11 SP3</li></ul>	<ul style="list-style-type: none"><li>• RHEL 7.0</li><li>• RHEL 6.5</li><li>• RHEL 6.4</li></ul>
Hypervisor OS for I/O attach hosts	<ul style="list-style-type: none"><li>• RedHat Enterprise Virtualization (RHEV)</li><li>• Kernel-based Virtual Machine (KVM)</li></ul> <p>(RHEV and KVM are only supported on RHEL 7.0, 6.5 and 6.4)</p>	
Operating system version for management stations only (no I/O attached hosts)	<ul style="list-style-type: none"><li>• RH5</li><li>• RH6</li><li>• SLES 10 client</li><li>• SLES 11 client</li></ul>	
Processor support	Intel Xeon 64 bit, AMD Opteron 64 bit	Intel Xeon 64 bit, AMD Opteron 64 bit
Base systems	<ul style="list-style-type: none"><li>• QS1200</li><li>• QS2400</li><li>• QD6000</li><li>• QD7000</li></ul>	<ul style="list-style-type: none"><li>• QS1200</li><li>• QS2400</li><li>• QD6000</li><li>• QD7000</li></ul>

**Table 7** System Requirements for Linux

Component	With Non-InfiniBand Host Connections	With InfiniBand Host Connections
Host Adapters	<p><b>Emulex</b> (Fiber Channel)</p> <ul style="list-style-type: none"> <li>• 8 Gb/s: LPE12000, LPE12002, LPE12004</li> <li>• 16 Gb/s: LPE16000, LPE16000B, LPE16002</li> </ul> <p><b>Qlogic</b> (Fiber Channel)</p> <ul style="list-style-type: none"> <li>• 8 Gb/s: QLE2560, QLE2562, QLE2564</li> <li>• 16 Gb/s: QLE2670, QLE2672</li> </ul> <p><b>Brocade</b> (Fiber Channel)</p> <ul style="list-style-type: none"> <li>• 8 Gb/s: 815, 825</li> <li>• 16 Gb/s: 1860-1, 1860-2</li> </ul> <p><b>HP BladeCenter</b> (Fiber Channel)</p> <ul style="list-style-type: none"> <li>• Qlogic 8Gb: QMH2572, QMH2562</li> </ul> <p><b>Emulex</b> 8Gb: LPE1205,</p> <ul style="list-style-type: none"> <li>• LPE1205A</li> </ul> <p><b>LSI</b> (SAS)</p> <ul style="list-style-type: none"> <li>• 6Gb: 9207-8e</li> <li>• 12Gb: 9300-8e</li> </ul> <p><b>Dell</b></p> <ul style="list-style-type: none"> <li>• 6Gb: 7e</li> </ul> <p><b>HP</b></p> <ul style="list-style-type: none"> <li>• 6Gb: h222, h221 NICs, CNAs, LoM(iSCSI)</li> </ul>	<p><b>Mellanox</b> (IB)</p> <p><b>40Gb:</b></p> <ul style="list-style-type: none"> <li>• MHQH19B-XSR, MHQH19BXTR</li> <li>• MHQH29B-XSR, MHQH29BXTR</li> <li>• MHQH19C-XSR, MHQH19CXTR</li> <li>• MHQH29C-XSR, MHQH29CXTR</li> <li>• MCX353A-QCAT, MCX353AQCAT</li> <li>• MCX353A-QCBT, MCX353AQCBT</li> </ul> <p><b>56 Gb:</b></p> <ul style="list-style-type: none"> <li>• MCX353A-FCAT, MCX354AFCAT</li> <li>• MCX353A-FCBT, MCX354AFCBT</li> <li>• MCX353A-FCCT, MCX354AFCCT</li> <li>• MCB191A-FCAT, MCB192AFCAT</li> <li>• MCB193A-FBAT, MCB193AFCAT</li> <li>• MCB194A-FCAT</li> </ul>
Fibre Channel configurations	Direct Connect and Fabric	N/A
Local file systems supported	RedHat and Novell provide specific file systems with their individual Linux distributions. Please refer to RedHat's and Novell's list of file systems for official support	
Rootboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)	No
I/O path failover	<p>SIOS (SteelEye) LifeKeeper with SLES</p> <p>Red Hat Cluster Server on RHEL</p>	
Providers	SMI_S	

## System Requirements for Linux with PowerPC Processors

Review these specifications in [Table 8](#) to make sure that your system meets the minimum general requirements.

**Table 8** Requirements for Linux with PowerPC Processors

Item	Specification
Operating system version for I/O attached hosts	<ul style="list-style-type: none"> <li>• RHEL 7.1 (IOP)</li> <li>• RHEL 7.0</li> <li>• RHEL 6.5</li> <li>• RHEL 6.4</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• SLES 12 (IOP)</li> <li>• SLES 11 SP4 (IOP)</li> <li>• SLES 11 SP3</li> </ul>
Processor Support	IBM Power 5 and newer
Base Systems	<ul style="list-style-type: none"> <li>• QS1200</li> <li>• QS2400</li> <li>• QD6000</li> <li>• QD7000</li> </ul>
Fibre Channel Host Adapters	<b>IBM</b> <ul style="list-style-type: none"> <li>• 8 Gb/s: 5273-P, 5735-P, 5729-P</li> <li>• 16 Gb/s: EN0A / EN0B</li> </ul>
iSCSI Host Connections	NICs, CNAs, LoM
Host Channel configurations	Direct Connect and Fabric
Rootboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)
I/O path failover	<b>DMMP</b> (DMMP-ALUA handler) <ul style="list-style-type: none"> <li>• SLES 12, SLES11 SP3</li> <li>• RHEL 7.0, RHEL 6.5, RHEL 6.4</li> </ul> <b>DMMP:</b> (DMMP-RDAC handler) <ul style="list-style-type: none"> <li>• SLES 12, SLES11 SP3</li> <li>• RHEL 7.0, RHEL 6.5, RHEL 6.4</li> </ul> <b>MPP:</b> (MPP-RDAC handler) <ul style="list-style-type: none"> <li>• RHEL 7.0, RHEL 6.5, RHEL 6.4</li> <li>• SLES 12, SLES 11 SP3</li> </ul>
Node failover	None
Providers	None

## Installing Storage Management Software on Linux OS

Use this procedure to install the storage management software packages for the Linux OS. You also can perform the software installation procedure by using a package manager that is compatible with Red Hat Package Manager (RPM) and has a graphical user interface (GUI). When you install the new software, earlier versions of the software are automatically removed as part of that process.

For this procedure, you must first obtain an installation file that is specific to your operating system and to the release level of the storage management software. In the following steps, the installation file is identified as `SMIA-LINUX64-11.20.0Bnn.nnnn.bin` (for Linux on Intel x64 processors) or `SMIA-LINUX-11.20.0Ann.nnnn.bin` (for all other supported processors). The characters `nn.nnnn` are, in practice, alpha-numeric characters: for example, `SMIA-LINUX-11.20.0400.0178.bin`.

- 1 Make sure that you have root privileges, which are required to install the software.
- 2 Download or copy the installation file, `SMIA-LINUX64-11.20.04nn.nnnn.bin` or `SMIALINUX-11.20.04nn.nnnn.bin`, to a directory on your host.
- 3 Change your current directory to the installation directory by typing `cd <install>` on the command line and then pressing **Enter**.

`<install>` is the name of the directory on your server to which you downloaded the installation file.

- 4 At the command prompt, type `SMIA-LINUX64-11.20.04nn.nnnn.bin` or `SMIALINUX-11.20.04nn.nnnn.bin`, and then press **Enter**.

After the software is loaded, the **Introduction** window appears.

- 5 Click **Next**.

The **License Agreement** window appears.

- 6 Select the option that accepts the terms of the License Agreement.

- 7 Click **Next**.

The **Select Installation Type** window appears.

- 8 Based on the type of installation you are performing, select one of these options.

The steps in this procedure describe a typical (full) installation.

- **Typical (Full Installation)** – This option, which is the default, installs all of the packages on the system. Choose this option if you do not know which installation type to select.
- **Management Station** – This option installs the software that is needed to configure, manage, and monitor a storage array. This option is for your workstation or management computer.
- **Host** – This selection installs the storage array server software. Use this type of installation for the host (server) that is connected to the storage array.
- **Custom** – This option lets you customize the features to be installed.

The installation type that you select is highlighted in blue text.

- 9 Click **Next**.

The **Multi-Path Driver Warning** dialog appears.

- 10 Click **Next**.

The **Pre-Installation Summary** window appears.

- 11 Click **Install**.

The **Installing** window appears while the software is loading. When the software is loaded, the **Install Complete** window appears.

---

**IMPORTANT:** If you cancel an installation before the installation completes or while the progress bar is still visible, the installation stops prematurely. The software creates an installation log. You must manually uninstall the software. If you cancel the installation before the progress bar is visible, you do not need to uninstall the software.

---

**12** To exit the installation program, click **Done**.

Several files and program packages are installed to the /opt/SM9 directory and the/opt/StorageManager directory.

**13** Do you want to manually install the RDAC package?

- **Yes** – Go to [step 14](#).
- **No** – Go to [Checking the Installation on Linux OS](#).

**14** Install the RDAC package.

**a** While in the /opt/StorageManager directory, type this command at the prompt, and press **Enter**. In this command, <rdac-Package-name> is the name of the RDAC package.

```
tar -xvf <rdac-Package-name>.tar.gz
```

The source files uncompress into the linuxrdac-09.01.Bx.xx directory.

**b** To change to the directory where the RDAC source is located, type the command for your version of the kernel, and press **Enter**.

```
2.4 kernel:
```

```
cd Linuxrdac
```

```
2.6 kernel:
```

```
cd linuxrdac-09.01.Bx.xx
```

**c** To remove the previously installed version of RDAC, type this command, and press **Enter**:

```
make uninstall
```

**d** To clean the directory, type this command, and press **Enter**:

```
make clean
```

**e** To compile the modules, type this command, and press **Enter**:

```
make
```

**f** To install RDAC, type this command, and press **Enter**:

```
make install
```

**g** After the make install process has completed, modify your bootloader configuration file. For more information about how to modify the bootloader configuration file, refer to the output from the `make install` command for Linux RDAC.

**h** Read the readme.txt file in the linuxrdac directory to complete the RDAC installation process.

---

**NOTE:** After you update the boot loader, you must reboot the host to apply the new MPP initrd image.

For further details about installing RDAC, refer to the *Multipath Drivers Guide*.

---

## Checking the Installation on Linux OS

After you have completed installing the software packages, make sure that they installed successfully.

- 1 At the prompt, type this command, and press **Enter**:

```
rpm -qa | grep SM*
```

- 2 At the prompt, type this command, and press **Enter**. In this command, *<package name>* is the name of a package that you installed.

```
rpm -qi <package name>
```

- 3 Note any problem that is reported.
- 4 For each package you installed, repeat [step 2](#) through [step 3](#).
- 5 Was the installation successful (no problems were reported)?

**Yes** – Go to [step 6](#).

**No** – From the `/opt/StorageManager` directory, review any error messages from the error message logs, `SANtricity_ES_InstallErrorLog.log` and `SANtricity_ES_InstallLog.log`, and correct the problem. If the problem persists, contact your Technical Support Representative.

- 6 Start the storage management software. At the prompt, type this command, and press **Enter**:

```
SMClient
```

After the client software starts, the Enterprise Management Window and these dialogs appear:

- Select Addition Method
- Enterprise Management Window Task Assistant

Refer to the online help topics in storage management software for more information about how to manage your storage array.

## Uninstalling Storage Management Software on Linux OS

If you have installed the storage management software but you have determined that you need to uninstall it, perform this procedure.

---

**NOTE:** Uninstalling the software is not the same as removing previous versions of the software.

---

- 1 To change to the Uninstall directory, from the `/opt/StorageManager` directory, type this command, and press **Enter**:

```
cd "Install SANtricity"
```

- 2 From the Uninstall SANtricity directory, type this command, and press **Enter**:

```
./Uninstall_SANtricity_ES
```

The **Uninstall** window appears.

- 3 Click **Next**.

The **Uninstall Options** window appears. You can choose either to perform a complete uninstallation or to select specific packages to uninstall individually.

- 4 Either select the packages that you want to uninstall, or select a complete uninstallation.
- 5 Click **Next**.

The **Multi-Path Driver Warning** dialog appears.

**6** Click **Next**.

While the software is uninstalling, the **Uninstall** window appears. When the procedure has completed, the **Uninstall Complete** window appears.

**7** Manually uninstall the RDAC package.

- a Navigate to the `/opt/StorageManager/linuxrdac` directory.

---

**NOTE:** In this command, `/opt/StorageManager/linuxrdac` is the directory in which the RDAC files are stored.

---

- b To uninstall RDAC, type this command, and press **Enter**:

`make uninstall`

- c To clean the directory, type this command, and press **Enter**:

`make clean`

**8** Revert the changes you made in the boot-loader configuration file.

**9** Click **Done**.

The uninstallation process is complete.

**10** Reboot the host.

# Upgrade Instructions for Windows OS

Use the procedures in this chapter to upgrade the storage management software on the Windows operating system. Refer to [Table 9](#) for system requirements for Windows OS.

**Table 9** System Requirements for Windows OS

Item	Requirement
Operating system version for I/ O attached hosts	<p>With Server Core, storage management is available only through the command line interface, SMcli</p> <ul style="list-style-type: none"> <li>• Supported editions (Windows 2012, Windows 2012 R2 and Windows 2008 R2)               <ul style="list-style-type: none"> <li>• Standard server and core</li> <li>• Foundation server and core</li> <li>• Datacenter server and core</li> </ul> </li> <li>• Supported editions (Windows 2012, Windows 2012 R2)               <ul style="list-style-type: none"> <li>• Essentials Server and Core</li> </ul> </li> <li>• Supported editions (Windows 2008 R2)               <ul style="list-style-type: none"> <li>• Enterprise Server and Core</li> <li>• Windows Storage Server</li> <li>• Web Server (Client only, no Failover)</li> </ul> </li> <li>• Unsupported editions (Windows 2008 R2)               <ul style="list-style-type: none"> <li>• HPC Server</li> <li>• Small or Essentials Business Server</li> <li>• Unified Data Storage Server</li> </ul> </li> </ul>
OS Versions for GUI Client only	<ul style="list-style-type: none"> <li>• Windows 7, 8 &amp; 8.1</li> <li>• Windows 7, 8 &amp; 8.1 Pro</li> <li>• Windows 7, 8 &amp; 8.1 Enterprise</li> </ul>
Hypervisor OS for I/O attach	<ul style="list-style-type: none"> <li>• Windows Server 2012 R2 Hyper-V</li> <li>• Windows Server 2012 Hyper-V</li> <li>• Hyper-V Server 2008 R2 SP1 (standalone)</li> <li>• Windows Server 2008 R2 SP1 Hyper-V (add on to 2008)</li> </ul>
Guest OSs for Hypervisor	<p>Microsoft provides the list of supported Guest OSs for this hypervisor. Please refer to Microsoft's list of guest OSs for official support.</p>
Processor Support	<p>Intel Xeon 64 bit, AMD Opteron 64 bit</p>
Base Systems	<ul style="list-style-type: none"> <li>• QS1200</li> <li>• QS2400</li> <li>• QD6000</li> <li>• QD7000</li> </ul>

**Table 9** System Requirements for Windows OS

Item	Requirement
Fibre Channel host adapters	<b>Emulex</b> <ul style="list-style-type: none"> <li>• 8 Gb/s: LPE12000, LPE12002, LPE12004</li> <li>• 16 Gb/s: LPE16000, LPE16000B, LPE16002, LPE16002B</li> </ul>
	<b>Qlogic</b> <ul style="list-style-type: none"> <li>• 8 Gb/s: QLE2560, QLE2562, QLE2564</li> <li>• 16 Gb/s: QLE2670, QLE2672</li> </ul>
	<b>Brocade</b> <ul style="list-style-type: none"> <li>• 8 Gb/s: 815, 825</li> <li>• 16 Gb/s: 1860-1, 1860-2</li> </ul>
	<b>HP Blade Center</b> <ul style="list-style-type: none"> <li>• 8 Gb/s: QMH2572, QMH2562</li> <li>• 16 Gb/s: LPE1205, LPE1205A</li> </ul>
SAS host adapters	<b>LSI</b> <ul style="list-style-type: none"> <li>• 6 Gb/s: 9207-8e</li> <li>• 12 Gb/s: 9300-8e</li> </ul> <b>Dell</b> <ul style="list-style-type: none"> <li>• 6 Gb/s: 7e</li> </ul> <b>HP</b> <ul style="list-style-type: none"> <li>• 6 Gb/s: h221, h222</li> </ul>
iSCSI host connections	NIC's and CNA's from multiple vendors will be tested. Support is not limited to the tested NIC's or CNA's as long as the customer uses the supported Software Initiator (SWI). Hardware Initiator (HWI) is not supported.
Configurations	Direct connect or Fabric
Reboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)
I/O path failover and mode	Microsoft Cluster Server <ul style="list-style-type: none"> <li>• Windows 2012 R2 supports 64 nodes</li> <li>• Windows 2012 supports 64 nodes</li> <li>• Windows 2008 R2 supports 16 nodes</li> </ul>
Local Filesystems supported	Microsoft provides the list of supported file systems. Please refer to Microsoft's list of file systems for official support
Node failover	Microsoft Cluster Server Windows 2012 supports 64 nodes Windows 2008 supports 16 nodes
Providers	<ul style="list-style-type: none"> <li>• SMIS</li> <li>• VDS/VSS</li> <li>• SMAPI</li> </ul>

## Installing Storage Management Software on Windows OS

Use this procedure to install the storage management software packages on the Windows OS.

---

**CAUTION:** Possible data corruption – If the host is allowed to access data on the storage array without RDAC or a valid installation of a path failover product, and has dual paths to the storage array, the data might become unusable.

---

**IMPORTANT:** If you are upgrading the storage management software on an I/O-attached host for a storage array that has controller firmware version 7.80 (or a release prior to version 7.80), upgrade the controller firmware and NVSRAM on the storage array to the version 8.20 before you upgrade the storage management software.

Before you start the primary server of a server cluster, complete all applicable configuration procedures for each system.

---

**NOTE:** Configure the Event Monitor on only one storage management station to prevent receiving duplicate event messages. Duplicate alerts are also sent if the Enterprise Management Window and the SMmonitor utility are running simultaneously.

---

**IMPORTANT:** Do not restart the system during the installation process. You will restart the system after you install all of the storage management software components.

If you are installing the Windows boot device on a storage array, refer to the boot device installation procedures in Appendix A of SANtricity Storage Manager 11.20 Software Installation Reference. Determine where to install the software before you begin this procedure. You should not install your monitoring stations on a root boot device, since doing so can result in the loss of important debug information when the entire system is down.

---

- 1 Before you install this software, close all other programs.
- 2 Download or copy the installation file, SMIA-WinX64-11.20.03nn.nnnn.exe (for Intel x64 processors) or SMIA-WS32-11.20.03nn.nnnn.exe (for Intel x32 processors), to a directory on your host.
- 3 To launch the installer, double-click the applicable.exe file.  
The **InstallAnywhere** dialog appears while the software installs. When the software is installed, the **Introduction** window appears.
- 4 Click **Next**.  
The **License Agreement** window appears.
- 5 Select the option that accepts the terms of the License Agreement.
- 6 Click **Next**.  
The **Choose Install Folder** window appears, which identifies the default installation location.
- 7 Click **Next**.  
The **Select Installation Type** window appears.
- 8 Based on the type of installation you are performing, select one of these options.  
The steps in this procedure describe a typical (full) installation.

- **Typical (Full Installation)** – This selection, which is the default, installs all of the packages on the system.  
Choose this option if you do not know which installation type to select.
- **Management Station** – This selection installs the software that is needed to configure, manage, and monitor a storage array. This option is for your workstation or management computer.
- **Custom** – This selection lets you customize the features to be installed.  
The installation type that you select is highlighted in blue text.

**9** Click **Next**.

If the software already exists, the **Overwrite Warning** dialog appears.

**10** If the **Overwrite Warning** dialog appears, click **OK**.

The Automatically Start Monitor? window appears.

**11** Select the appropriate option for your system.

If you start the Event Monitor on multiple machines, you might receive duplicate error messages from the same storage array. If you do not want to receive duplicate error messages, start the Event Monitor on only one machine. Make sure to run the Event Monitor on a machine that will run continuously.

**12** Click **Next**.

The **Pre-Installation Summary** window appears.

**13** Click **Install**.

The **Installing** window appears while the software is loading. The **Installation/Remove** status window also appears throughout the installation process.

The **Security Alert** dialog might appear multiple times.

**14** Did the **Security Alert** dialog appear?

- **Yes** – Click Yes, and go to [step 15](#).
- **No** – Go to [step 15](#).

---

**IMPORTANT:** When RDAC is not installed, the **Install Complete** window shows an error message that states that the installation has completed and that there are some warnings. The message suggests that you look at the installation log for details. The installation log contains a warning that a Win32 exception can be found. This is normal and expected behavior. The installation was successful.

---

---

**NOTE:** If you cancel an installation before the installation completes or while the progress bar is still visible, the installation stops prematurely. The software creates an installation log. You must manually uninstall the software by using the steps in [Uninstalling Storage Management Software on the Windows OS](#). If you cancel the installation before the progress bar is visible, you do not need to uninstall the software.

---

When the software is loaded, the Install Complete window appears.

**15** Make sure that the **Yes, restart my system** option is selected.

**16** Click **Done**.

Several files and program packages are stored in the <LOCAL DRIVE>:\Program Files\StorageManager directory.

---

**IMPORTANT:** If you repeatedly cancel an installation or uninstallation before the process completes fully and try to install the software again, the installation process might not work. In addition, the software might not be installed after the installation process has completed. The installation complete panel tells you where the software is installed, but it is not there. If this problem occurs, delete the .xml file from the Program Files\Zero G directory.

---

The installation is completed, and Windows is restarted.

## Checking the Installation on the Windows OS

After you have completed installing the software packages, make sure that they installed successfully.

---

**NOTE:** To make sure that all of the packages installed successfully on the Windows OS, go to the registry settings in the `HKEY_LOCAL_MACHINE>Software>Wow6432NodeStorage>Storage>SMInstaller` directory.

---

**1** Select **Start > Programs**.

The list of installed programs appears.

**2** Make sure that storage management software appears in the program list.

If the storage management software does not appear in the list, refer to the Product Release Notes for the current release, or contact your Technical Support Representative.

**3** To start the storage management software, select **Start > All Programs > SANtricity Storage Manager Client**.

Refer to the online help topics in the storage management software for more information about how to manage your storage array.

After the client software starts, the Enterprise Management Window and these dialogs appear:

- **Select Addition Method**
- **Enterprise Management Window Task Assistant**

## Uninstalling Storage Management Software on the Windows OS

If you have installed storage management software, but you have determined that you need to uninstall it, perform this procedure.

---

**NOTE:** Uninstalling the software is not the same as removing previous versions of the software.

The procedure in [step 1](#) is required only if you are using the storage array as a boot device.

---

- 1 Make sure that a single path exists to the storage array. Choose one of two methods to make sure that the alternate path to the storage array has been removed:
  - **Method 1** – Remove the host interface cable to the alternate path. When you are finished, go to step 5.
  - **Method 2** – Modify NVSRAM to temporarily disable RDAC multi-path functionality at the storage array by performing these substeps:

---

**CAUTION:** Possible data corruption – If no multi-path driver exists in the host and you send I/O to the storage array, data corruption could occur. Do not uninstall the multi-path driver, even if you are not using the storage array as a boot device.

---

- a Select the storage array in the Enterprise Management Window.
  - b Select **Tools > Execute Script**.  
The **Script Editor** dialog appears.
  - c In the upper half of the **Script Editor** dialog, type these commands at the prompt, and press **Enter**.  

```
set controller[a] HostNVSRAMByte[1,0x16]=0xFF,0x20;  
set controller[b] HostNVSRAMByte[1,0x16]=0xFF,0x20;
```
  - d Select **Tools > Execute Only**.
  - e For the NVSRAM modifications to take effect, turn off the power to the base system, wait 30 seconds for the base system to turn off the power, and turn on the power again.
- 2 Remove the software packages.
    - a Select **Start > Settings > Control Panel > Add or Remove Programs**.  
The **Add or Remove Programs** dialog appears.
    - b Select storage management software from the list of programs.
    - c Click **Change/Remove**.  
The **Uninstall** window appears.
    - d Click **Next**.
    - e Make sure that the **Complete Uninstall** option is selected.
    - f Click **Next**.  
The software uninstallation process begins. The status dialog appears during the uninstallation process. When the procedure has completed, the **Uninstall Complete** window appears.
    - g Make sure that **Yes** is selected so that your computer will restart.
    - h Click **Done**.
  - 3 Is the Windows boot device on a storage array?

---

**CAUTION:** Possible data corruption – If the Windows host uses any volumes on the storage array (boot device or otherwise), there is a risk of data corruption if RDAC is removed and there are multiple paths to the storage array.

---

- **Yes** – Go to [step 4](#).
  - **No** – You have completed the procedure.
- 4 Shut down the host system.

---

**CAUTION:** Possible data corruption – Because RDAC is removed, only a single path to the storage array is expected. The path goes to the controller that owns the boot volume. If the host is permitted to start without RDAC and still has dual paths to the storage array, the data might become unusable.

---

5 Start the host system.

---

## Upgrade Instructions for AIX OS

Use the procedures in this chapter to upgrade the storage management software on the AIX operating system. Refer to [Table 10](#) for system requirements for Window OS.

**Table 10** System Requirements for AIX OS

Item	Requirement
Operating system version for I/ O attached hosts	<ul style="list-style-type: none"><li>• AIX 7.1 TL3</li><li>• AIX 6.1 TL9</li><li>• VIOS 2.2.3.x</li><li>• VIOS 2.2.2.x</li></ul>
Processor Support	IBM POWER™ 5 and newer
Base Systems	<ul style="list-style-type: none"><li>• QS1200</li><li>• QS2400</li><li>• QD6000</li><li>• QD7000</li></ul>
Host adapters	8 Gb/s <ul style="list-style-type: none"><li>• 5273-P</li><li>• 5735-P</li><li>• EN0Y</li><li>• 5729-P</li></ul> 16 Gb/s <ul style="list-style-type: none"><li>• EN0A</li><li>• EN0B</li></ul>
Configurations	<ul style="list-style-type: none"><li>• Direct connect</li><li>• Fabric</li></ul>
Reboot supported?	Yes
I/O path failover and mode	Native: (MPIO/non-ALUA) <ul style="list-style-type: none"><li>• AIX 7.1 TL3</li><li>• AIX 6.1 TL9</li><li>• VIOS 2.2.3.x</li><li>• VIOS 2.2.2.x</li></ul>

**Table 10** System Requirements for AIX OS

Item	Requirement
Node failover	Power HA (HACMP)
Providers	None

Make sure that the maximum kernel parameters are configured depending on the requirements as shown in [Table 11](#).

**Table 11** Kernel Configuration Requirements

Parameter	Description	Configuration
max_thread_proc 64	Maximum threads per process	1024
maxfiles	Soft file limit per process	2048
maxuser	Influences other parameters	256 or greater
ncallout	Number of pending timeouts	4144

## Installing the Storage Management Software on the AIX OS

Use this procedure to install the storage management software packages on the AIX OS. When you install the new software, earlier versions of the software are automatically removed as part of that process.

For this procedure, you must first obtain an installation file that is specific to your operating system and to the release level of the storage management software from [Quantum.com](http://Quantum.com). In the following steps, the installation file is identified as `SMIA-AIX-11.10.04nn.nnnn.bin`. The characters `nn.nnnn` are, in practice, alpha-numeric characters: for example, `SMIA-AIX-11.10.0400.0178.bin`.

- 1 Make sure that you have root privileges, which are required to install the software.
- 2 Download or copy the installation file, `SMIA-AIX-11.10.04nn.nnnn.bin` to a directory on your host.
- 3 Change your current directory to the installation directory by typing `cd <install>` on the command line and then pressing **Enter**.  
`<install>` is the name of the directory on your server to which you downloaded the installation file.
- 4 At the command prompt, type `sh SMIA-AIX-11.10.04nn.nnnn.bin`, and then press **Enter**.  
 After the software is loaded, the **Introduction** window appears.
- 5 Click **Next**.  
 The **License Agreement** window appears.
- 6 Select the option that accepts the terms of the License Agreement.
- 7 Click **Next**.  
 The **Select Installation Type** window appears.
- 8 Based on the type of installation that you are performing, select one of these options.  
 The steps in this procedure describe a typical (full) installation.

- **Typical (Full Installation)** – This selection, which is the default, installs all of the packages on the system. Choose this option if you do not know which installation type to select.
- **Management Station** – This selection installs the software that is needed to configure, manage, and monitor a storage array. This option is for your workstation or management computer.
- **Host** – This selection installs the storage array server software. Use this type of installation for the host (server) that is connected to the storage array.
- **Custom** – This selection lets you customize the features to be installed.

---

**NOTE:** The target directory for installing the SMclient utility must be the root directory of the host system. Do not try to force the installation program to install the SMclient utility in a different location.

---

The installation type that you select is highlighted in blue text.

9 Click **Next**.

The **Pre-Installation Summary** window appears.

10 Click **Install**.

The **Installing** window appears while the software is loading. When the software is loaded, the **Install Complete** window appears.

---

**NOTE:** If you cancel an installation before the installation completes or while the progress bar is still visible, the installation stops prematurely. The software creates an installation log. You must manually uninstall the software. If you cancel the installation before the progress bar is visible, you do not need to uninstall the software.

---

11. To exit the installation program, click **Done**.

Several files and program packages are installed to the /opt/SM9 directory and the /opt/StorageManager directory.

## Checking the Installation on the AIX OS

After you have completed installing the software packages, check to make sure that the packages installed successfully.

1 At the prompt, type this command, and press **Enter**:

```
swList | grep SM*
```

This command lists the storage management software packages that you installed.

2 At the prompt, type this command, and press **Enter**:

```
swverify -v <package name>
```

In this command, <package name> is the name of a package that you installed.

3 Note any failure reported.

4 For each package you installed, repeat [step 2](#) through [step 3](#).

5 Was the installation successful (no problems were reported)?

**Yes** – Go to [step 6](#).

**No** – From the /opt/StorageManager directory, review any error messages from the error message log, and correct the problem. If the problem persists, contact your Technical Support Representative.

- 6 For each system that is used as a storage management station or host, perform the software installation and removal procedures that are described in this chapter.
- 7 Start the storage management software. At the prompt, type this command, and press **Enter**:  
*SMClient*

After the client software starts, the Enterprise Management Window and these dialogs appear:

- Select Addition Method
- **Enterprise Management Window Task Assistant**

Refer to the online help topics in the storage management software for more information about how to manage your storage array.

## Uninstalling Storage Management Software on the AIX OS

If you have installed the storage management software, but you have determined that you need to uninstall it, perform this procedure.

---

**NOTE:** Uninstalling the software is not the same as removing previous versions of the software.

---

- 1 To change to the Uninstall directory, from the /opt/StorageManager directory, type this command, and press **Enter**:

```
cd "Uninstall SANtricity"
```

- 2 From the Uninstall SANtricity directory, type this command, and press **Enter**:

```
cd ./Uninstall_SANtricity
```

The **Uninstall** window appears.

- 3 Click **Next**.

The **Uninstall Options** window appears. You can choose either to perform a complete uninstallation or to select specific packages to uninstall individually.

- 4 Either select the packages that you want to uninstall, or select a complete uninstallation.

- 5 Click **Next**.

While the software is uninstalling, the **Uninstall** window appears. When the procedure has completed, the **Uninstall Complete** window appears.

- 6 Click **Done**.

The uninstallation process is complete.

---

## Upgrade Instructions for Asymmetric Logical Unit Access (ALUA) with VMware OS

Use the procedures in this chapter to configure VMware to support ALUA/TPGS. Starting with storage management software version 10.83 and controller firmware version 7.83, any storage array with the ALUA/TPGS feature enabled is managed by the VMW\_SATP\_ALUA plug-in on VMware.

To use a host running VMware as a management station, you must install SANtricity on one of the guest OSs running over VMware. Use the procedures in the guide for the supported guest OS to upgrade SANtricity on such a management station.

## System Requirements for VMware

Systems running VMware are supported only as I/O attached hosts. You must run SANtricity Storage Manager on a management station with a supported OS or on a guest OS running with VMware. For a management station running a guest OS on VMware, you must use out-of-band management.

Refer to [Table 12](#) for system requirements for VMware.

**Table 12** System Requirements for VMware

Item	Requirement
Operating system version for I/O attached hosts	VMware <ul style="list-style-type: none"> <li>• ESXi 5.5 U1</li> <li>• ESXi 5.1 U2</li> <li>• ESXi 5.0 U3</li> </ul>
Processor Support	Intel Xeon 64 bit, AMD Opteron 64 bit
Guest OSs	VMware provides the list of supported Guest OSs. Please refer to VMware's list of Guest OSs for official support.
Base Systems	<ul style="list-style-type: none"> <li>• QS1200</li> <li>• QS2400</li> <li>• QD6000</li> <li>• QD7000</li> </ul>
Fibre Channel host adapters	Emulex <ul style="list-style-type: none"> <li>• 8 Gb/s: LPE12000, LPE12002, LPE12004</li> <li>• 16 Gb/s: LPE16000, LPE16002</li> </ul> Qlogic <ul style="list-style-type: none"> <li>• 8 Gb/s: QLE2560, QLE2562, QLE2564</li> <li>• 16 Gb/s: QLE2670, QLE2672</li> </ul> Brocade <ul style="list-style-type: none"> <li>• 8 Gb/s: 815, 825</li> <li>• 16 Gb/s: 1860-1, 1860-2</li> </ul>
SAS host adapters	LSI <ul style="list-style-type: none"> <li>• 6 Gb/s: 9207-8e</li> <li>• 12 Gb/s: 9300-8e</li> </ul> Dell <ul style="list-style-type: none"> <li>• 6 Gb/s: 7e</li> </ul> HP <ul style="list-style-type: none"> <li>• 6 Gb/s: H221, H222</li> </ul>
iSCSI host connections	You may use any NIC or CNA provided that you use a supported software initiator (SWI). Use of a hardware initiator (HWI) is not supported.

**Table 12** System Requirements for VMware

Item	Requirement
Reboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)
Local Filesystems Supported	VMware provides the list of supported filesystems. Please refer to VMware's list of filesystems for official support.
I/O path failover and mode	VMware Native failover (VMW SATP ALUA) <ul style="list-style-type: none"> <li>• ESXi 5.5</li> <li>• ESXi 5.1</li> <li>• ESXi 5.0</li> </ul>
Node failover	VMware HA
Providers	None

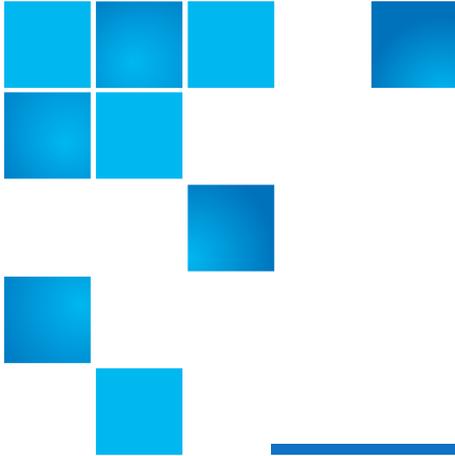
## Installing ALUA Support for VMware Versions ESXi5.0 U3, ESXi5.1 U2, ESXi5.5 U1, and Subsequent Versions

Starting with ESXi5.0 U1 and ESX4.1U3, VMware will automatically have the claim rules to select the VMW\_SATP\_ALUA plug-in to manage storage arrays that have the target port group support (TPGS) bit enabled. All arrays with TPGS bit disabled are still managed by the VMW\_SATP\_LSI plug-in.

- 1 Make sure that the host software on the management station is upgraded to version 11.20.
- 2 Upgrade the controllers in the storage array to controller firmware version 8.20 and the corresponding NVSRAM version.
- 3 From host management client, verify that the host OS type is set to VMWARE. Starting with storage management software version 10.84, the VMWARE host type will have the ALUA and TPGS bits enabled by default.
- 4 Use one of the following command sequences to verify that the TPGS/ALUA enabled devices are claimed by the VMW\_SATP\_ALUA plug-in.

For ESX4.1, enter the `#esxcli nmp device list` command on the command line of the host. Check that the output shows `VMW_SATP_ALUA` as the value of `Storage Array Type` for every storage array whose host software level is 10.83 or higher. Storage arrays with lower level host software show `VMW_SATP_LSI` as the value of `Storage Array Type`.

For ESXi5.0, enter the `#esxcli storage nmp device list` command on the command line of the host. Check that the output shows `VMW_SATP_ALUA` as the value of `Storage Array Type` for every storage array whose host software level is 10.83 or later. Storage arrays with lower level host software show `VMW_SATP_LSI` as the value of `Storage Array Type`.



This chapter provides the information on upgrading and/or replacing the base system controllers (sometimes referred to as controller canisters).

---

## Upgrading/Replacing Base System Controllers

Use these procedures to replace all of the controllers in a base system. You typically use these procedures when you choose to upgrade all of the controllers to a different model or platform. You might also use these procedures in the following situations:

- When all controllers in a base system encounter hardware failures and are no longer functional.
- To upgrade the host interface cards (HICs) in your base system by replacing both controllers with the same model of controllers, but with different HICs.
- To upgrade the dual inline memory modules (DIMMs) in your base system by replacing both controllers with the same model of controllers, but with different DIMMs.

### Controller Specifics

For duplex base systems, you replace both controllers. For simplex base systems, you replace the one controller. In both cases, you must power off the base system. As a result, you cannot access data on the storage array until you successfully complete the replacement.

If your storage array participates in remote volume mirroring, only iSCSI or Fibre Channel connections are supported between the primary site and the remote site. If the HIC configuration in your new controllers does not include iSCSI or Fibre Channel connections, remote volume mirroring will not be supported.

If you order a new controller, it will normally be shipped without a battery installed. When possible, you should remove the battery from your old controller and then install that battery in the new controller. However, for some controller upgrades, the battery from the old controller is not compatible with the new controller. In those cases, you must order a battery along with your new controller, and have that battery available before you begin these tasks.

Some controller upgrades result in the Vendor ID in SCSI Inquiry Data changing from LSI to NETAPP. When the Vendor ID changes from LSI to NETAPP, additional steps are required on the Windows, VMWare, and AIX operating systems to reclaim devices. Steps for these operating systems are included in this document.

If you are replacing the controllers to upgrade to a new model, keep in mind that your current storage array might have premium features installed that the new model cannot support. For

example, some controllers do not support the legacy SnapShot premium feature. If you replace your controllers, and your storage array was using the legacy Snapshots feature, you must disable that feature and delete or convert all volumes (that is, snapshots, repositories) associated with that feature before you replace the controllers. You can convert legacy Snapshots to Snapshots. Before you upgrade a base system, you should disable any premium features used on your storage array that are not supported on the new controllers.

If you change your controllers to newer models, your new storage array configuration might support lower numbers of some objects (for example, volumes) in the storage management software than your old configuration. You must make sure that your old configuration does not exceed the object limits listed below before you replace the controller(s).

- Maximum number of volumes - 512
- Maximum number of partitions - 128
- Maximum number of snapshot volumes - 512
- Maximum number of member volumes per consistency group - 32
- Maximum number of consistency groups - 16
- Maximum number of views - 256
- Maximum number of legacy RVM mirrors - 16
- Maximum number of ARVM mirrors - 32
- Maximum number of ARVM mirrors per mirror group - 32
- Maximum total number of mirrors (Legacy RVM + ARVM) - 32
- Maximum number of volume copies - 511
- Maximum number of thin provisioned volumes - 512
- Maximum number of drive slots in the storage array (base system + all attached expansion units) - 192

## Upgrade Requirements

Table 13 provides upgrade requirements for the QS1200, QS2400, QD6000, and QD7000 base systems (upgrade from an older controller to a newer controller).

**Table 13** Upgrade Requirements

Older Controller	To Newer Controllers
QS1200, QS2400, QD6000, and QD7000 base systems	Battery - Reuse the old battery
	Vendor ID - Additional steps required when upgrading from Pikes Peak to Soyuz or Titan
	Feature Support - No legacy snapshots for Soyuz or Titan
	No legacy RVM or Data Assurance for Pikes Peak and/or Soyuz with iSCSI HICs

---

**IMPORTANT:** Before you replace the controllers, make sure that any premium features that are installed and any configuration of objects in the storage management software can be supported with your new controllers. Failure to do this will result in an out-of-compliance condition or configuration errors. Contact a Technical Support Representative if you encounter configuration errors.

---

**CAUTION:** Possible loss of data access – Before you replace the controllers, upgrade your storage array to the latest version of controller firmware. If you are not able to upgrade the existing controllers to the latest release (8.10.05 or later), then you should verify that the replacement controllers have the same major version of controller firmware installed as the existing controllers. Contact a Technical Support Representative for assistance in making this determination.

---

**CAUTION:** Possible loss of data access – If any controller that you are replacing manages any secure volumes, the new controller needs the correct security key to manage those volumes. After you replace the controller and restore power to the base system, you can use SANtricity Storage Manager to load the key from the file in which it was saved. Be sure that such a file exists and that you know the pass phrase required to install the security key before you replace the controller.

---

To complete this procedure, you will need antistatic protection and one or two new controller canisters. You might also need new controller batteries. If your new controller canisters do not have the same host interface cards as the controller canisters you are replacing, you might need new host bus adapters, cables and Small Form-factor Pluggable (SFP) transceivers to re-cable your host connections. If the new controller canisters support different drive cabling from the old controller canisters, you might also need different drive cables.

## Cabling Considerations for Base Systems Hardware Upgrades

Compare your current host cabling to the supported cabling for your new controllers to determine whether you can reuse SFPs, QSFPs or cables from your old cabling configuration. The HBAs, HCAs, or Ethernet adapters, as well as switches in the network fabric used to connect your hosts to your storage array must match the HICs in your controller canisters.

Table 14 provides host cabling configurations for the QD7000 base systems.

**Table 14** Host Cabling Configurations for QD7000 Base Systems

HIC		Cable		
Data Rate and Protocol	Number of Connectors	Connector	Type	Length
16 Gb/s Fibre Channel	4	SFP+	OM2 SW optical	2,3,5,10,25m
		SFP+	OM3 SW optical	50-150m
		SFP+	OS2 LW optical	50-300m

## Preparing to Replace the Controllers

- 1 Make sure that the existing storage array is updated to the latest Quantum released controller firmware.
- 2 If an FDE security key exists on the storage array, save the FDE security key to a location not on the storage array.
- 3 Perform the following steps to record the serial number for your storage array:
  - a In the **EMW** Tree view, double-click your storage array.  
The **AMW** opens
  - b In the **Summary** tab of the **AMW**, click the **View Storage Array Profile** link.
  - c Make a record of the value for Chassis Serial Number.  
You need this serial number to perform the steps in [Powering On the Storage Array](#).
- 4 Gather support data about your storage array by using one of these methods:
  - Use the storage management software to collect and save a support bundle of your storage array. From the Array Management Window toolbar, select Monitor > Health > Collect Support Data Manually. Then name and specify a location on your system where you want to store the support bundle.
  - Use the command line interface (CLI) to run the save storageArray supportData command to gather comprehensive support data about the storage array. For more information about this command, refer to the current version of the Command Line Interface and Script Commands Programming Guide.

---

**NOTE:** Gathering support data can temporarily impact performance on your storage array.

---

- 5 Stop all I/O operations between the storage array and all connected hosts.

---

**CAUTION:** Possible data loss – If you continue with the steps to replace a controller while I/O operations are occurring between the storage array and attached hosts, you might lose data.

---

- 6 On each host that is connected to the storage array, unmount all file systems associated with volumes on the storage array.
- 7 Wait for five minutes.
- 8 In the Hardware tab of the AMW, select the graphic representation of the storage array, and then select Monitor > Reports > Operations in Progress to make sure that there are no background operations in progress.  
  
The Operations in Progress window shows the time remaining for any operations. Wait for those operations to complete before you continue with the next step.
- 9 Turn off power to the base system.
- 10 Wait for all of the LEDs on the base system to go dark.
- 11 Turn off power to each expansion unit that is connected to the base system.
- 12 Wait for two minutes for all of the drives to spin down.

## Removing Controller Canisters from a Base System

**CAUTION:** Possible hardware damage – To prevent electrostatic discharge damage to the tray, use proper antistatic protection when handling tray components.

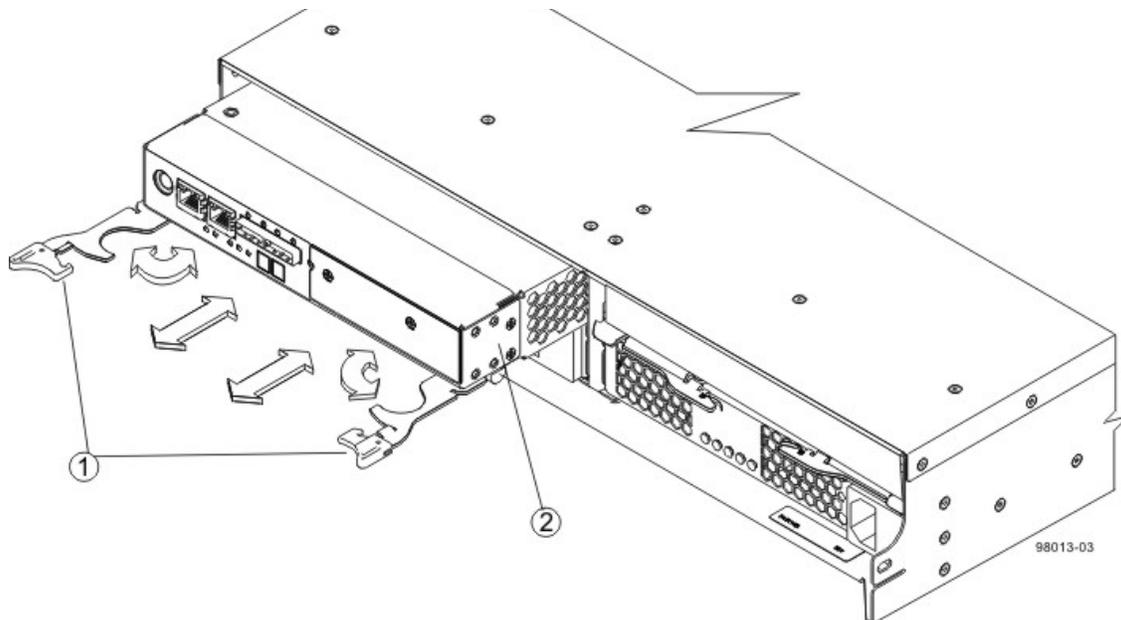
- 1 Put on antistatic protection.

**CAUTION:** Potential degraded performance – To prevent degraded performance, do not twist, fold, pinch, or step on the cables. Many cables have a minimum bending radius. Check the specifications for your cables, and do not bend any cable tighter than the minimum specified radius.

- 2 Label each cable that is attached to the old controller canister. Depending on the HIC configuration, you might be able to reconnect some cables after you replace the controller canister.
- 3 Disconnect all of the interface and Ethernet cables from the old controller canister.  
If fiber-optic cables are present, you can use the two release levers to partially remove the controller canister. Opening these release levers makes it easier to press down the fiber-optic cable release tab.
- 4 If the old controller canister contains a Fibre Channel HIC or an InfiniBand HIC, remove the small form-factor pluggable (SFP+) transceivers (for Fibre Channel) or quad SFP (QSFP+) transceivers (for InfiniBand) from the HIC, and save them for possible reuse.
- 5 Remove controller A. See [Figure 1](#) and [Figure 2](#).
  - a Unlock and rotate the release handles out to release the controller canister.
  - b Using the release handles and your hands, pull the controller canister out of the base system.

[Figure 1](#) shows a representative controller (QS1200/QS2400) with the release handles for a base system. Other base system controllers have a similar configuration for the release handles.

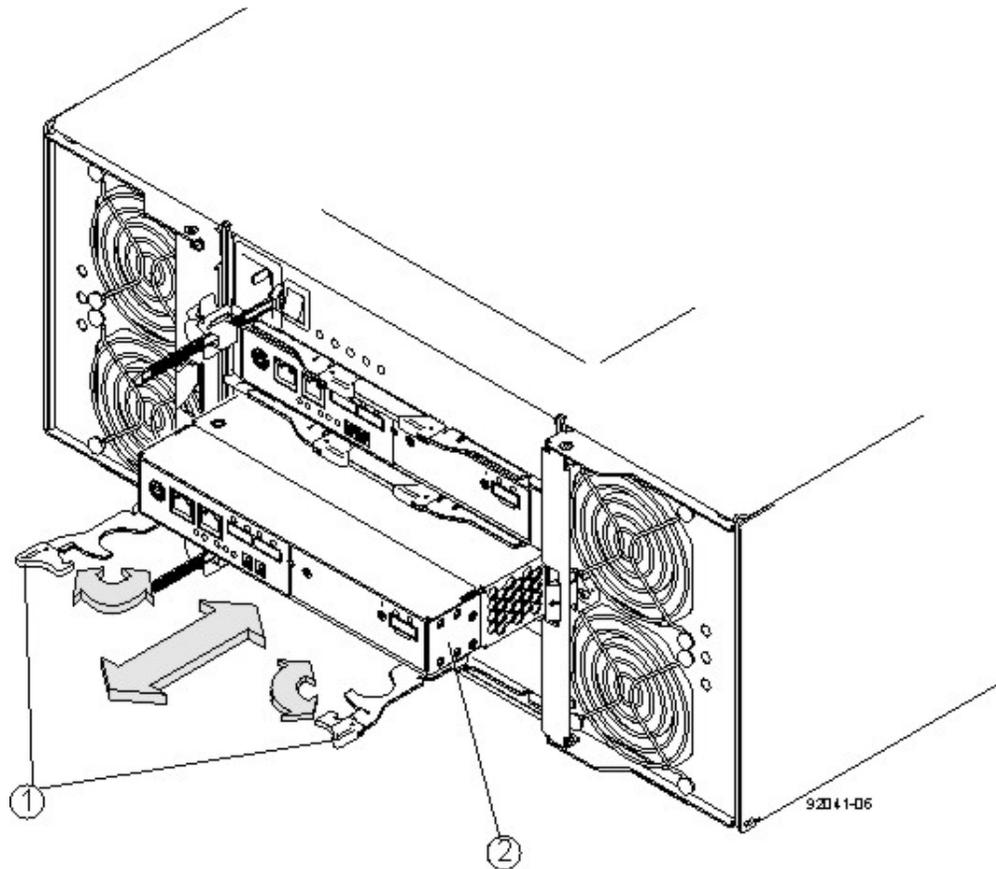
**Figure 1** Removal of Base System Controller



- 1 Release Handles
- 2 Controller

Figure 2 shows a representative controller (QD6000/QD7000) with the release handles for a base system. Other base system controllers have a similar configuration for the release handles.

Figure 2 Removal of Base System Controller



1 Release Handles

2 Controller

6 Set the old controller canister on a flat, static-free surface near the base system with the release levers up.

Position the controller canister so that you can access the top cover.

7 Choose one of the following options:

- If you will reuse the battery from the old controller in the new controller, continue with [step 8](#).
- If you will install a new battery in the new controller, go to [step 11](#).

8 Press down on both of the top cover latch buttons on the old controller canister, and slide the top cover to the rear of the canister.

9 Perform one of the following options, depending on your model of base system, to release the old battery:

For the QS1200, QS2400, QD6000, and QD7000, release the tab that secures the battery to the controller canister.

10 Remove the battery by sliding it towards the rear of the old controller canister.

11 For a duplex base system, repeat [step 2](#) through [step 10](#) for the second controller canister.

## Installing New Controller Canisters in Base System

Perform the following steps for each controller in the base system.

- 1 Unpack a new controller canister.
  - a Set the new controller canister on a flat, static-free surface near the base system with the top cover up.
  - b Save all of the packing materials so that you can, if necessary, ship the old controller canister.
- 2 Push down the two top cover latch buttons that secure the top cover to the new controller canister.
- 3 Remove the top cover by sliding it to the rear of the new controller canister.
- 4 Insert the battery (either the new battery that you ordered or the battery that you removed from the old controller canister) into the new controller canister. Slide the battery into the canister, making sure it stays below the rivets on the wall of the new canister.
- 5 Keeping the locking handle at a 45 degree angle, align the connectors at the bottom of the battery with the connectors on the canister.
- 6 Push the battery down until you hear it click, and move the locking handle up to secure the controller battery to the controller canister.

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**IMPORTANT:** To make sure that the controller battery is seated correctly in a QS1200, QS2400, QD6000, and QD7000 base system controller, you might need to slide it out and insert it again. You will know it is secure when you hear it click into place, and the locking handle does not move out of its upright position when you wiggle it.

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- 7 Reinstall the top cover on the new controller canister by sliding it forward until the top latch covers click.
- 8 Slide the new controller canister all the way into the base system. Rotate the release levers towards the center of the controller canister to lock it into place.
- 9 If your new controller canister has a Fibre Channel HIC or an InfiniBand HIC, install the SFP+ transceivers (Fibre Channel) or QSFP+ transceiver (InfiniBand) into the controller canister.

Depending on the HICs involved in your upgrade, you might be able to reuse SFP+ transceiver or QSFP+ transceivers that you removed from your old controller canister. See [Table 14](#) for details about cabling requirements.
- 10 Reconnect all of the cables between the base system and the expansion units.

If the drive cabling configuration is the same as it was with your old controllers, use the labels that you attached to the cables to reconnect the cables correctly.

## Powering On the Storage Array

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**NOTE:** If the controller upgrade involves a protocol change (for example, Fibre Channel to iSCSI), any hosts groups, hosts, and volume-to-LUN mappings defined in the host mappings tab remain intact. However, you must take steps to associate the new host ports with the hosts. If the controller upgrade does not involve a protocol change, all host port mappings will remain intact and no additional steps are required.

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- 1 Turn on the Power switch on the rear of each expansion unit that is connected to the base system.
- 2 Wait two minutes for the drives to spin up.
- 3 Turn on the Power switch on the rear of the base system.

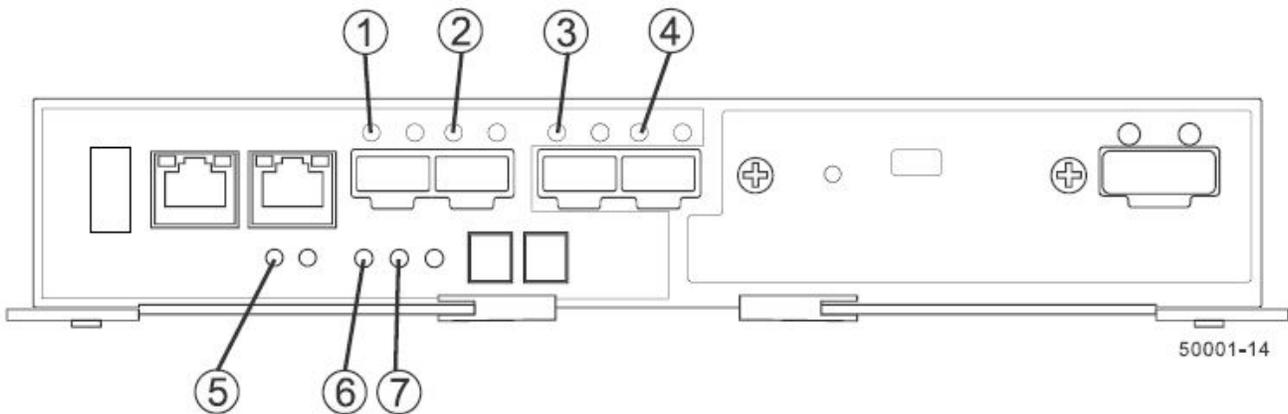
- 4 Wait three minutes for the power-up process to complete.
- 5 If you saved a security key in Preparing to Replace the Controllers, perform the following steps on each controller to import that security key.
  - a If there is a mix of secured and unsecured drives in the storage array, create a new FDE security key.  
Unsecured drives are unassigned drives, GHS drives, or drives which are part of a volume group or a disk pool that is not secured by FDE. Secured drives are assigned drives which are a part of an FDE secured volume group or Disk Pool.
  - b Import the FDE security key that you saved in Preparing to Replace the Controllers.
  - c If there were only secured drives (no unsecured drives) in the storage array, the controller(s) will automatically reboot to complete the import operation.  
Wait for all controllers to boot up. When a controller finishes booting, its icon will appear in the Enterprise Management Window (EMW).
- 6 Execute this step if there is a mix of secured and unsecured drives in the storage array:
  - a Run the set allDrives nativeState SMcli command.
  - b Reset all controllers using SANtricity Storage Manager.
  - c Wait for all controllers to boot up. When a controllers has finished booting, it appears in the EMW.
- 7 Look at the LEDs on controller A to make sure that it is booting correctly.

The Host Link Service Action Required LEDs turns green during the reboot. The seven-segment display shows the sequence OS+ Sd+ blank- to indicate that the controller is performing Start-of-day (SOD) processing.

After the controller successfully completes rebooting, the seven-segment display shows the tray ID matching the seven segment display on the second controller. You can then discover the new controller canister by using the storage management software.

Figure 3 shows the QS1200/QS2400 base system controller LEDs.

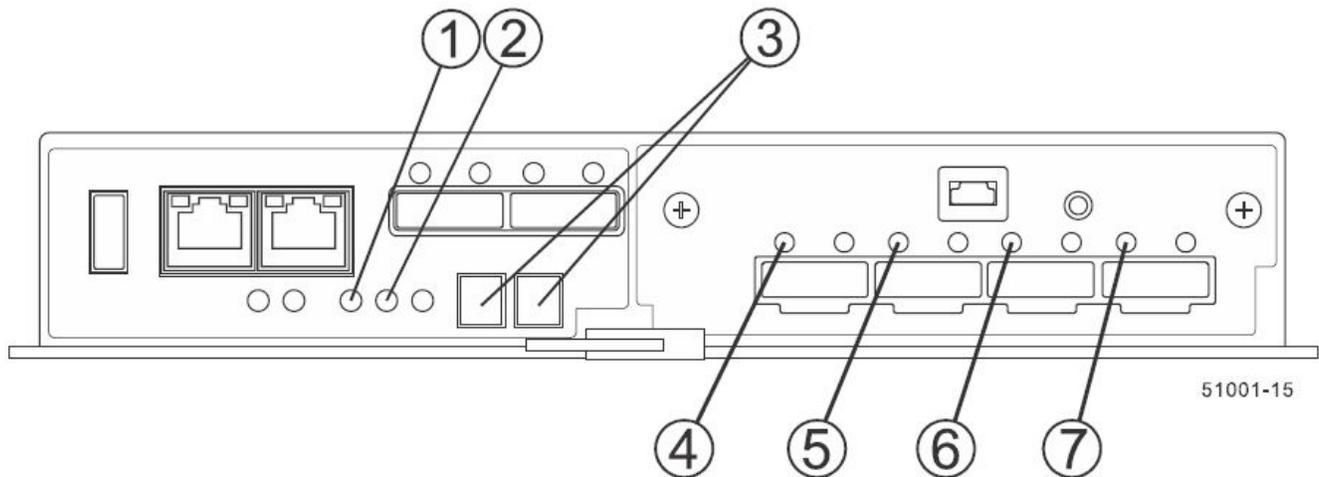
**Figure 3** QS1200/QS2400 Base System Controller LEDs



- 1 Controller Service Action Allowed LED (Blue)
- 2 Controller Service Action Required LED (Amber)
- 3 Seven-Segment Display
- 4 Host Link 1 Service Action Required LED (Amber)
- 5 Host Link 2 Service Action Required LED (Amber)
- 6 Host Link 3 Service Action Required LED (Amber)
- 7 Host Link 4 Service Action Required LED (Amber)

Figure 4 shows QD7000 base system controller LEDs.

Figure 4 QD7000 Base System Controller LEDs



- 1 Controller Service Action Allowed LED (Blue)
  - 2 Controller Service Action Required LED (Amber)
  - 3 Seven-Segment Display
  - 4 Host Link 1 Service Action Required LED (Amber)
  - 5 Host Link 2 Service Action Required LED (Amber)
  - 6 Host Link 3 Service Action Required LED (Amber)
  - 7 Host Link 4 Service Action Required LED (Amber)
- 8 Perform these steps if any of the base system's Service Action Required LEDs are on, or if the Controller Service Action Required LED is on:
    - a Check that the controller canister has been installed correctly and that all of the cables are correctly seated.  
Reinstall the controller canister, if necessary.
    - b Check the base system's Service Action Required LEDs and the Controller Service Action Required LED again. If the problem is not corrected, contact your Technical Support Representative.
  - 9 For a duplex configuration, repeat [step 7](#) through [step 8](#) for controller B.
  - 10 Using the LEDs and the storage management software, check the status of all of the trays in the storage array.
  - 11 Does any component have a Needs Attention status?
    - Yes – Click the Recovery Guru toolbar button in the Array Management Window, and complete the recovery procedure. If the problem is not resolved, contact your Technical Support Representative.
    - No – Go to [step 12](#).
  - 12 Remove the antistatic protection.
  - 13 If your controller upgrade involves a protocol change (for example, Fibre Channel to iSCSI), and you already have hosts defined for your storage array, perform the following steps to associate the new host ports with your hosts:
    - a In the **Array Management Window**, select the **Host Mappings** tab.
    - b From the **Storage Array** tree on the left of the window, select the host to associate with a port.

- c From the Array Management Window toolbar, select **Host Mappings > Manage Host Port Identifiers**.
  - d To update the host port identifier information associated with each host, replace the host port IDs from the old host adapters with the new host port IDs for the new host adapter.
  - e Repeat step d for each host.
- 14 Gather support data about your updated storage array by using one of these methods:
- Use the storage management software to collect and save a support bundle of your storage array. From the Array Management Window toolbar, select **Monitor > Health > Collect Support Data Manually**. Then name and specify a location on your system where you want to store the support bundle.
  - Use the CLI to run the `save storageArray supportData` command to gather comprehensive support data about the storage array.

For more information about the CLI command, refer to the current version of the *Command Line Interface and Script Commands Programming Guide*.

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**NOTE:** Gathering support data can temporarily impact performance on your storage array.

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- 15 Perform the following steps to open a non-technical case with NetApp Technical Support. This action alerts NetApp Technical Support to the changes that you made to the configuration of your storage array.
- a Get the serial number of the base system that you recorded in Preparing to Replace the Controllers.
  - b Go to the [Quantum.com](https://mysupport.netapp.com/eservice/assistant) support site at [mysupport.netapp.com/eservice/assistant](https://mysupport.netapp.com/eservice/assistant).
  - c If the **Login** page appears, enter your username and password, and select **Login**. The **Give Us Feedback** page opens.
  - d Select **Product Registration** from the drop-down list under **Category 1**.
  - e Enter the following text in the **Comments** text box, substituting the serial number of your base system for serial number:  
*Please create alert against Serial Number: serial number. The alert name should be "E-Series Upgrade". The alert text should read as follows:  
"Attention: The controllers in this system have been upgraded from the original configuration. Verify the controller configuration before ordering replacement controllers and notify dispatch that the system has been upgraded."*
  - f Click the **Submit** button at the bottom of the form.

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# Remounting Volumes after Changing Vendor from LSI to NETAPP

If your controller upgrade results in changing the vendor ID from LSI to NETAPP, you must take steps on each Windows, VMWare or AIX host that uses volumes from the updated storage array. Refer to the task for the corresponding operating system on each host.

## Remounting Volumes on a Windows Host

- 1 In the **Device Manager**, select **Show Hidden Devices**.
- 2 For each NETAPP SCSI Disk Device listed in the **Device Manager**, right-click on the entry and select **Uninstall**.

If Windows displays a dialog with a message indicating that you should reboot the host, finish uninstalling all of the volumes before you scan for hardware and reboot.

- 3 Right-click in the **Device Manager** and select **Scan for Hardware Changes**.
- 4 Reboot the host.

## Steps for AIX Hosts

After you replace the controllers, you might observe that host shows the new volumes on the storage array, but also shows the original volumes as failed. If failed volumes appear, perform the following steps.

- 1 From the command line, run the `cfgmgr` command.

## Remounting Volumes on a VMWare Host

After you replace the controllers, you might observe the following conditions:

- VMWare shows new paths for the volumes on the storage array, but also shows the original paths as dead paths.
- The hosts still list the volumes on the storage array as having LSI vendor IDs. This might occur when the volumes were claimed by the LSI rule at the start and so continue to use the same LSI rule when the volumes come back on line.
- The Display Name does not reflect the change from LSI to NetApp. This might occur because the display name became free test after initial discovery. In this case, you can change the Display Name manually.

If dead paths appear, perform the following steps.

- 1 Perform a rescan on the each host.
- 2 Halt all host I/O operations to this subsystem.
- 3 To reclaim the volumes under NetApp rule, perform the following steps.
  - a From the command line, run the `esxcli storage core device list` command. Check the output from the command to identify volumes whose names have the form `aa.xxxx`.
  - b From the command line, run the command `do esxcli storage core claiming reclaim -d naa.xxxxx` to change the LSI vendor ID to NetApp.

