



# SGI InfiniteStorage 4000 Series and 5000 Series System Upgrade Guide

(ISSM 10.86)

The information in this document supports the SGI InfiniteStorage 4000 series and 5000 series storage systems (ISSM 10.86). Refer to the table below to match your specific SGI InfiniteStorage product with the model numbers used in this document.

<b>SGI Model #</b>	<b>NetApp Model</b>
TP9600H	6091
TP9700F	6091
IS4500F	6091
TP9600F	3994 and 3992
IS4000H	3994
IS350	3992
IS220	1932 1333 DE1300
IS4100	4900
IS-DMODULE16-Z	FC4600
IS-DMODULE60	DE6900
IS4600	7091
IS-DMODULE12 & IS2212 (JBOD)	DE1600
IS-DMODULE24 & IS2224 (JBOD)	DE5600
IS-DMODULE60-SAS	DE6600
IS5012	E2600
IS5024	E2600
IS5060	E2600
IS5512	E5400
IS5524	E5400
IS5560	E5400
IS5600	E5500

## Copyright information

---

Copyright © 1994–2012 NetApp, Inc. All rights reserved. Printed in the U.S.A.

No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

## Trademark information

---

NetApp, the NetApp logo, Network Appliance, the Network Appliance logo, Akorri, ApplianceWatch, ASUP, AutoSupport, BalancePoint, BalancePoint Predictor, Bycast, Campaign Express, ComplianceClock, Cryptainer, CryptoShred, Data ONTAP, DataFabric, DataFort, Decru, Decru DataFort, DenseStak, Engenio, Engenio logo, E-Stack, FAServer, FastStak, FilerView, FlexCache, FlexClone, FlexPod, FlexScale, FlexShare, FlexSuite, FlexVol, FPolicy, GetSuccessful, gFiler, Go further, faster, Imagine Virtually Anything, Lifetime Key Management, LockVault, Manage ONTAP, MetroCluster, MultiStore, NearStore, NetCache, NOW (NetApp on the Web), Onaro, OnCommand, ONTAPI, OpenKey, PerformanceStak, RAID-DP, ReplicatorX, SANscreen, SANshare, SANtricity, SecureAdmin, SecureShare, Select, Service Builder, Shadow Tape, Simplicity, Simulate ONTAP, SnapCopy, SnapDirector, SnapDrive, SnapFilter, SnapLock, SnapManager, SnapMigrator, SnapMirror, SnapMover, SnapProtect, SnapRestore, Snapshot, SnapSuite, SnapValidator, SnapVault, StorageGRID, StoreVault, the StoreVault logo, SyncMirror, Tech OnTap, The evolution of storage, Topio, vFiler, VFM, Virtual File Manager, VPolicy, WAFL, Web Filer, and XBB are trademarks or registered trademarks of NetApp, Inc. in the United States, other countries, or both.

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. A complete and current list of other IBM trademarks is available on the Web at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml).

Apple is a registered trademark and QuickTime is a trademark of Apple, Inc. in the U.S.A. and/or other countries. Microsoft is a registered trademark and Windows Media is a trademark of Microsoft Corporation in the U.S.A. and/or other countries. RealAudio, RealNetworks, RealPlayer, RealSystem, RealText, and RealVideo are registered trademarks and RealMedia, RealProxy, and SureStream are trademarks of RealNetworks, Inc. in the U.S.A. and/or other countries.

All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such.

NetApp, Inc. is a licensee of the CompactFlash and CF Logo trademarks.

NetApp, Inc. NetCache is certified RealSystem compatible.

# Table of Contents

---

<b>Chapter 1</b>	<b>Preparing to Upgrade Your Storage Management Software . . . . . 1</b>
	Upgrading the Storage Management Software, Firmware, and NVSRAM . . . . . 1
	Upgrading Controller Firmware and NVSRAM . . . . . 3
	Upgrading the ESM Firmware . . . . . 4
	Storage Management Software Packages . . . . . 4
	Installation Options . . . . . 5
	Checking the Current Version of the Storage Management Software . . . . . 6
	Supported Controller-Drive Trays . . . . . 6
	Supported Storage Array Configurations . . . . . 8
<b>Chapter 2</b>	<b>Upgrade Instructions for the HP-UX OS . . . . . 9</b>
	System Requirements for HP-UX . . . . . 9
	Installing the Storage Management Software on the HP-UX OS . . . . . 10
	Checking the Installation on the HP-UX OS . . . . . 12
	Uninstalling the Storage Management Software on the HP-UX OS . . . . . 13
<b>Chapter 3</b>	<b>Upgrade Instructions for the Solaris OS . . . . . 15</b>
	Supported Components for Solaris . . . . . 15
	Installing the Storage Management Software on the Solaris OS . . . . . 17
	Checking the Installation on the Solaris OS . . . . . 19
	Uninstalling the Storage Management Software on the Solaris OS . . . . . 20
<b>Chapter 4</b>	<b>Upgrade Instructions for the Linux OS . . . . . 21</b>
	System Requirements for Linux . . . . . 21
	System Requirements for Linux with InfiniBand . . . . . 24
	Installing the Storage Management Software on the Linux OS . . . . . 26
	Checking the Installation on the Linux OS . . . . . 29
	Uninstalling Storage Management Software on the Linux OS . . . . . 30

<b>Chapter 5</b>	<b>Upgrade Instructions for the Windows OS.....</b>	<b>33</b>
	System Requirements for Windows Server 2008, Windows Server 2012, Hyper-V and Vista .....	33
	Installing the Storage Management Software on the Windows OS .....	35
	Checking the Installation on the Windows OS.....	39
	Uninstalling Storage Management Software on the Windows OS .....	39
<b>Chapter 6</b>	<b>Upgrade Instructions for Asymmetric Logical Unit Access (ALUA) with the VMware OS .....</b>	<b>43</b>
	System Requirements for VMware .....	43
	Installing ALUA Support for VMware Versions ESX4.1U3, ESXi5.0U1, and Subsequent Versions .....	44

# Preparing to Upgrade Your Storage Management Software **1**

The following table shows the supported upgrade paths for controller trays and controller-drive trays for storage management software version 10.86 and controller firmware version 7.86.

**Table 1 Supported Trays and Software Upgrade Paths**

Tray Name	Installed Storage Management Software Version	Installed Controller Firmware Version
<b>Controller-drive trays</b>		
E2612, E2624, E2660	10.70 or later	7.70 or later
E5412, E5424, E5460	10.80 or later	7.80 or later

**NOTE** If you are upgrading from controller firmware version 7.75.26, you must first upgrade to 7.75.28, and then upgrade to 7.86. All other supported upgrades are performed directly without an intermediate step.

## Upgrading the Storage Management Software, Firmware, and NVSRAM

**NOTE** To make sure that your failover driver is compatible with the new hardware, firmware, and software, refer to the *SANtricity ES Storage Manager Failover Drivers User Guide for Version 10.86*. For the RHEL and SLES operating systems, if you are setting up a configuration to support Asymmetric Logical Unit Access (ALUA), additional steps are required to set the correct Operating System in Storage Partition Mapping.

These steps are required for a successful upgrade to storage management software version 10.86 and controller firmware version 7.86. Perform the steps in order.

1. Make sure that the controller-drive trays in your storage array are compatible with the software level and the firmware level to which you are upgrading.
2. Check that the host bus adapters (HBAs), switches, driver versions, firmware levels, and specific hardware restrictions are supported.

Refer to your storage vendor for compatibility information.

**NOTE** If you plan to upgrade or install storage area network (SAN) hardware, make those changes before you upgrade the storage management software.

3. Start the existing storage management software with the procedure for your operating system.
4. Check that the storage array has Optimal status.

5. Save a support bundle for the storage array.
  - a. In the SANtricity ES **Enterprise Management** window, double-click the icon for the storage array.
  - b. In the **Array Management Window**, select **Monitor>>Health>>Collect Support Data Manually**.

The **Array Management** window for the storage array appears.

- c. Enter a file path for the archive file in the **Specify filename** text box.
  - d. Click **Start**.
6. Make sure that the hardware and operating systems on all attached hosts and managements 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.

7. Make sure that your failover driver is compatible with the new hardware, firmware, and software. Refer to the topics under *SANtricity ES Storage Manager Failover Drivers User Guide for Version 10.86*.
8. Make sure that the current version of the storage management software can be upgraded directly to SANtricity ES Storage Manager Version 10.86.

Table [Supported Trays and Software Upgrade Paths](#) shows the supported upgrade paths.

9. Install storage management software version 10.86 using the instructions for your operating system (OS). OS-specific instructions are given in subsequent chapters of this document.
10. Make sure that the installation was successful. Use the procedure in this document for your operating system to start the storage management software.
11. Update the controller firmware and NVSRAM.

See the steps in [Upgrading Controller Firmware and NVSRAM](#).

12. Update the ESM firmware.

See the steps in [Upgrading the ESM Firmware](#).

---

**NOTE** Starting with SANtricity ES Storage Manager version 10.83, a storage array can use asymmetric logical unit access (ALUA). ALUA enables a controller tray or a controller-drive tray to service I/O requests through either controller in a duplex configuration. Additional steps are required for ESX 5.0 to update the VMware configuration. See [Upgrade Instructions for Asymmetric Logical Unit Access \(ALUA\) with the VMware OS](#) on page [Upgrade Instructions for Asymmetric Logical Unit Access \(ALUA\) with the VMware OS](#) for instructions.

---

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

14. Check that the storage array has an Optimal status. If one or more managed devices has a Needs Attention status, contact your Technical Support Representative.

## Upgrading Controller Firmware and NVSRAM

If you need to upgrade controller firmware and NVSRAM, obtain a copies of the installation files from the SANtricity ES Storage Manager installation DVD or from your storage vendor's web site. Save the files on the management station where you will perform the upgrade.

1. In the SANtricity ES **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>>Controller Firmware>>Upgrade**.
3. In the **Pre-Upgrade Check** dialog, click **OK**.
4. Does an error dialog with the message "Too many critical events logged" appear?
  - If yes, select **Monitor>>Reports>>Log**, resolve any listed events, and then go to step 2.
  - If no, continue with step 5.
5. In the **Download Controller Firmware** dialog, click **Select File** for the controller firmware, locate and select the controller firmware upgrade file that you downloaded, and then click **OK** in the **Select File** dialog.
6. If you choose to upgrade the NVSRAM while you upgrade the controller firmware, select the check box labeled **Transfer NVSRAM file with controller firmware**.
7. Click **Select File** for the NVSRAM, locate and select the NVSRAM upgrade file that you downloaded, and then click **OK** in the **Select File** dialog.
8. Click **Transfer**.

The **Confirm Download** dialog appears.

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

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

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

## Upgrading the ESM Firmware

If you need to upgrade ESM Firmware, obtain a copies of the installation files from the SANtricity ES Storage Manager installation DVD or from your storage vendor's web site. Save the file on the management station where you will perform the upgrade.

1. In the SANtricity ES **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>>ESM Firmware**.

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

3. In the **Download Environmental (ESM) Card Firmware** dialog, click **Select All** to upgrade all of the drive trays in the storage array.
4. In the **Download Environmental (ESM) Card Firmware** dialog, click **Select File**, locate and select the file you downloaded, and then click **OK**.

The **ESM Firmware Compatibility Warning** dialog appears.

5. Read the warning message in the **ESM Firmware Compatibility Warning** dialog and then, if you are confident that you are ready to proceed, click **OK**.
6. In the **Download Environmental (ESM) Card Firmware** dialog, click **Start**.

The **Confirm Download** dialog appears.

7. In the **Confirm Download** dialog, type "yes" in the text box and then click **OK**.
8. In the **ESM Firmware Compatibility Warning** dialog, click **Close**.

## Storage Management Software Packages

All storage management software packages are generally installed in the same directory on the same system, whether the system is the host or a separate storage management station.

**Table 2 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.

Software Package	Description and Usage
Redundant Dual Active Controller (RDAC)/Multi-Path Proxy (MPP)	A multi-path failover driver, proprietary to NetApp, 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 topics under <i>SANtricity ES Storage Manager Failover Drivers User Guide for Version 10.86</i> .
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 installs the InstallAnywhere utility.

<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.

**NOTE** The Microsoft Virtual Disk Service (VDS) and Volume Shadow Copy Service (VSS) providers are a part of the SANtricity ES Storage Manager package for the Windows Server 2003 OS, the Windows Server 2008 OS, and the Windows Server 2012 OS.

## Installation Options

Install only the packages that are required for the type of installation you are performing.

**Table 3 Installation Options and Related Software Packages**

Installation Option	SMruntime	SMclient	SMutil	SMagent	RDAC Failover Driver <sup>1</sup>
Typical installation	X	X	X	X	
Storage management station <sup>2</sup>	X	X			
Host station	X		X		X

Installation Option	SMruntime	SMclient	SMutil	SMagent	RDAC Failover Driver <sup>1</sup>
A host station acting as a storage management station (out-of-band management) <sup>3</sup>	X	X	X		X
Host with in-band management	X	X	X	X	X

<sup>1</sup> The RDAC/MPP failover driver is proprietary to NetApp and is available for download to the Linux OS.

<sup>2</sup> The storage management station is a computer that runs storage management software that adds, monitors, and manages the storage arrays on a network.

<sup>3</sup> Out-of-band management is a method to manage a storage array over the network through an Ethernet connection, from a storage management station that need not have an I/O path connection to the controllers.

### Checking the Current Version of the Storage Management Software

To check the level of the current storage management software, type the command that corresponds to your operating system, and press **Enter**. The *<package name>* placeholder refers to the name of the software package that is installed.

- In the HP-UX operating system, type the command `swlist | grep SM*`, and press **Enter**:
- In the Solaris operating system, type the command `pkginfo -l <package name>`, and press **Enter**:
- In the Linux operating system, type the command `rpm -qi <package name>`, and press **Enter**:
- In the Windows operating system, perform these tasks.
  - a. Select **Start >> Run**.
  - b. Type `reged32`, and press **Enter**.

The **Register Editor** window appears.

- c. Select **HKEY\_LOCAL\_MACHINE >> SOFTWARE >> STORAGE**.

The host software versions are listed under the storage directory.

### Supported Controller-Drive Trays

A controller-drive tray is a unit that contains drives, redundant cooling fans and power supplies, and (depending on the model) one or two controllers. Controller-drive trays do not contain ESMs.

Table 4 shows the controller-drive trays and the maximum number of drive slots and the total number of volumes that are supported by each controller-drive tray. The total numbers include drive slots and volumes that are contained in the controller-drive tray and in additional attached drive trays.

**Table 4 Supported Trays and the Maximum Number of Drives and Volumes**

Tray Name	Maximum Drives slots per Storage Array	Maximum Volumes per Storage Array <sup>1</sup>
E2600	192	512
E5400 (E5412, E5424, and E5460)	384 (240 with InfiniBand)	2048
E5500 (E5512, E5524, and E5560)	384 <sup>2</sup> (240 with InfiniBand)	2048

<sup>1</sup> Snapshot (Legacy) repository volumes and Synchronous Mirroring repository volumes are included in the number of volumes supported.

<sup>2</sup> The drive slot limit might be lower than 384 for some sub-models of the E5500 controller-drive trays.

Table 1 lists controller-drive trays and controller trays can co-exist in a storage network with hardware running storage management software version 10.86 and controller firmware version 7.86. They cannot, however, be upgraded to storage management software version 10.86 and controller firmware version 7.86.

**Table 5 Co-existing Trays and the Maximum Number of Drives and Volumes**

Tray Name	Controller Type	Maximum Drive Slots per Storage Array	Maximum Volumes per Storage Array <sup>1</sup>
<b>Controller-drive trays</b>			
SHV2520	2880 (dual)	14 <sup>2</sup>	1024
SHV2600	2882	112	1024
SAT2700	2820-SATA	14 <sup>2</sup>	512
SAT2800	2822-SATA	112	512
CDE3994	3992 or 3994	112	1024
<b>Controller trays</b>			
FC1250	4884	224	2048
FC1275	5884	224	2048
CE6998	6091	224	2048

<sup>1</sup> Snapshot (Legacy) repository volumes and Synchronous Mirroring repository volumes are included in the number of volumes supported.

<sup>2</sup> Additional drive trays are not supported.

## Supported Storage Array Configurations

The drive tray is a unit that contains drives, redundant cooling fans and power supplies, and one or two ESMs. Drive trays do not contain controllers.

**Table 6 Supported Drive Trays**

	<b>DE1600/ DE5600</b>	<b>DE6600</b>	<b>Mix of DE1600/ DE5600 and DE6600</b>
E2600	total drive slots=192 maximum	Maximum of 2 drive trays (total drive slots=180 maximum)	Not supported
E5400	Any mixture with total drive slots=384 maximum and drive trays = 15 maximum*		
E5500	Any mixture with total drive slots=384 maximum and drive trays = 15 maximum*		

\*The total number of drive slots includes those in the controller-drive trays. The maximum number of drive slots and drive trays is lower for some sub-models.

# Upgrade Instructions for the HP-UX OS

# 2

Use the procedures in this chapter to upgrade the storage management software on the HP-UX operating system.

## System Requirements for HP-UX

Review these specifications to make sure that your system meets the minimum installation requirements.

Operating system version for I/O attached hosts	11.3
Processor support	Itanium 2, PA-RISC
Controller-drive trays	<ul style="list-style-type: none"><li>■ E2600</li><li>■ E5400</li></ul>
Host adapters	<ul style="list-style-type: none"><li>■ AB378A (4 Gb/s)</li><li>■ AB379A (4 Gb/s)</li><li>■ AH400A (8 Gb/s)</li><li>■ AH401A (8 Gb/s)</li></ul>
Fibre Channel configurations	<ul style="list-style-type: none"><li>■ Direct connect</li><li>■ Fabric</li></ul>
JRE version	1.6.x
Rootboot supported?	Yes
SCSI driver	edisk version 1
I/O path failover	TPGS (11.31)
Preferred failover mode	ALUA
Node failover	None
Providers	None

The storage management software installation program does not verify the updates. Some updates might be superseded by other updates. For information about the latest updates, refer to <http://www1.itrc.hp.com/service/patch/mainPage.do>.

---

**NOTE** On the web page from which you download the patch, click the **dependency** link to make sure that you install all required updates.

---

Make sure that the maximum kernel parameters are configured depending on the requirements as shown in the following table.

**Table 1 HP-UX Storage Management Station – 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 HP-UX OS

Use this procedure to install the storage management software packages on the HP-UX OS.

---

**ATTENTION Possible loss of data** – Downgrades from storage management software version 10.83 to a previous version can cause data loss and are not supported.

---

---

**NOTE** When you use the SMinstaller command to install the new software, earlier versions of the software are automatically removed as part of that process.

---

Modify these instructions as required for your specific installation.

1. Make sure that you have root privileges, which are required to install the software.
2. The installation file, SMIA-HPUX-90.10.xx.xx.bin, is available either from your storage vendor's web site or from an installation DVD. Depending on the source of the installation file, select one of the following choices.
  - If you are obtaining the installation file from a web site, download the file to your management station. Skip to step 5.
  - If the installation file is on a DVD, continue with step 3.
3. Insert the installation DVD into the DVD-ROM drive.
4. If necessary, mount the DVD-ROM drive. In the example command that follows, the installation DVD is mounted at /dvdrom.

In the example command that follows, the installation DVD is mounted at /dvdrom.

```
mount -o dvdcase /dev/dsk/c#t#d0 /dvdrom
```

---

**NOTE** This mount point is shown here only as an example. You might need to modify this command for your operating system. If you need more information about mounting devices on your operating system, refer to the documentation that came with your operating system.

---

5. To change to the installation directory, type this command, and press **Enter**. In this command, *<install>* is the name of the directory where the installation files are located.

```
cd <install>
```

6. At the prompt, type this command, and press **Enter**. In this command, *SMIA-HPUX.bin* is the name of the installation program on the DVD.

```
sh SMIA-HPUX.bin
```

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

7. Click **Next**.

The **License Agreement** window appears.

8. Select the option that accepts the terms of the License Agreement.
9. Click **Next**.

The **Select Installation Type** window appears.

10. 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.

11. Click **Next**.

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

12. 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.

---

13. 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 HP-UX OS

After you have completed installing the software packages, check that they 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 the Storage Management Software on the HP-UX 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 the Solaris OS

# 3

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

## Supported Components for Solaris

Review these specifications to make sure that your system meets the minimum general requirements.

---

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

---

Operating system version for I/O attached hosts	<ul style="list-style-type: none"><li>■ Solaris 10 u9</li><li>■ Solaris 11</li></ul>
Processor support	Sun Sparc, Intel Xeon 32 bit, Intel Xeon 64 bit, AMD Opteron 32 bit, AMD Opteron 64 bit
Controller-drive trays	<ul style="list-style-type: none"><li>■ E2600</li><li>■ E5400</li></ul>

Host adapters	Emulex <ul style="list-style-type: none"> <li>■ LP11000, LP11002</li> <li>■ LPE12000/12002</li> </ul>
	Qlogic <ul style="list-style-type: none"> <li>■ QLA246x</li> <li>■ QLE246x</li> <li>■ QLE2560/2562</li> </ul>
	Sun <ul style="list-style-type: none"> <li>■ SG-XPCI1FC-QF4 (QLA2460)</li> <li>■ SG-XPCI2FC-QF4 (QLA2462)</li> <li>■ SG-XPCIE1FC-QF4 (QLE2460)</li> <li>■ SG-XPCIE2FC-QF4 (QLE2462)</li> <li>■ SG-XPCIE1FC-QF8-N (QLe2560)</li> <li>■ SG-XPCIE2FC-QF8-N (QLe2562)</li> <li>■ SG-XPCI1FC-EM4 (LP11000)</li> <li>■ SG-XPCI2FC-EM4 (LP11002)</li> <li>■ SG-XPCIE1FC-EM4 (Lpe11000)</li> <li>■ SG-XPCIE2FC-EM4 (Lpe11002)</li> <li>■ SG-XPCIE2FC-EM8-Z Dual Port (LPe12002)</li> <li>■ SG-XPCIE1FC-EM8-Z Single Port (LPe12000)</li> </ul>
Fibre Channel configurations	<ul style="list-style-type: none"> <li>■ Direct connect</li> <li>■ Fabric</li> </ul>
JRE version	1.6.x
Rootboot supported?	Yes, where supported by the HBA
SCSI driver	sd/ssd/Leadville
I/O path failover	<ul style="list-style-type: none"> <li>■ Solaris 10 MPxIO</li> <li>■ Solaris 11 MPxIO</li> </ul> ALUA is supported only on Solaris 11
Preferred failover mode	<ul style="list-style-type: none"> <li>■ Solaris 10 u9 non-TPGS</li> <li>■ Solaris 11 TPGS/ALUA</li> </ul>
Node failover	SunCluster 3.2 or latest
Providers	SMI

## Installing the Storage Management Software on the Solaris OS

Use this procedure to install the storage management software packages on the Solaris OS. Refer to the *Failover Drivers Guide for SANtricity ES Storage Manager* for information about failover driver installation and configuration on the Solaris OS.

---

**ATTENTION Possible loss of data** – Downgrades from storage management software version 10.83 to a previous version can cause data loss and are not supported.

---

Modify these instructions as required for your specific installation.

1. Make sure that you have root privileges, which are required to install the software.
2. The installation file, `SMIA-SOL.bin`, is available either from your storage vendor's web site or from an installation DVD. Depending on the source of the installation file, select one of the following choices:
  - If you are obtaining the installation file from a web site, download the file to your management station. Skip to step 6.
  - If the installation file is on a DVD, continue with step 3.
3. Insert the installation DVD into the DVD-ROM drive.
4. If necessary, mount the DVD-ROM drive.

In this procedure, the installation DVD is mounted at `/mnt/dvdrom`.

```
mount -F hsfs -r /dev/c#t#d0s2 /mnt/dvdrom
```

---

**NOTE** This mount point is shown here only as an example. You might need to modify this command for your operating system. If you need more information about mounting devices on your operating system, refer to the documentation that came with your operating system.

---

5. To change to the DVD-ROM drive, type this command, and press **Enter**. In this command, `<dvdrom>` is the name of the DVD-ROM drive where the DVD is mounted.

```
cd <dvdrom>
```

6. Uncompress the installation packages to an existing folder on your hard drive.
7. To change to the installation directory, type this command, and press **Enter**. In this command, `<install>` is the name of the directory where the installation files are located.

```
cd <install>
```

8. At the prompt, type this command, and press **Enter**. In this command, `SMIA-SOL.bin` is the name of the installation program on the CD.

```
SMIA-SOL.bin
```

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

9. Click **Next**.

The **License Agreement** window appears.

10. Select the option that accepts the terms of the License Agreement.
11. Click **Next**.

The **Select Installation Type** window appears.

12. 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.

---

**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.

13. Click **Next**.

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

14. 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.

---

15. 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 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.

- a. 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.

- b. To determine whether the RDAC driver package resides on your system, type this command at the prompt. In this command, *<rdac>* is the RDAC package name.

```
pkginfo | grep <rdac>
```

Look for the storage management softwareRDAC package.

2. 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.
3. For each package you installed, repeat step 1 through step 2.
4. 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 the Storage Management Software on the 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 the Linux OS

# 4

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

## System Requirements for Linux

Review these specifications to make sure that your system meets the minimum general requirements.

Operating system version for I/O attached hosts	<ul style="list-style-type: none"><li>■ RHEL 5.8</li><li>■ RHEL 6.3</li><li>■ SLES 11.2</li></ul>
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 32 bit, Intel Xeon 64 bit, AMD Opteron 32 bit, AMD Opteron 64 bit
Controller-drive trays	<ul style="list-style-type: none"><li>■ E2600</li><li>■ E5400</li><li>■ E5500</li></ul>

Host adapters	<p>Emulex</p> <ul style="list-style-type: none"> <li>■ LP11000, LP11002</li> <li>■ LP1150</li> <li>■ LPe11000, LPe11002</li> <li>■ LPe1150</li> <li>■ LPe12000/12002</li> <li>■ LPe1250</li> </ul> <p>Qlogic</p> <ul style="list-style-type: none"> <li>■ QLA246x</li> <li>■ QLE246x</li> <li>■ QLE256</li> </ul> <p>Brocade</p> <ul style="list-style-type: none"> <li>■ 415</li> <li>■ 425</li> <li>■ 815,</li> <li>■ 825</li> </ul>
SAS host adapters	<p>LSI</p> <ul style="list-style-type: none"> <li>■ 3801E</li> <li>■ 3801X</li> <li>■ 3442E</li> <li>■ 3442X</li> <li>■ 9200-8e</li> <li>■ LSI 9207-8e</li> </ul>

iSCSI host connections	<p>1 Gb/s</p> <ul style="list-style-type: none"> <li>■ Broadcom NetXtreme II 5708</li> <li>■ Broadcom NetXtreme II 5709</li> <li>■ Broadcom NetXtreme LF 5721</li> <li>■ Intel PRO/1000MT Dual Port</li> <li>■ Intel PRO/1000PT Dual port</li> </ul> <p>10 Gb/s</p> <ul style="list-style-type: none"> <li>■ Brocade 1020</li> <li>■ Qlogic 8142</li> <li>■ Emulex OCE10102</li> <li>■ Intel 10Gb XSFR</li> <li>■ Intel 10Gb AFDA Server Adapter</li> <li>■ Broadcom NetXtreme II 57712</li> <li>■ Broadcom NetXtreme II 57711</li> </ul>
Fibre Channel configurations	Fabric
JRE version	1.6.x
Rootboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)
SCSI driver	sd_mod
I/O path failover	<p>DMMP (RDAC Handler with ALUA support)</p> <p>For ALUA support, you must install a patch for RHEL 6.1 or SLES 11.1. Refer to the <i>Failover Drivers Guide</i> for instruction to install the requisite patches.</p> <p>ALUA is supported without a patch for RHEL 6.3 and SLES 11.2</p>
Preferred failover mode	DMMP-ALUA
Node failover	<ul style="list-style-type: none"> <li>■ SIOS (SteelEye) LifeKeeper</li> <li>■ Native RH Clustering</li> </ul>
Providers	SMI

## System Requirements for Linux with InfiniBand

Operating system version for I/O attached hosts	<ul style="list-style-type: none"><li>■ RHEL 6.3</li><li>■ SLES 5.8</li></ul>
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 32 bit, Intel Xeon 64 bit, AMD Opteron 32 bit, AMD Opteron 64 bit
Controller-drive trays	<ul style="list-style-type: none"><li>■ E5400</li><li>■ E5500</li></ul>

Host adapters	<p>ConnectX IB QDR PCI Express Adapter Cards</p> <ul style="list-style-type: none"> <li>■ MHQH19-XSC</li> <li>■ MHQH19-XTC</li> <li>■ MHQH29-XSC</li> <li>■ MHQH29-XTC</li> </ul>
	<p>ConnectX-2 QDR PCI Express Adapter Cards</p> <ul style="list-style-type: none"> <li>■ MHQH19B-XSR</li> <li>■ MHQH19B-XTR</li> <li>■ MHQH29B-XSR</li> <li>■ MHQH29B-XTR</li> <li>■ MHQH19C-XSR</li> <li>■ MHQH19C-XTR</li> <li>■ MHQH29C-XSR</li> <li>■ MHQH29C-XTR</li> </ul>
	<p>ConnectX-3 QDR and FDR PCI Express Adapter Cards</p> <ul style="list-style-type: none"> <li>■ MCX353A-QCAT</li> <li>■ MCX353A-FCAT</li> <li>■ MCX354A-QCAT</li> <li>■ MCX354A-FCAT</li> </ul>

Switches	Mellanox Switches <ul style="list-style-type: none"> <li>■ SX6036</li> <li>■ SX6536</li> <li>■ IS5035</li> <li>■ IS500</li> <li>■ IS5200</li> <li>■ IS5300</li> <li>■ IS5600</li> <li>■ 4036</li> <li>■ 4036E</li> <li>■ 4200</li> <li>■ 4799</li> </ul> Qlogic Switches <ul style="list-style-type: none"> <li>■ 12300</li> <li>■ 12800</li> </ul>
Fibre Channel configurations	Fabric
JRE version	1.6.x
Rootboot supported?	No
SCSI driver	Mellanox OFED driver
I/O path failover	DMMP only - ALUA
Preferred failover mode	ALUA
Node failover	Lustre
Providers	None

## Installing the Storage Management Software on the 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 is graphical user interface (GUI) based.

---

**ATTENTION Possible loss of data** – Downgrades from storage management software version 10.83 to a previous version can cause data loss and are not supported.

---

---

**NOTE** Refer to the *Failover Drivers Guide for SANtricity ES Storage Manager* for information about failover driver installation and configuration on the Linux OS. You must complete manual procedures for correct failover driver installation.

---

**NOTE** The storage management software supports the use of the storage array as a boot device.

---

Modify these instructions as required for your specific installation.

1. Make sure that you have root privileges, which are required to install the software.
2. The installation file, `SMIA-LINUX.bin`, is available either from your storage vendor's web site or from an installation DVD. Depending on the source of the installation file, select one of the following choices:
  - If you are obtaining the installation file from a web site, download the file to your management station. Skip to step 5.
  - If the installation file is on a DVD, continue with step 3.
3. Insert the installation DVD into the DVD-ROM drive.
4. If necessary, mount the DVD-ROM drive.

In the example command that follows, the installation DVD is mounted at `/mnt`.

```
mount /dev/dvdrom /mnt
```

---

**NOTE** This mount point is shown here only as an example. You might need to modify this command for your operating system. If you need more information about mounting devices on your operating system, refer to the documentation that came with your operating system.

---

5. At the prompt, type this command, and press **Enter**. In this command, `SMIA-LINUX.bin` is the name of the installation program on the DVD or the name of the downloaded file on the host.

```
sh SMIA-LINUX.bin
```

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**.

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

11. Click **Next**.

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

12. 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.

---

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

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

14. Do you want to manually install the RDAC package?
  - **Yes** – Go to step 15.
  - **No** – Go to [Checking the Installation on the Linux OS](#).

15. 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` directory (2.4 kernel) or the `linuxrdac-09.01.Bx.xx` directory (2.6 kernel).

- 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 clean the directory, type this command, and press **Enter**.

```
make clean
```

- d. To compile the modules, type this command, and press **Enter**:

```
make
```

- e. To install RDAC, type this command, and press **Enter**.

```
make install
```

- f. 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.

- g. Read the `readme.txt` file in the `linuxrdac` directory to complete the RDAC installation process.

---

**NOTE** For further details about installing RDAC, refer to the *Failover Drivers User Guide*.

---

## Checking the Installation on the 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 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 storage management software for more information about how to manage your storage array.

## Uninstalling Storage Management Software on the 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 "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**.

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. To completely uninstall storage management software, reverse the changes you made in the boot-loader configuration file.
9. Click **Done**.

The uninstallation process is complete.



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

## System Requirements for Windows Server 2008, Windows Server 2012, Hyper-V and Vista

Operating system version for I/O attached hosts	<p>Windows Server 2008 R2 SP1 (64-bit only)</p> <ul style="list-style-type: none"> <li>■ Standard server and core</li> <li>■ Enterprise server and core</li> <li>■ Datacenter server and core</li> <li>■ Web edition (client only, no failover supported)</li> <li>■ Foundation server and core</li> </ul> <p>Hyper-V Server 2008 R2 SP1 (standalone)</p> <p>Windows Server 2008 R2 SP1 Hyper-V (add on to 2008)</p> <p>Refer to the applicable Microsoft documentation for guest operating systems supported on Hyper-V</p>
Operating system version for management stations only (no I/O attached hosts)	<ul style="list-style-type: none"> <li>■ Windows Vista SP1</li> <li>■ Windows 7</li> <li>■ Windows XP</li> </ul>
Processor Support	Intel Xeon 64 bit, AMD Opteron 64 bit
Controller-drive trays	<ul style="list-style-type: none"> <li>■ E2600</li> <li>■ E5400</li> <li>■ E5500*</li> </ul> <p>*The E5500 controller-drive trays support host connections to Windows host only if the hosts runs Windows Server 2012.</p>

Fibre Channel host adapters	Emulex
	<ul style="list-style-type: none"> <li>■ LP11000, LP11000DC</li> <li>■ LP101</li> <li>■ LP1150</li> <li>■ LPe11000, LPe11002</li> <li>■ LPe1150</li> <li>■ LPe12000/12002</li> <li>■ LPe1250</li> </ul>
	Qlogic
SAS host adapters	<ul style="list-style-type: none"> <li>■ QLA246x</li> <li>■ QLE246x</li> <li>■ QLE2560/2562</li> </ul>
	Brocade
	<ul style="list-style-type: none"> <li>■ 415</li> <li>■ 425</li> <li>■ 815,</li> <li>■ 825</li> </ul>
	LSI
	<ul style="list-style-type: none"> <li>■ 3801E</li> <li>■ 3801X</li> <li>■ 3442E</li> <li>■ 3442X</li> <li>■ SAS9200-8e</li> <li>■ 9207-8e</li> </ul>

iSCSI host connections	1 Gb/s <ul style="list-style-type: none"> <li>■ Broadcom NetXtreme II 5708</li> <li>■ Broadcom NetXtreme II 5709</li> <li>■ Broadcom NetXtreme LF 5721</li> <li>■ Intel PRO/1000MT Dual Port</li> <li>■ Intel PRO/1000PT Dual port</li> </ul> 10 Gb/s <ul style="list-style-type: none"> <li>■ Brocade 1020</li> <li>■ Qlogic 8142</li> <li>■ Qlogic8242</li> <li>■ Intel 10Gb XSFR</li> <li>■ Intel 10Gb AFDA Server Adapter</li> <li>■ Broadcom NetXtreme II 57712</li> <li>■ Broadcom NetXtreme II 57711</li> </ul>
Fibre Channel configurations	Fabric
JRE version	1.6.x
Rootboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)
SCSI driver	Storport
I/O path failover	Microsoft MPIO with Net App DSM
Preferred failover mode	ALUA
Node failover	MicroSoft Cluster Server (16 nodes)
Providers	<ul style="list-style-type: none"> <li>■ SM</li> <li>■ VDS/VSS</li> </ul>

## Installing the Storage Management Software on the Windows OS

Use this procedure to install the storage management software packages on the Windows OS. Refer to the *Failover Drivers User Guide* for information about failover driver installation and configuration on the Windows OS.

---

**ATTENTION Possible loss of data** – Downgrades from storage management software version 10.83 to a previous version can cause data loss and are not supported.

---

---

**ATTENTION 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.

---

**NOTE** Before you start the primary server of a server cluster, complete all applicable configuration procedures for each system. This version of the storage management software does not support 64-bit versions of the Windows XP operating system. All administrator functions using the storage management software must be performed from a 32-bit storage management station.

---

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.

---

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

---

**NOTE** If you are installing the Windows boot device on a storage array, refer to the boot device installation procedures in *Initial Configuration and Software Installation for SANtricity ES Storage Manager*. Determine where to install the software before you begin this procedure. You will need the boot device installation procedures from *Initial Configuration and Software Installation for SANtricity ES Storage Manager* to perform step 12 in this procedure.

---

1. Before you install this software, close all other programs.
2. The installation file, SMIA-WS32.exe or SMIA-WS64.exe, is available either from your storage vendor's web site or from an installation DVD. Depending on the source of the installation file, select one of the following choices:
  - If you are obtaining the installation file from a web site, download the file to your management station. Skip to step 7.
  - If the installation file is on a DVD, continue with step 3.
3. Insert the installation DVD into the DVD-ROM drive.
4. From the desktop, double-click the name of the DVD, such as SANSM960.  
  
The DVD window appears.
5. Open the install folder.
6. Select your operating system architecture (32-bit or 64-bit), and open the appropriate folder.

7. To launch the installer, double-click the .exe file, such as SMIA-WS32.exe.

The **InstallAnywhere** dialog appears while the software installs. When the software is installed, the **Introduction** window appears.

8. Click **Next**.

The **License Agreement** window appears.

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

10. Click **Next**.

The **Choose Install Folder** window appears, which identifies the default installation location.

11. Click **Next**.

The **Select Installation Type** window appears.

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

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

---

**NOTE** If you want to install the Windows boot device on a storage array, select **Management Station**. This selection installs the software on a storage management station that is attached to the storage array where the boot device will be installed. Complete the boot device installation procedures in *Initial Configuration and Software Installation for SANtricity ES Storage Manager*. After you finish the boot device installation procedures, return to this procedure.

---

- **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.

13. Click **Next**.

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

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

The **Automatically Start Monitor?** window appears.

15. 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.

16. Click **Next**.

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

17. 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.

18. Did the **Security Alert** dialog appear?

- **Yes** – Click **Yes**, and go to step 19.
- **No** – Go to step 19.

---

**NOTE** 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](#)” on page 39. 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.

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

20. Click **Done**.

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

---

**NOTE** 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\Storage 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 >> Programs >> SMclient**.

Refer to the online help topics in 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.

---

---

**NOTE** 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:

---

**ATTENTION 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 controller tray, wait 30 seconds for the controller tray 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?

---

**ATTENTION 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.

---

**ATTENTION 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 Asymmetric Logical Unit Access (ALUA) with the VMware OS 6

---

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, SANtricity ES is installed on one of the guest OSs running over VMware. Use the procedures in the guide for the supported guest OS to upgrade SANtricity ES on such a management station.

## System Requirements for VMware

Systems running VMware are supported only as I/O attached hosts. You must run SANtricity ES 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.

Operating system version for I/O attached hosts	VMware <ul style="list-style-type: none"> <li>■ 4.1 u3</li> <li>■ 5.0 u2</li> <li>■ 5.1 (M/N release)</li> </ul> Refer to the applicable VMware documentation for guest operating systems supported.
Processor Support	Intel Xeon 64 bit, AMD Opteron 64 bit
Controller-drive trays	<ul style="list-style-type: none"> <li>■ E2600</li> <li>■ E5400</li> </ul>
JRE version	1.6.x
Rootboot supported?	Yes, where supported by the HBA (not with iSCSI host connections)
I/O path failover	VMware Native failover - TPGS
Preferred failover mode	SATP-ALUA
Node failover	<ul style="list-style-type: none"> <li>■ VMware HA</li> <li>■ VMware FT (fault tolerance)</li> </ul>
Providers	None

## Installing ALUA Support for VMware Versions ESX4.1U3, ESXi5.0U1, 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 10.86.
2. Upgrade the controllers in the storage array to controller firmware version 7.86 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 command `#esxcli nmp device list` 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 command `#esxcli storage nmp device list` 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*.



Copyright © 2012 NetApp, Inc. All rights reserved.

