



SANtricity System Manager 11.30

Upgrade Guide

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Contents

Deciding whether to use this guide	4
Controller software and firmware upgrades	5
Workflow for controller software and firmware upgrade	6
Upgrade controller software and firmware	7
Activate controller software and firmware	8
Drive firmware upgrades	10
Upgrade drive firmware	11
Review the possible software and firmware upgrade errors	13
Copyright information	15
Trademark information	16
How to send comments about documentation and receive update notifications	17

Deciding whether to use this guide

This guide describes how to upgrade SANtricity System manager, controller firmware and NVSRAM, and IOM/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 System Manager. This guide assumes that you are upgrading an existing storage array that has previously been installed and is functioning normally.

Related procedures

In some configurations, SANtricity System Manager might be used on a storage system that uses components of SANtricity Storage Manager that must be upgraded separately. Check whether any of the following conditions apply:

- If your storage system is part of a storage network that includes multiple storage systems, you might use the SANtricity Storage Manager Enterprise Management Window (EMW) for unified management of all of your storage systems. In this case, upgrade SANtricity Storage Manager. See the procedures in [SANtricity Storage Manager 11.30 Upgrade Guide](#).
- If you use the command line interface (CLI) or scripts that rely on the CLI to help manage your storage system, upgrade SANtricity Storage Manager. See the procedures in [SANtricity Storage Manager 11.30 Upgrade Guide](#).
- If you use the command line interface (CLI) or scripts that rely on the CLI to help manage your storage system, upgrade SANtricity Storage Manager. See the procedures in [SANtricity Storage Manager 11.30 Upgrade Guide](#).
- If host running operating systems other than Microsoft Windows or AIX have I/O connections to your storage system, upgrade the multipath drivers for those hosts. See the procedures in the Power Guide for your operating system (for example, [SANtricity 11.30 Installing and Configuring for Linux Power Guide for Advanced Users](#)).

Where to Find the Latest Information About the Product

To access the latest information about this product and other documentation for E-series and EF-series storage arrays, go to the [NetApp Support Site](#).

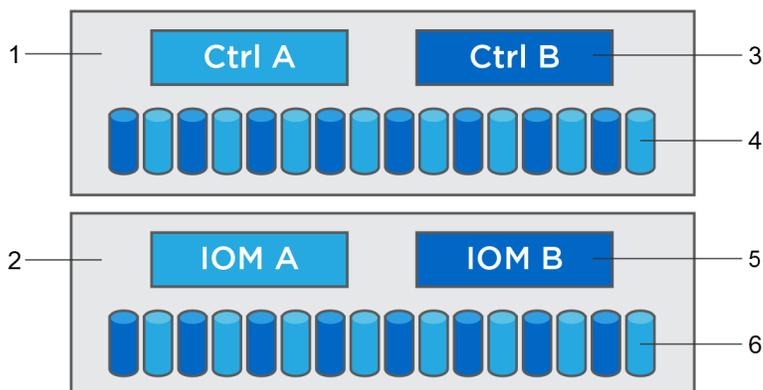
Controller software and firmware upgrades

You can upgrade your storage array's software and firmware to make sure you have all the latest features and bug fixes.

Components included in the SANtricity OS controller software upgrade

Several storage array components contain software or hardware that you might want to upgrade occasionally.

- **Management software** – System Manager is the software that manages the storage array.
- **Controller firmware** – Controller firmware manages the I/O between hosts and volumes.
- **Controller NVSRAM** – Controller NVSRAM is a controller file that specifies the default settings for the controllers.
- **IOM firmware** – The input/output module (IOM) firmware manages the connection between a controller and a drive shelf. It also monitors the status of the components.
- **Supervisor software** – Supervisor software is the virtual machine on a controller in which the software runs.



1	Controller shelf
2	Drive shelf
3	Software, controller firmware, controller NVSRAM, supervisor software
4	Drive firmware
5	IOM firmware
6	Drive firmware

You can view your current software and firmware versions with the Software and Firmware Inventory command.

As part of the upgrade process, the host's multipath/failover driver and/or HBA driver might also need to be upgraded so the host can interact with the controllers correctly. To determine if this is the case, see the [NetApp Interoperability Matrix Tool](#).

When to stop I/O

If your storage array contains two controllers and you have a multipath driver installed, the storage array can remain processing I/O while the upgrade occurs. During the upgrade, controller A fails over all of its LUNs to controller B, upgrades, takes back its LUNs and all of controller B's LUNs, and then upgrades controller B. After the upgrade completes, you might need to manually redistribute volumes between the controllers to ensure volumes return to the correct owning controller.

Pre-upgrade health check

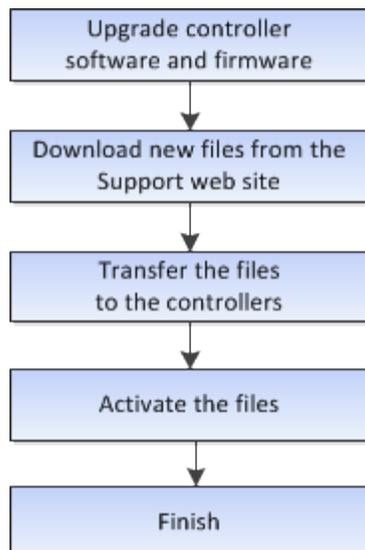
A pre-upgrade health check runs as part of the upgrade process. The pre-upgrade health check assesses all storage array components to make sure the upgrade can proceed. The following conditions might prevent the upgrade:

- Failed assigned drives
- Hot spares in use
- Incomplete volume groups
- Exclusive operations running
- Missing volumes
- Controller in Non-optimal status
- Excess number of event log events
- Configuration database validation failure
- Drives with old versions of DACstore

You also can run the pre-upgrade health check separately without doing an upgrade.

Workflow for controller software and firmware upgrade

In SANtricity System Manager, you can upgrade the controller software and firmware by following these steps.



Upgrade controller software and firmware

You can upgrade your storage array's software and firmware to make sure you have all the latest features and bug fixes.

Before you begin

- You have read the *SANtricity Software version 11.30 Product Release Notes* document and the `readme.txt` file and have determined that you want to do the upgrade.
- You know whether you want to upgrade your IOM firmware.
Normally, you want to upgrade all components at the same time. However, you might not want to upgrade your IOM firmware if you do not want to upgrade it as part of the SANtricity OS controller software upgrade or if technical support has instructed you to downgrade your IOM firmware (you can downgrade only using the command line interface).
- You know whether you want to upgrade the controller NVSRAM file.
Normally, you want to upgrade all components at the same time. However, you might not want to upgrade the controller NVSRAM file if your file has either been patched or is a custom version and you do not want to overwrite it.
- You know whether you want to activate now or later.
Reasons for activating later might include:
 - **Time of day** – Activating the software and firmware can take a long time, so you might want to wait until I/O loads are lighter. The controllers fail over during activation so performance might be lower than usual until the upgrade completes.
 - **Type of package** – You might want to test the new software and firmware on one storage array before upgrading the files on other storage arrays.

About this task

Perform this operation only when instructed to do so by technical support.

Attention: Risk of data loss or risk of damage to the storage array — Do not make changes to the storage array while the upgrade is occurring. Maintain power to the storage array.

Steps

1. If your storage array contains only one controller or you do not have a multipath driver installed, stop I/O activity to the storage array to prevent application errors. If your storage array has two controllers and you have a multipath driver installed, you do not need to stop I/O activity.
2. Select **Support > Upgrade Center**.
3. Download the new file from the Support web site to your management client.
 - a. In the area labeled SANtricity OS Controller Software upgrade, click **NetApp Support**.
 - b. On the Support web site, click the **Downloads** tab, and then select **Software**.
 - c. Select **E-Series/EF-Series SANtricity OS Controller Software**.
 - d. Follow the remaining instructions on the web site.

The file to download has a filename similar to E28xx_1130 with a `.zip` or `.tar.gz` extension.

4. If you do NOT want to upgrade the IOM firmware at this time, click **Suspend IOM Auto-Synchronization**.
If you have a storage array with a single controller, the IOM firmware is not upgraded.
5. Under SANtricity OS Controller Software upgrade, click **Begin Upgrade**.
6. If you want to transfer the files to the controller without activating them, select the **Transfer now but activate upgrade later** check box.
7. Click **Browse**, and select the new file that you downloaded from the Support web site.
SANtricity OS controller software files have a filename similar to `RCB_11.30_280x.dlp`.
8. If you want to upgrade the controller NVSRAM at the same time, select the **Transfer Controller NVSRAM file with upgrade** check box, and then click **Browse** to select the new NVSRAM file that you downloaded from the Support web site.
Controller NVSRAM files have a filename similar to `N2800-830000-000.dlp`.
9. Click **Start**, and confirm that you want to perform the operation.
You can cancel the operation during the pre-upgrade health check, but not during transferring or activating.

The pre-upgrade health check begins. If the pre-upgrade health check passes, the upgrade process proceeds to transferring the files and activating the files. If the pre-upgrade health check fails, use the Recovery Guru or contact technical support to resolve the problem.

On successful completion of the pre-upgrade health check, transfer and activation, if selected, occurs. The time it takes to upgrade depends on your storage array configuration and the components that you are upgrading.
10. (Optional) To see a list of what was upgraded, click **Save Log**.
The file is saved in the Downloads folder for your browser with the name `latest-upgrade-log-timestamp.txt`.

After you finish

Verify that all components appear on the Hardware page.

Verify the new software and firmware versions by performing the Software and Firmware Inventory command.

If you upgraded controller NVSRAM, any custom settings that you have applied to the existing NVSRAM are lost during the process of activation. You need to apply the custom settings to the NVSRAM again after the process of activation is complete.

Activate controller software and firmware

You can choose to activate the upgrade files immediately or wait until a more convenient time.

About this task

You can download and transfer the files without activating them. You might choose to activate later for these reasons:

- **Time of day** – Activating the software and firmware can take a long time, so you might want to wait until I/O loads are lighter. The controllers fail over during activation so performance might be lower than usual until the upgrade completes.
- **Type of package** – You might want to test the new software and firmware on one storage array before upgrading the files on other storage arrays.

When you have software and firmware that has been transferred but not activated, you see a notification in the Notifications area of System Manager's Home page and also on the Upgrade Center page.

Attention: You cannot stop the activation process after it starts.

Steps

1. Select **Support > Upgrade Center**.
2. In the area labeled SANtricity OS Controller Software upgrade, click **Activate**, and confirm that you want to perform the operation.

You can cancel the operation during the pre-upgrade health check, but not during activating.

The pre-upgrade health check begins. If the pre-upgrade health check passes, the upgrade process proceeds to activating the files. If the pre-upgrade health check fails, use the Recovery Guru or contact technical support to resolve the problem.

On successful completion of the pre-upgrade health check, activation occurs. The time it takes to activate depends on your storage array configuration and the components that you are activating.

3. (Optional) To see a list of what was upgraded, click **Save Log**.

The file is saved in the Downloads folder for your browser with the name `latest-upgrade-log-timestamp.txt`.

After you finish

Verify that all components appear on the Hardware page.

Verify the new software and firmware versions by performing the Software and Firmware Inventory command.

If you upgraded controller NVSRAM, any custom settings that you have applied to the existing NVSRAM are lost during the process of activation. You need to apply the custom settings to the NVSRAM again after the process of activation is complete.

Drive firmware upgrades

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

Online and offline drive firmware upgrades

There are two types of drive firmware upgrade methods: online and offline.

Online

During an online upgrade, drives are upgraded sequentially, one at a time. The storage array continues processing I/O while the upgrade occurs. You do not have to stop I/O. If a drive can do an online upgrade, the online method is used automatically.

Drives that can do an online upgrade include the following:

- Drives in an Optimal pool
- Drives in an Optimal redundant volume group (RAID 1, RAID 5, and RAID 6)
- Unassigned drives
- Standby hot spare drives

Doing an online drive firmware upgrade can take several hours exposing the storage array to potential volume failures. Volume failure could occur in these cases:

- In a RAID 1 or RAID 5 volume group, one drive fails while a different drive in the volume group is being upgraded.
- In a RAID 6 pool or volume group, two drives fail while a different drive in the pool or volume group is being upgraded.

Offline (parallel)

During an offline upgrade, all drives of the same drive type are upgraded at the same time. This method requires stopping I/O activity to the volumes associated with the selected drives. Because multiple drives can be upgraded concurrently (in parallel), the overall downtime is significantly reduced. If a drive can do only an offline upgrade, the offline method is used automatically.

The following drives **MUST** use the offline method:

- Drives in a non-redundant volume group (RAID 0)
- Drives in a non-optimal pool or volume group
- Drives in SSD cache

Compatibility

Each drive firmware file contains information about the drive type on which the firmware runs. You can download the specified firmware file only to a compatible drive. System Manager automatically checks compatibility during the upgrade process.

Upgrade drive firmware

You can upgrade your drives' firmware to make sure you have all the latest features and bug fixes.

Before you begin

- You have backed up your data using disk-to-disk backup, volume copy (to a volume group not affected by the planned firmware upgrade), or a remote mirror.
- If the drives are capable of only an offline upgrade, I/O activity to all volumes associated with the drives is stopped.
- The storage array has an Optimal status.
- All drives have an Optimal status.
- No configuration changes are running on the storage array.

Steps

1. Select **Support > Upgrade Center**.
2. Download the new files from the Support web site to your management client.
 - a. Under Drive Firmware upgrade, click **NetApp Support**.
 - b. On the Support web site, click the **Downloads** tab, and then select **Firmware**.
 - c. Select **Disk Drive & Firmware Matrix**.
 - d. Follow the remaining instructions on the web site.
3. Under Drive Firmware upgrade, click **Begin Upgrade**.
A dialog box appears which lists the drive firmware files currently in use.
4. Click **Browse**, and select the new drive firmware files that you downloaded from the Support web site.

Drive firmware files have a filename similar to
D_HUC101212CSS600_30602291_MS01_2800_0002 with the extension .zip or .tar.gz.

You can select up to four drive firmware files one at a time. If more than one drive firmware file is compatible with the same drive, you get a file conflict error. Decide which drive firmware file you want to use for the upgrade and remove the other one.
5. Click **Next**.

A dialog box appears which lists the drives that you can upgrade with the selected files. Only drives that are compatible appear. If no drives appear, you do not have any compatible drives. To see only drives that are capable of doing an online upgrade, select the **Display only drives capable of online upgrades** check box.
6. In the first column of the table, select the check box next to each drive that you want to upgrade or select the check box in the table header to select all drives.

Notice the Upgrade Capability column. If a drive can do both online and offline upgrades, an online upgrade occurs. If a drive can do only an offline upgrade, an offline upgrade occurs. Offline upgrades require that you stop I/O to the volume first.
7. Click **Start**, and confirm that you want to perform the operation.

8. If you need to stop the upgrade, click **Stop**.

Any firmware downloads currently in progress complete. Any firmware downloads that have not started are canceled.

Attention: Stopping the drive firmware upgrade might result in data loss or unavailable drives.

9. (Optional) To see a list of what was upgraded, click **Save Log**.

The file is saved in the Downloads folder for your browser with the name `firmware_upgrade_log.log`. If you stopped the upgrade operation, the log file tells you which drives were upgraded and which were not.

Review the possible software and firmware upgrade errors

Errors can occur during either the controller software upgrade or the drive firmware upgrade.

Firmware download error	Description	Recommended action
Failed assigned drives	Failed to upgrade an assigned drive in the storage array.	<p>One reason for the failure might be that the drive does not have the appropriate signature. Make sure that the affected drive is an authorized drive. Contact technical support for more information.</p> <p>When replacing a drive, make sure that the replacement drive has a capacity equal to or greater than the failed drive you are replacing.</p> <p>You can replace the failed drive while the storage array is receiving I/O.</p>
Integrated hot spare drives	If the drive is marked as a hot spare and is in use for a volume group, the firmware upgrade process fails.	This error condition must be corrected before you can upgrade the firmware. Launch System Manager and use the Recovery Guru to resolve the problem.
Incomplete volume groups	If any drive that is part of a volume group is bypassed, removed or unresponsive, it is considered an incomplete volume group. An incomplete volume group prevents firmware upgrades.	If one or more volume groups or disk pools are incomplete, you must correct this error condition before you can upgrade the firmware. Launch System Manager and use the Recovery Guru to resolve the problem.
Exclusive operations (other than background media/parity scan) currently running on any volume groups	Cannot upgrade the firmware if any exclusive operations are in progress on a volume.	If one or more exclusive operations are in progress, the operations must complete before the firmware can be upgraded. Use System Manager to monitor the progress of the operations.
Missing volumes	Cannot upgrade the firmware if any volume is missing.	You must correct the missing volume condition before the firmware can be upgraded. Launch System Manager and use the Recovery Guru to resolve the problem.

Firmware download error	Description	Recommended action
Either controller in a state other than Optimal	Cannot upgrade the firmware if either controller is in a state other than optimal.	One of the storage array controllers needs attention. This condition must be corrected before the firmware can be upgraded. Launch System Manager and use the Recovery Guru to resolve the problem.
SPM Verify Database Controller check fails	Cannot upgrade the firmware because the storage partitions mappings database is corrupted.	A storage partitions mapping database error occurred on a controller. Contact technical support to resolve this issue.
Configuration Database Validation (If supported by the storage array's controller version)	Cannot upgrade the firmware because the configuration database is corrupted.	A configuration database error occurred on a controller. Contact technical support to resolve this issue.
MEL Related Checks	Cannot upgrade the firmware because the event log contains errors.	Contact technical support to resolve this issue.
More than 10 DDE Informational or Critical MEL events were reported in the last 7 days	Cannot upgrade the firmware because there are more than 10 DDE informational or critical MEL events reported in the last seven days.	Contact technical support to resolve this issue.
More than 2 Page 2C Critical MEL Events were reported in the last 7 days	Cannot upgrade the firmware because there are more than two page 2C critical MEL Events reported in the last seven days.	Contact technical support to resolve this issue.
More than 2 Degraded Drive Channel Critical MEL events were reported in the last 7 days	Cannot upgrade the firmware because there are more than two degraded drive channel critical MEL events reported in the last seven days.	Contact technical support to resolve this issue.
More than 4 critical MEL entries in the last 7 days	Cannot upgrade the firmware because there are more than four critical event log entries reported in the last seven days.	Contact technical support to resolve this issue.

You can correct some of these conditions by using the Recovery Guru in System Manager. However, for some of the conditions, you might need to contact technical support. The information about the latest controller firmware download is available from the storage array. This information helps technical support to understand the error conditions that prevented the firmware upgrade and download.

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