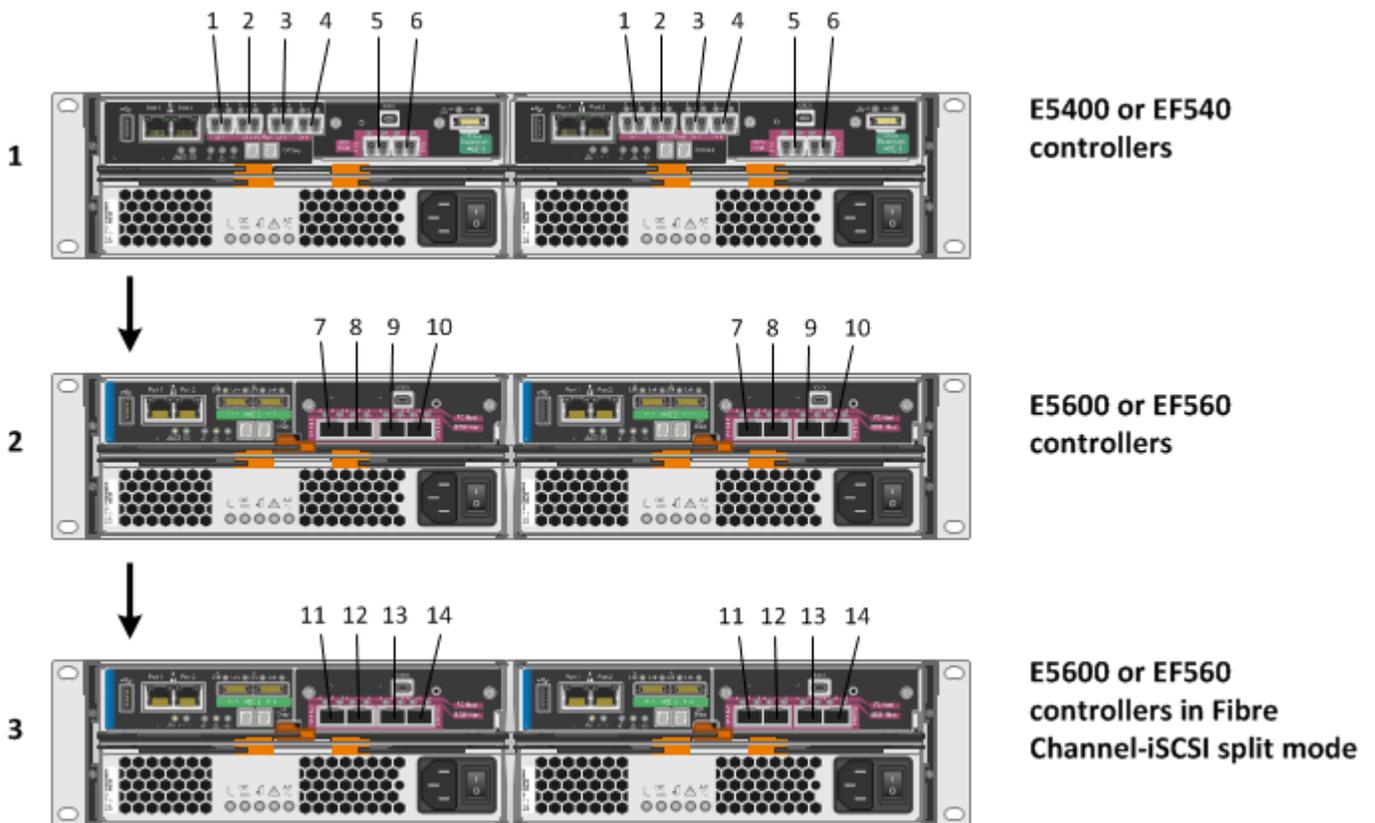


Upgrading E5400 or EF540 Controllers to E5600 or EF560 Controllers when Using Fibre Channel and iSCSI

You can upgrade an E-Series E5400 storage array or an EF-Series EF540 flash array that has Fibre Channel base ports and two-port iSCSI host interface cards (HICs) by installing new E5600 or EF560 controllers and four-port HICs. You can then apply a feature pack in SANtricity® Storage Manager to configure the HICs to operate with two iSCSI ports and two Fibre Channel ports (Fibre Channel-iSCSI split mode).

This document describes how to:

1. Remove the existing E5400 or EF540 controllers with Fibre Channel base ports and iSCSI HICs.
2. Install new E5600 or EF560 controllers with four-port HICs.
3. Apply a feature pack in SANtricity Storage Manager to convert the HICs to Fibre Channel-iSCSI split mode.



Callout number	Port	Step 1. Initial E5400/EF540 configuration	Step 2. Initial E5600/EF560 configuration after hardware upgrade	Step 3. E5600/EF560 configuration after applying the feature pack
1	Base port 1	8 Gb Fibre Channel		
2	Base port 2	8 Gb Fibre Channel		

Callout number	Port	Step 1. Initial E5400/EF540 configuration	Step 2. Initial E5600/EF560 configuration after hardware upgrade	Step 3. E5600/EF560 configuration after applying the feature pack
3	Base port 3	8 Gb Fibre Channel		
4	Base port 4	8 Gb Fibre Channel		
5	HIC port 1	10 Gb iSCSI		
6	HIC port 2	10 Gb iSCSI		
7	HIC port 1		16 Gb Fibre Channel (or 10 Gb iSCSI)	
8	HIC port 2		16 Gb Fibre Channel (or 10 Gb iSCSI)	
9	HIC port 3		16 Gb Fibre Channel (or 10 Gb iSCSI)	
10	HIC port 4		16 Gb Fibre Channel (or 10 Gb iSCSI)	
11	HIC port 1			10 Gb iSCSI
12	HIC port 2			10 Gb iSCSI
13	HIC port 3			16 Gb Fibre Channel
14	HIC port 4			16 Gb Fibre Channel

Considerations for this procedure

Before starting this procedure, be aware of the following:

- You must schedule a downtime maintenance window for this procedure, and you cannot access data on the storage array or flash array until you have successfully completed the upgrade. You must power off the system to replace the controllers.
- You must use out-of-band management to perform this procedure. This procedure is not supported if you use in-band management.
- If you are using the Asynchronous Mirroring feature, you might need to take the precautions described in this document to ensure that the new E5600 or EF560 controllers do not lock down when they first come online.

Before removing E5400 or EF540 controllers

- Upgrade SANtricity Storage Manager to version 11.25 or later. You must have this version of SANtricity Storage Manager or a later version to operate the E5600 or EF560 HICs in Fibre Channel-iSCSI split mode.
- Confirm that the replacement E5600 or EF560 controllers include four-port Fibre Channel HICs or four-port iSCSI HICs. There are additional requirements for the replacement controllers if you are using asynchronous mirroring. For more information, see [Important considerations if you use asynchronous mirroring](#) on page 3.
- Confirm that you have obtained the necessary hardware for the conversion. For example, you might need replacement cables, and you will need new SFP transceivers to support 16 Gb Fibre Channel. Your NetApp Sales Representative can help you determine what hardware you need and help you order the correct parts.

Note: NetApp recommends that you obtain new unified SFP transceivers, which support both 16 Gb Fibre Channel and 10 Gb iSCSI.

- These instructions apply only if you are upgrading the controllers on an E5400 or EF540 system that has Fibre Channel base ports and iSCSI HIC ports. They do not apply if you are upgrading any other E5400 or EF540 configuration.

Steps

1. [Important considerations if you use asynchronous mirroring](#) on page 3
2. [Cabling and SFP considerations for E5400 or EF540 upgrades](#) on page 4
3. [Obtaining the feature pack key](#) on page 6
4. [Preparing to replace the controllers](#) on page 7
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7. [Removing the controller canisters](#) on page 11
8. [Installing new controller canisters](#) on page 14
9. [Applying power](#) on page 15
10. [Verifying the SANtricity OS \(controller firmware\) version](#) on page 17
11. [Applying the feature pack key](#) on page 17
12. [Resuming operations](#) on page 18
13. [Sending an upgrade notification to NetApp](#) on page 19

Related information

[E2700 and E5600 SANtricity Software and Firmware Upgrade Guide](#)

[E-Series System Controller Upgrade Guide](#)

[NetApp E-Series and EF-Series Systems Documentation Center](#)

[NetApp Downloads](#)

[NetApp Interoperability Matrix Tool](#)

Important considerations if you use asynchronous mirroring

If you use the Asynchronous Mirroring feature on an E5400 or EF540 system with Fibre Channel base ports and iSCSI HIC ports, you must take precautions to ensure that the new E5600 or EF560 controllers do not lock down when they first come online.

Important: The considerations in this section apply only if the replacement E5600 or EF560 controllers have a version of SANtricity OS (controller firmware) earlier than 8.25. These considerations do not apply if the replacement controllers have SANtricity OS (controller firmware) version 8.25 or later.

The Asynchronous Mirroring feature requires both the local storage array and the remote storage array to use the same protocol. When you start this procedure, the E5400 or EF540 systems have four Fibre Channel base ports and two iSCSI HIC ports. When you first install the E5600 or EF560 controllers, the four new HIC ports are either all Fibre Channel or all iSCSI. If the protocol that had been used for asynchronous mirroring is missing after the upgrade, SANtricity OS (controller firmware) might lock down the new controllers.

Attention: Possible loss of data access. A controller lock-down will occur and you will be unable to access your data if all of these conditions are true:

- The E5400 or EF540 controllers had been using the Asynchronous Mirroring feature.
- You install E5600 or EF560 controllers that have a version of SANtricity OS (controller firmware) earlier than 8.25.
- When you initially install the replacement E5600 or EF560 controllers (that is, before you apply the feature pack to convert them to Fibre Channel-iSCSI split mode), the HICs do not include the protocol that you had been using for mirroring.

To avoid a controller lock-down during the upgrade, install E5600 or EF560 controllers with SANtricity OS (controller firmware) version 8.25 or later. If the replacement controllers have a version of SANtricity OS (controller firmware) earlier than 8.25 or if you are unsure which firmware version is installed:

- Install E5600 or EF560 controllers with Fibre Channel HIC ports if mirroring occurred over Fibre Channel on the original E5400 or EF540 system.

Original controller	Protocol for mirroring	Controller FRU number for replacement E5600 or EF560
E5400	Fibre Channel	E-X561202A-R6 E5600 controller with four-port 16 Gb Fibre Channel HIC
EF540	Fibre Channel	EF-X561202A-R6 EF560 controller with four-port 16 Gb Fibre Channel HIC

- Install E5600 or EF560 controllers with iSCSI HIC ports if mirroring occurred over iSCSI on the original E5400 or EF540 system.

Original controller	Protocol for mirroring	Controller FRU number for replacement E5600 or EF560
E5400	iSCSI	E-X561206A-R6 E5600 controller with four-port 10 Gb iSCSI HIC
EF540	iSCSI	EF-X561206A-R6 EF560 controller with four-port 10 Gb iSCSI HIC

Important: If you install E5600 or EF560 controllers with iSCSI HIC ports, be aware that if you had been using the Data Assurance (DA) feature for any Fibre Channel hosts, SANtricity OS (controller firmware) temporarily issues out-of-compliance warnings when you apply power to the new controllers. The warnings occur because the DA feature is not supported for iSCSI. The warnings stop and you can continue using the DA volumes as soon as you apply the feature pack to convert the new controllers to Fibre Channel-iSCSI split mode and restore the storage array configuration.

Cabling and SFP considerations for E5400 or EF540 upgrades

Before upgrading to new controllers and HICs, ensure that you have the correct replacement cables and SFP transceivers.

About this task

The following tables list the supported cables for the E5400 and EF540 controllers and for the E5600 and EF560 controllers. Compare your current host cabling to the supported cabling for the new controllers to determine what cables you need. The host bus adapters (HBAs), host channel adapters (HCAs), or Ethernet adapters, as well as switches in the network fabric used to connect your hosts to your storage array, must match the data rates and protocols of the HIC ports.

Table 1: Supported cables for Fibre Channel E5400 and EF540 controllers with iSCSI HICs

HICs and base ports			Cable		
Port location	Data rate and protocol	Number of connectors	Connector	Type	Length
Base ports	8 Gb Fibre Channel	4	SFP	OM2 SW optical	2, 3, 5, 10, 25m
			SFP	OM3 SW optical	50-150m
HIC ports	10 Gb iSCSI	2	SFP+	OM2 optical	2, 3, 5, 10, 25m
			SFP+	OM3 optical	50-150m
			Twin-Ax	passive copper	2-7m

Table 2: Supported cables for E5600 and EF560 controllers with four-port optical HICs

HIC ports		Cable		
Data Rate and Protocol	Number of Connectors	Connector	Type	Length
16 Gb/s Fibre Channel	4	SFP+	OM2 SW optical	2, 3, 5, 10, 25m
		SFP+	OM3 SW optical	50-150m
		SFP+	OS2 LW optical	50-300m
10 Gb/s iSCSI	4	SFP+	OM2 optical	2, 3, 5, 10, 25m
		SFP+	OM3 optical	50-150m
		Twin-Ax	passive copper	2-7m
1 Gb/s iSCSI	4	SFP+ ¹	OM2 optical	2, 3, 5, 10, 25m
		SFP+ ¹	OM3 optical	50-150m
		Twin-Ax	passive copper	2-7m
		RJ-45 ²	passive copper	2-70m

¹Optical cables for 1-Gb/s iSCSI connections require a 1 Gbps SFP.
² Copper cables with RJ-45 connectors for iSCSI connections require an SFP adapter.

The following tables list the supported SFPs for the E5400 and EF540 controllers and for the E5600 and EF560 controllers.

Note: NetApp recommends using unified SFP transceivers for this procedure. Otherwise, you must wait to cable the array until after you have applied the feature pack to convert the HIC to Fibre Channel-iSCSI split mode.

Table 3: Supported SFPs for Fibre Channel E5400 and EF540 controllers with iSCSI HICs

SFP type	Supported data rate	Protocol
10 Gbps	10 Gbps	iSCSI only
8 Gbps	2 Gbps, 4 Gbps, 8 Gbps	Fibre Channel only

Table 4: Supported SFPs for E5600 and EF560 controllers with four-port optical HICs

SFP type	Supported data rate	Protocol
Unified	<ul style="list-style-type: none"> Fibre Channel: 4 Gbps, 8 Gbps, 16 Gbps iSCSI: 10 Gbps 	Fibre Channel or iSCSI
10 Gbps	10 Gbps	iSCSI only
16 Gbps	4 Gbps, 8 Gbps, 16 Gbps	Fibre Channel only
1 Gbps	1 Gbps	iSCSI only

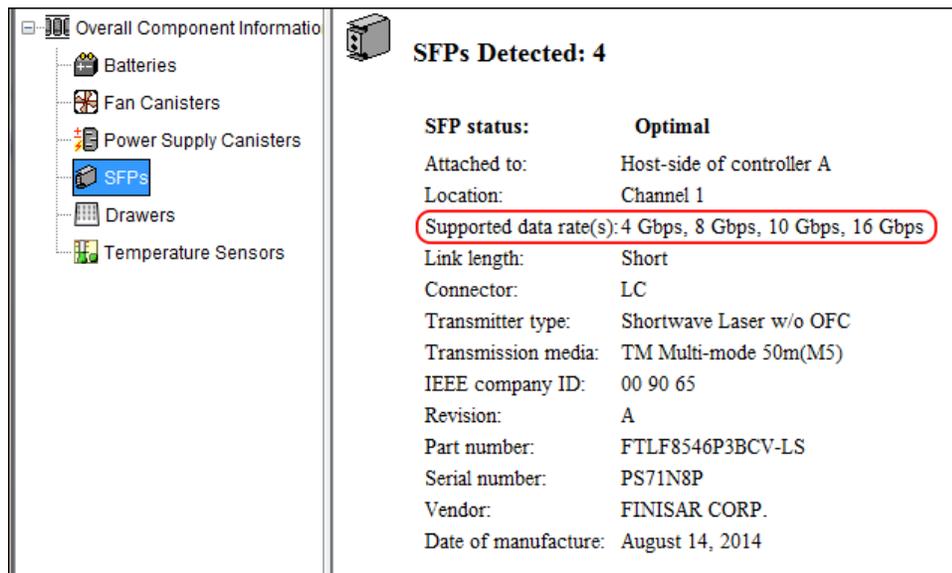
Follow these steps to determine what types of SFPs are currently installed.

Steps

1. From the Array Management Window, select **Hardware > Tray > View/Edit > Controller/Drive components**.

- From the **Overall Component Information** navigator on the left, click **SFPs**.

The SFP status is displayed. The screen shot shows the supported data rates for unified SFPs.



- Locate the **Supported data rate(s)** entry in the results.

Supported data rate	SFP type	Protocol
4 Gbps, 8 Gbps, 10 Gbps, 16 Gbps	Unified	<ul style="list-style-type: none"> Fibre Channel: 4 Gbps, 8 Gbps, 16 Gbps iSCSI: 10 Gbps
10 Gbps	10 Gbps	iSCSI only
4 Gbps, 8 Gbps, 16 Gbps	16 Gbps	Fibre Channel only
2 Gbps, 4 Gbps, 8 Gbps	8 Gbps	Fibre Channel only

Obtaining the feature pack key

You can apply a feature pack key in SANtricity Storage Manager to convert the protocol of a host interface card (HIC) to Fibre Channel-iSCSI split mode. To obtain the feature pack key, you need a Feature Activation Code, the chassis serial number, and the Feature Enable Identifier for your storage system.

Steps

- From the following table, locate the Feature Activation Code for the replacement E5600 or EF560 controllers you installed, and copy the value to a text file.

Controller type	Initial protocol	Feature activation code needed to convert to Fibre Channel-iSCSI split mode
E5600	Fibre Channel	TGI-7MS-ZXC1E
	iSCSI	4GL-QMS-ZYT9N
EF560	Fibre Channel	SGS-DNS-Z48EQ
	iSCSI	PGV-WNS-Z5PL0

2. Locate the serial number for your storage system. You can look at the silver label affixed to the top of your system enclosure, or you can get the serial number from the software, as follows:
 - a. From the Array Management Window, select the **Summary** tab, and click **View Storage Array Profile** in the Monitor area.
 - b. On the Storage Array tab, locate the **Chassis Serial Number**.
 - c. Copy and paste the value into a text file.
3. Locate and record the Feature Enable Identifier for your storage system:
 - a. From the Array Management Window, select **Storage Array > Premium Features** to display the **Premium Features and Feature Pack Information** window.

The 32-digit Feature Enable Identifier is displayed under **Storage Array Feature Information**.
 - b. Copy and paste this 32-digit identifier into a text file.
4. Go to [NetApp License Activation: Storage Array Premium Feature Activation](#), and enter the information required to obtain the feature pack.
 - Feature Activation Code from the table
 - Serial number for the storage system
 - Feature Enable Identifier

Note: The Premium Feature Activation web site includes a link to “Premium Feature Activation Instructions.” Do not attempt to use those instructions for this procedure.
5. Choose whether to receive the key file for the feature pack in an email or to download it directly from the site.
6. Save the key file for later use.

Preparing to replace the controllers

You must perform a number of steps to prepare your system for replacing controllers, including stopping host I/O operations.

Before you begin

You have upgraded the E5400 or EF540 controllers to the latest 8.20 release of SANtricity OS (controller firmware). To determine which firmware version you have, check the **Summary** tab in the Array Management Window. To download new firmware, go to the NetApp Downloads page, and select **Downloads > Software**. Download the correct version of **E-Series/EF-Series SANtricity OS (Controller Firmware)** for your storage array.

Steps

1. If the Drive Security feature is enabled and a security key exists on the storage array, follow these steps to save the key:
 - a. Go to the Array Management Window.
 - b. From the **Storage Array** menu, select **Security > Drive Security > Save Key**.
 - c. Save the security key to a location not on the storage array.
2. Confirm that you have saved the serial number for your storage array.

You need this serial number to send an upgrade notification to NetApp Support.
3. Gather support data about your storage array by using one of these methods:

- Use the storage management software to collect and save a support bundle of your storage array. From the Array Management Window toolbar, select **Monitor > Health > Collect Support Data Manually**. Then, name and specify a location on your system where you want to store the support bundle.
- Use the command line interface (CLI) to run the `save storageArray supportData` command to gather comprehensive support data about the storage array.

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

4. Ensure that no I/O operations are occurring between the storage array and all connected hosts. For example, you can perform these steps:

- Stop all processes that involve the LUNs mapped from the storage to the hosts.
- Ensure that no applications are writing data to any LUNs mapped from the storage to the hosts.
- Unmount all file systems associated with volumes on the array.

Note: The exact steps to stop host I/O operations depend on the host operating system and the configuration, which are beyond the scope of these instructions. If you are not sure how to stop host I/O operations in your environment, consider shutting down the host.

Attention: Possible data loss - If you continue this procedure while I/O operations are occurring, you might lose data.

- 5. If the storage array participates in a mirroring relationship, stop all host I/O operations on the secondary storage array.
- 6. If you are using asynchronous mirroring or synchronous mirroring, perform the following to delete any mirrored pairs and deactivate any mirroring relationships:

Mirroring Relationship	Steps
Synchronous Mirroring (supported for Fibre Channel only)	<ul style="list-style-type: none"> a. In the Array Management Window, select Help > Contents, and search for the topics related to Synchronous Mirroring. b. Follow the guidelines and instructions in the online help to identify all synchronous mirroring volumes that might exist. c. In the Logical pane, right-click a synchronous mirroring volume, and select Copy Services > Synchronous Mirroring > Remove Mirror Relationship. d. Select all volumes, and click Remove. e. After you delete all mirroring relationships, deactivate Synchronous Mirroring by selecting Copy Services > Mirroring > Deactivate. f. Select the synchronous mirroring check box from the pop-up window. <p>Attention: If you do not delete all mirroring relationships before deactivating mirroring, you receive an error.</p>
Asynchronous Mirroring (supported for iSCSI and Fibre Channel only)	<ul style="list-style-type: none"> a. In the Array Management Window, access the online help and search for the topics related to Asynchronous Mirroring. b. Follow the instructions in the online help to remove all asynchronous mirrored pairs from the asynchronous mirror groups. <ul style="list-style-type: none"> Note: When removing each pair, select the Delete all repositories associated with this mirrored pair check box. c. Follow the instructions in the online help to delete all asynchronous mirror groups.

7. Wait for five minutes to allow any data in cache memory to be flushed to disk.

8. In the **Hardware** tab of the **Array Management Window**, select the graphic representation of the storage array, and then select **Monitor > Reports > Operations in Progress**.
9. Wait for all operations shown on the **Operations in Progress** window to complete before continuing with the next step.

Related information

[NetApp Downloads](#)

[SANtricity 11.30 Command Line Interface and Script Commands Programming Guide](#)

Saving the configuration

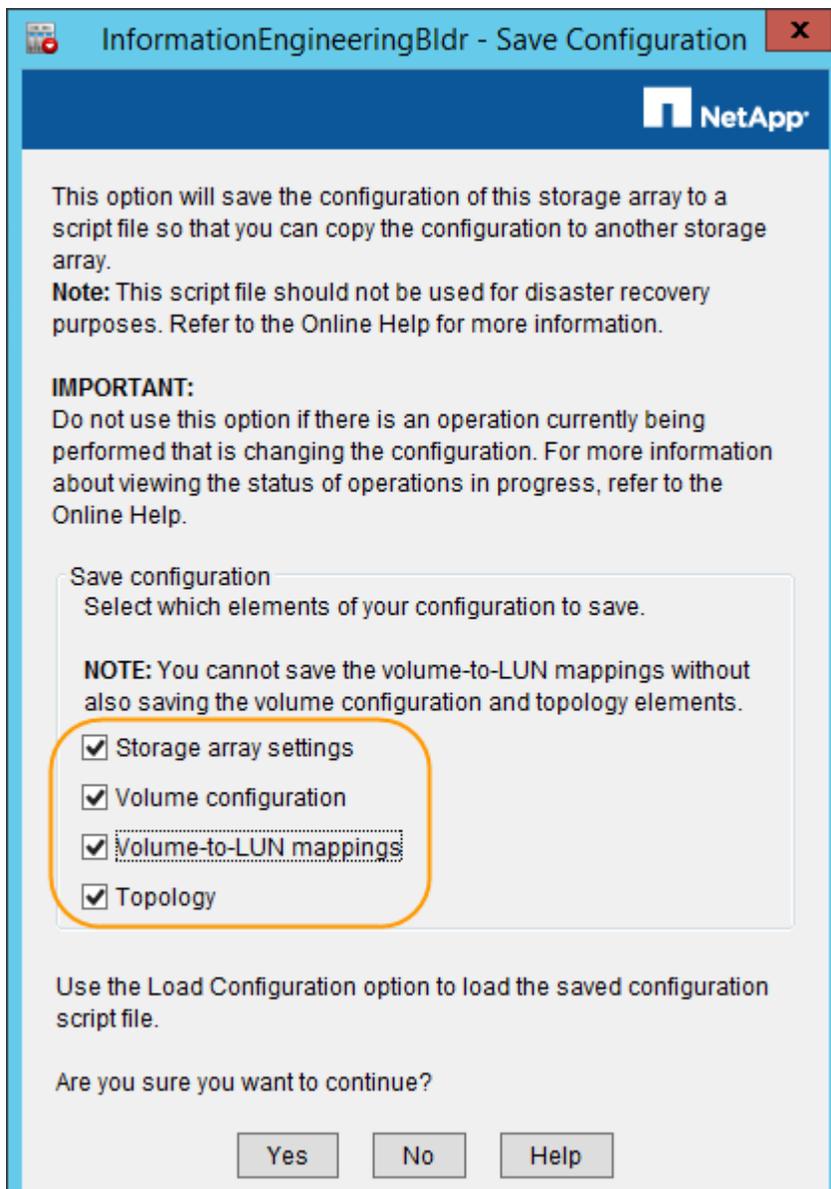
Before powering down and removing the controllers, save a configuration file from SANtricity Storage Manager. You can use this file to restore the configuration after you install the new controllers.

Before you begin

You have stopped host I/O operations, waited 5 minutes, and verified that no operations are in process.

Steps

1. Go to the Array Management Window.
2. From the **Storage Array** menu, select **Configuration > Save**.
3. In the **Save Configuration** dialog box, select the **Storage array settings**, **Volume configuration**, **Volume-to-LUN mappings**, and **Topology** check boxes.



4. Click **Yes**.
5. Specify where you want to save the configuration file (.cfg).
6. Click **Save**.

Powering down

After you have stopped host I/O operations and saved the configuration, you are ready to power down the storage array or flash array.

Before you begin

- If the Drive Security feature is enabled, you have saved the Drive Security key.
- You have collected a support bundle.
- You have stopped host I/O operations and confirmed that no operations are in process.

- You have saved the configuration file.

Steps

1. Turn off both power switches on the controller-drive tray.
2. Wait for all LEDs on the controller-drive tray to go dark.
3. Turn off both power switches on any attached expansion drive trays.
4. Wait two minutes for drive activity to stop.

Removing the controller canisters

The controller canisters contain the controllers, the HICs, and the batteries. You must remove both controller canisters from the controller-drive tray.

Steps

1. Put on antistatic protection.

Attention: Possible hardware damage – To prevent electrostatic discharge damage, use proper antistatic protection when handling tray components.

2. Label each cable that is attached to the controller canisters.

Labels make it easier to replace the host cables and to reconnect the power cables, any expansion drive cables, and the management cables after installing the new controllers.

3. Disconnect all of the cables from the controller canisters.

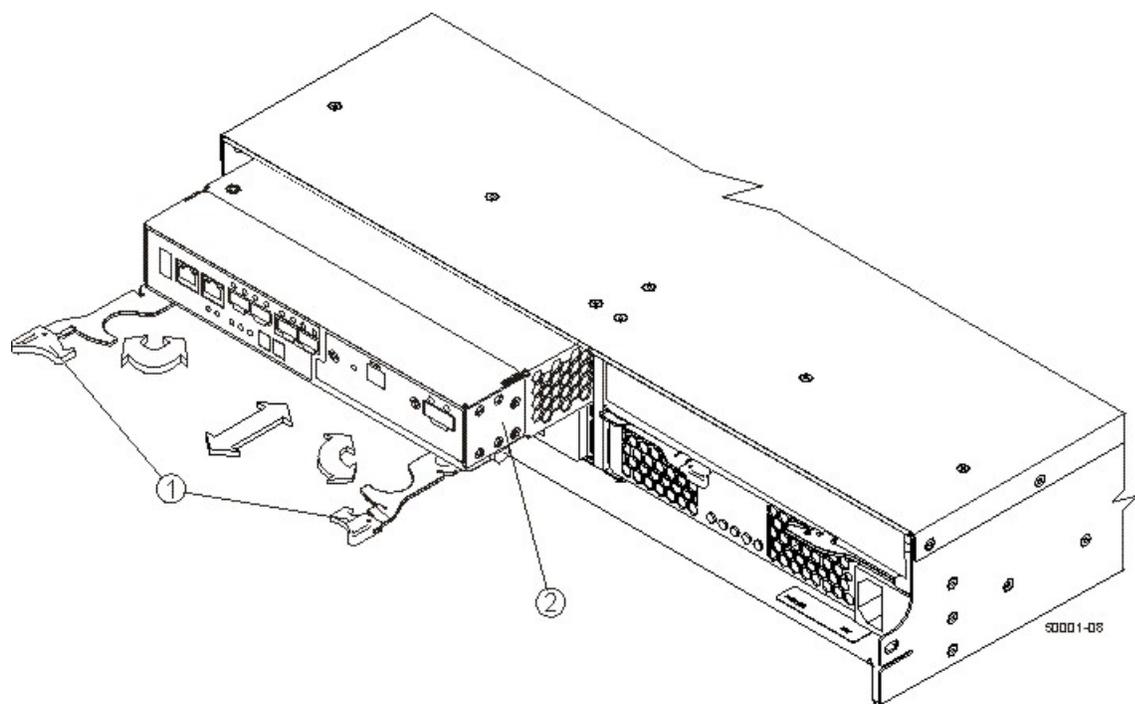
If fiber-optic cables are present, use the two release levers to partially remove the controller canister. Opening these release levers makes it easier to press down the fiber-optic cable release tab

Attention: Potential degraded performance – To prevent degraded performance, do not twist, fold, pinch, or step on the cables.

4. Follow these steps to remove controller A:

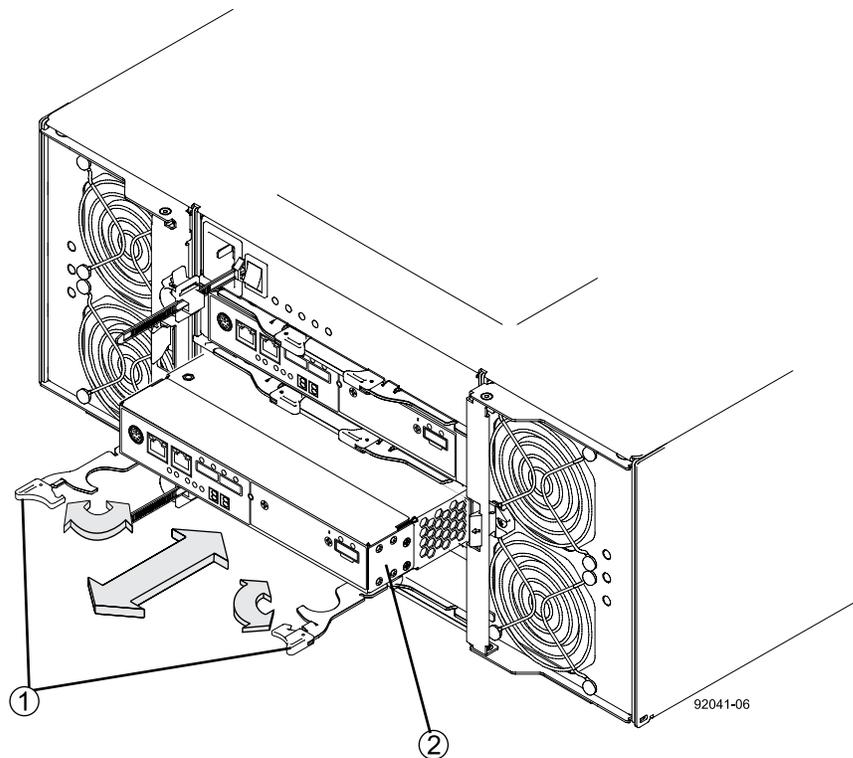
- a. Unlock and rotate the release handles out to release the controller canister.
- b. Using the release handles and your hands, pull the controller canister out of the tray.

Removing a controller canister from the E5412, E5424, or EF540



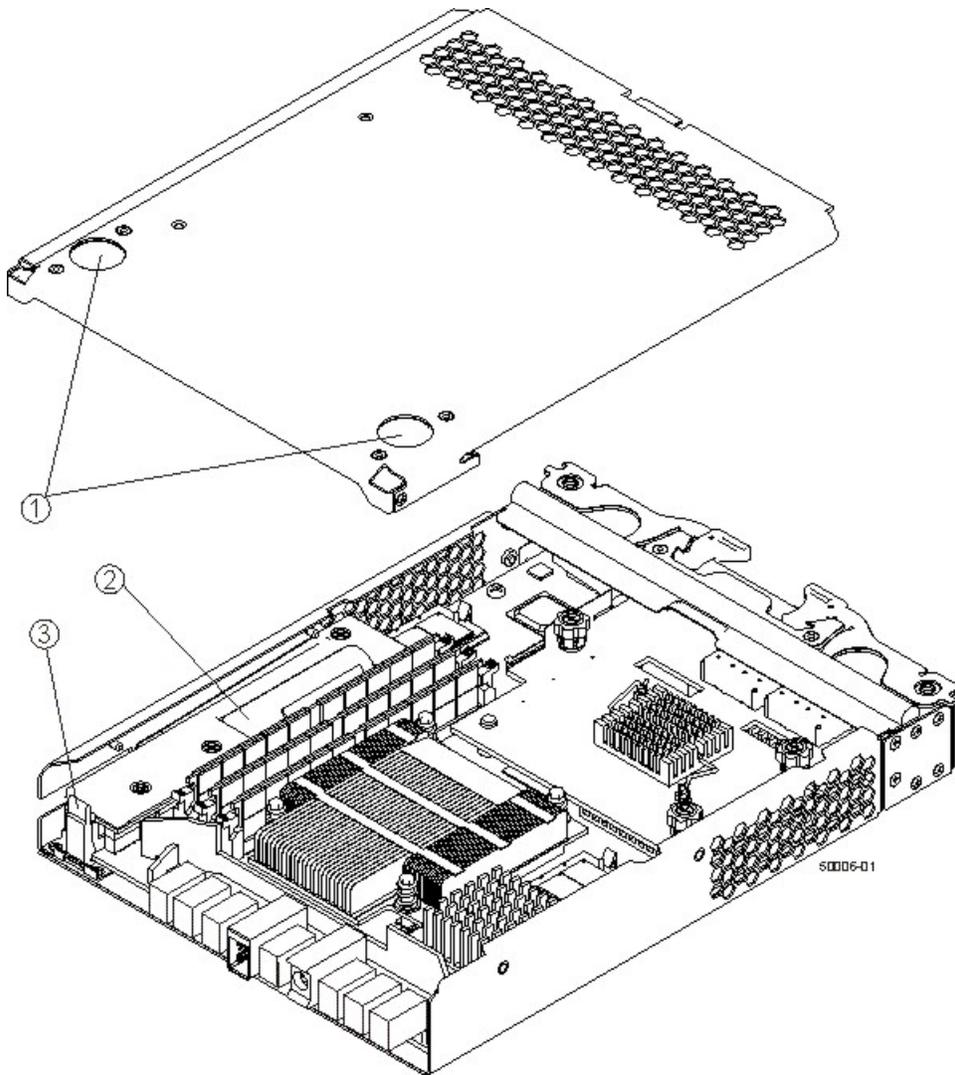
1	Release handles
2	Controller canister

Removing a controller canister from the E5460



1	Release handles
2	Controller canister

5. Set the controller canister on a flat, static-free surface with the release levers up. Position the controller canister so that you can access the top cover.
6. Choose one of the following options:
 - If you will reuse the battery from the old controller in the new controller, continue with the next step.
 - If you will install a new battery in the new controller, repeat these steps to remove controller B and then go to [Installing new controller canisters](#) on page 14.
7. Follow these steps to remove the battery:
 - a. Press down on both of the top cover latch buttons and slide the top cover off the controller canister.
 - b. Release the tab that secures the battery to the controller canister.



1	Top cover latch buttons
2	Battery
3	Locking tab

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

8. Repeat these steps to remove controller B.

Installing new controller canisters

Installing a new controller canister includes installing a battery, installing new SFP transceivers, and reconnecting cables.

Before you begin

You have removed the battery from the old controller canister, or you have obtained a new battery.

Steps

1. Unpack the new controller canister, and set it on a flat, static-free surface with the top cover up.

Save the packing materials in case you need to return the old controller canisters.

2. Press down on both of the top cover latch buttons, and slide the top cover off the controller canister.
3. Insert the battery at a slight downward angle into the controller canister.
4. Slide the battery into the canister, making sure it stays below the rivets on the wall of the canister.
5. Keeping the locking handle at a 45 degree angle, align the connectors at the bottom of the battery with the connectors on the canister.
6. Push the battery down until you hear it click, and move the locking handle up to secure the battery to the controller canister.
Attention: To make sure that the battery is seated correctly, you might need to slide it out and insert it again. You will know it is secure when you hear it click into place and when the locking handle does not move out of its upright position when you wiggle it.
7. Reinstall the top cover on the controller canister by sliding it forward until the top cover latch buttons click.
8. Slide the new controller canister all the way into the controller-drive tray. Rotate the release levers towards the center of the controller canister to lock it into place.
9. Repeat these steps to install the other controller.
10. Install new unified SFP transceivers into the HIC ports.
Attention: If you are not using unified SFPs, you cannot cable the array until after you have applied the feature pack to convert the HIC to Fibre Channel-iSCSI split mode.
11. Connect cables between the unified SFPs and the hosts.
12. Reconnect the cables between the controller-drive tray and any expansion drive trays and between the management ports and the management station.
13. Reconnect the power cords to each controller canister.

Applying power

When you first apply power to the new E5600 or EF560 controllers, all HIC ports are set to the same protocol.

Steps

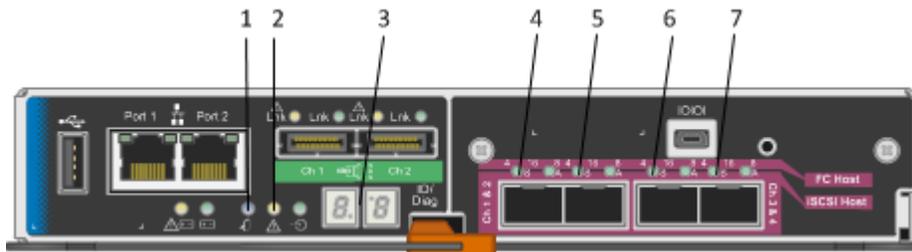
1. If you have expansion drive trays, turn on the two power switches at the back of each tray.
2. Wait two minutes.
3. Turn on the two power switches at the back of the controller-drive tray.
 - Do not turn off the power switches during the power-on process.
 - The fans in each tray are very loud when they first start up. The loud noise during start-up is normal.
4. Wait 10 minutes for the power-on process to complete.
5. Confirm that none of the amber LEDs on the front or back of any trays are illuminated.
 - If an amber LED is on, there is a problem with a component. Use SANtricity Storage Manager to help resolve the problem.
 - For controllers running SANtricity OS 8.20, you must reboot each controller through the SANtricity Storage Manager or command line interface (CLI) after powering on the storage array for the first time after performing a controller upgrade.

6. If the Drive Security feature is enabled, follow these steps on each controller:
 - a. If the storage array includes a mix of secured and unsecured drives, create a new Drive Security key. (From the **Storage Array** menu, select **Security > Drive Security > Create Key**.)
 Unsecured drives are unassigned drives, GHS drives, or drives that are part of a volume group or a disk pool that is not secured by Drive Security. Secured drives are assigned drives that are a part of a secured volume group or disk pool using Drive Security.
 - b. Import the Drive Security key you saved when preparing to remove the controllers. (From the **Storage Array** menu, select **Security > Drive Security > Import Key**.)
 If the storage array has secured drives only (no unsecured drives), the controllers automatically reboot to complete the import operation.
 - c. Wait for the controllers to boot up. When a controller finishes booting, its icon appears in the Enterprise Management Window (EMW).
7. If the Drive Security feature is enabled, and the storage array has a mix of secured and unsecured drives, follow these steps:
 - a. Run the `set allDrives nativeState SMcli` command.
 - b. Reset all controllers using SANtricity Storage Manager.
 - c. Wait for all controllers to boot up.

When a controllers has finished booting, its icon appears in the EMW.

8. Look at the LEDs on controller A to make sure that it is booting correctly.

The Host Link Service Action Required LEDs turns green during the reboot. The seven-segment display shows the sequence OS+ Sd+ blank- to indicate that the controller is performing Start-of-day (SOD) processing. After the controllers successfully reboot, the seven-segment displays on both controllers show the tray ID. You can then discover the new controller canister by using the storage management software.



1	Controller Service Action Allowed LED (blue)
2	Controller Service Action Required LED (amber)
3	Seven-segment display
4	Host Link 1 Service Action Required LED
5	Host Link 2 Service Action Required LED
6	Host Link 3 Service Action Required LED
7	Host Link 4 Service Action Required LED

9. Perform these steps if any of the controller-drive tray's Service Action Required LEDs are on, or if the Controller Service Action Required LED is on:
 - a. Check that the controller canister has been installed correctly and that all of the cables are correctly seated. Reinstall the controller canister, if necessary.

- b. Check the Service Action Required LEDs and the Controller Service Action Required LED again. If the problem is not corrected, contact technical support.
10. Repeat these steps for controller B.
11. Using the LEDs and the storage management software, check the status of all of the trays in the storage array.
12. If any component has a Needs Attention status, click the Recovery Guru toolbar button in the Array Management Window, and complete the recovery procedure. If the problem is not resolved, contact technical support.
13. Remove the antistatic protection.
14. Gather support data about your updated storage array by using one of these methods:
 - Use the storage management software to collect and save a support bundle of your storage array. From the Array Management Window, select **Monitor > Health > Collect Support Data Manually**. Then, name and specify a location on your system where you want to store the support bundle.
 - Use the CLI to run the `save storageArray supportData` command to gather comprehensive support data about the storage array.

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

Verifying the SANtricity OS (controller firmware) version

You must confirm that the controllers have SANtricity OS (controller firmware) version 8.25 or later before applying the feature pack to convert the HIC to Fibre Channel-iSCSI split mode.

Before you begin

You have applied power to the new controllers and confirmed that none of the amber LEDs are on.

Steps

1. From the Enterprise Management Window, select the device to open the Array Management Window.
2. Select the **Summary** tab.
3. On the **Monitor** panel, locate **Controller Firmware Version**. Confirm that the version number is 8.25 or later.
 - If the version number is 8.25 or later, you are ready to apply the feature pack key. See [Applying the feature pack key](#).
 - If the version number is earlier than 8.25, download and install SANtricity OS (controller firmware) version 8.25 or later. Then, apply the feature pack key.

Applying the feature pack key

You can apply a feature pack key to change the HIC protocol.

About this task

This task describes how to apply a feature pack key to a single storage array. If you intend to use mirroring after the conversion, you might need to apply a key to the local storage array and to the remote storage array. Each array requires its own key.

Steps

1. From the Array Management Window, select **Storage Array > Premium Features**.
2. In the **Feature Pack** section at the bottom of the screen, click **Change**.

Note: Do not click the **Use Key File** button in the **Enable a Premium Feature** section.

The Select Feature Key File dialog opens, which lets you select the generated key file.

3. Select the folder in which you placed the generated key file.
4. Select the key file, and click **OK**.
5. Click **Close**.

Both controllers automatically reboot twice as the new feature pack takes effect. Assuming the SFPs and cables are correct for the new protocol, the storage array returns to an optimal state after the reboot operations are complete.

6. Follow these steps to confirm that the protocol was changed:
 - a. From the Array Management Window, re-select the **Hardware** tab.

The information shown on the tab is refreshed.

- b. Scroll down to the **Host Interface Board** section and confirm that the value for **Type** is what you expect:

Value for Type	HIC protocol
iSCSI	iSCSI
Fibre channel	Fibre Channel
iSCSI, Fibre channel	Fibre Channel-iSCSI split mode

Resuming operations

After applying the feature pack key to convert E5600 or EF560 controllers to Fibre Channel-iSCSI split mode, you can complete host cabling, restore the logical configuration that you previously saved, and resume operations.

About this task

Attention: You must restore the saved configuration before making any changes to the physical configuration of the storage array. For example, if the storage array contained drives in slot 3, slot 4, and slot 5 when you saved the configuration, it must still contain drives in slot 3, slot 4, and slot 5 when you restore the configuration. The operation fails if these drives are not installed.

Steps

1. Complete any remaining host cabling tasks.

For example, if you have not already installed SFPs on the new controllers, you can now install the SFPs and host cables. If you are using the Asynchronous Mirroring feature, you can now connect cables to the other storage array.

2. Restore the saved configuration, as follows:

- a. From the Enterprise Management Window, select the **Devices** tab.
 - b. Select the storage array to which you want to load the configuration, and select **Tools > Load Storage Array Configuration**.

Note: The **Load Storage Array Configuration** option is not available if the Script Editor dialog box is open.

The Load Configuration dialog box appears.

- c. Review the information in the **Load Configuration** dialog box, and click **Yes**.

The Load Script dialog box appears.

- d. Select the script file that you want to load, and click **OK**.

The Confirm Load Configuration dialog box appears.

- e. Click **Execute**.

Note: If an error occurs, the load configuration operation stops, and a message appears in the lower portion (Output View) of the Script Editor dialog box, which indicates the error.

3. Confirm that all hosts can see the original LUNs.
4. Verify that asynchronous mirrors are operating normally and with no errors.
5. Resume host I/O.

Sending an upgrade notification to NetApp

Whenever you upgrade the controllers in your E-Series storage array or EF-Series flash array, you must notify NetApp technical support that you have changed the configuration. The upgrade notification alerts NetApp that you have changed the configuration and helps to ensure that you receive correct replacement parts if you need them later.

Before you begin

You have obtained the chassis serial number for the controller-drive tray or the flash array.

Steps

1. Go to the Give Us Feedback page on the NetApp Support Site.

[NetApp Support: Give Us Feedback](#)

2. Log in to the site with your user name and password.

The **Give Us Feedback** page is displayed.

Note: If the **Give Us Feedback** page is not displayed automatically, select **Contact Us > Report an Issue** from the top menu bar.

3. Enter your name and email address.
4. From the **Category 1** drop-down list, select **Product Registration**.
5. Copy and paste the following text into the **Comments** text box. Replace <serial number> with the chassis serial number.

```
Create an alert against Serial Number: <serial number>. The alert name should be "E-Series Upgrade." The alert text should read as follows: "Attention: The controllers in this system have been upgraded from the original configuration. Verify the controller configuration before ordering replacement controllers and notify dispatch that the system has been upgraded."
```

6. Click **Submit**.

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