Adding, Upgrading, or Replacing Host Interface Cards in E5700 Controller Shelves

You can add host interface cards (HICs) to E5700 controller shelves that only have baseboard host ports. Adding HICs allows you to increase the number of host ports in your storage array and can provide additional host protocols. When you add HICs, you must power off the storage array, install the HIC, and reapply power.

Before you begin

- The HICs must be compatible with your controllers.

  Attention: Possible loss of data access – Never install a HIC in an E5700 controller canister if that HIC was designed for another E-Series controller. In addition, both controllers and both HICs must be identical. The presence of incompatible or mismatched HICs will cause the controllers to lock down when you apply power.

- You have all cables, transceivers, switches, and host bus adapters (HBAs) needed to connect the new host ports.

  Note: For information about compatible hardware, refer to the *NetApp Interoperability Matrix Tool* and the *NetApp Hardware Universe*.

- You have an ESD wristband, or you have taken other antistatic precautions.
- You have a #1 Phillips screwdriver.
- You have labels to identify the new host cables.
- You have installed SANtricity Storage Manager on a management station, so you can use the storage array's command line interface (CLI).

  Note: If this software has not yet been installed, follow the instructions in the *SANtricity Power Guide for Advanced Users* for your operating system to download and install it.

- You have scheduled a downtime maintenance window for this procedure. The power must be off when you install HICs, so you will not be able to access data on the storage array until you have successfully completed this procedure.

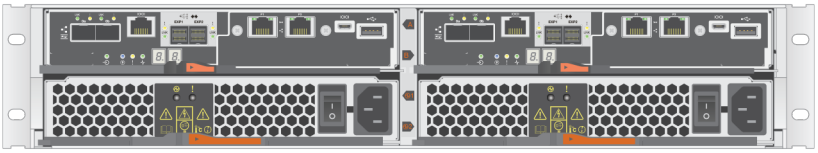
About this procedure

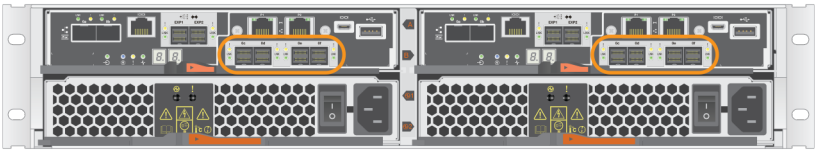
Use this procedure to add a HIC to a controller canister that has baseboard ports only. This procedure applies to following controller shelves:

- E5724 controller shelf
- E5760 controller shelf

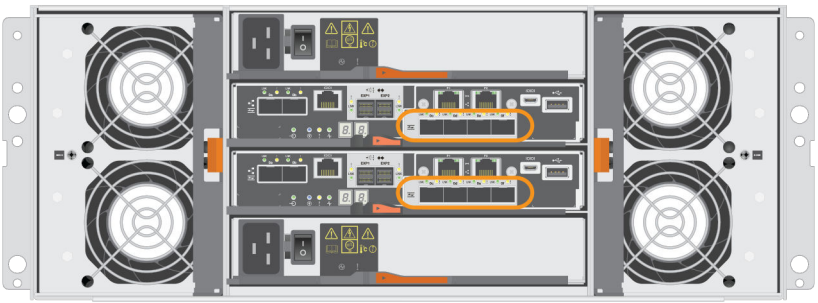
Copyright © 2018 NetApp, Inc. All rights reserved.

The following figures show an E5724 controller shelf with two controller canisters before and after installing a HIC into each controller.





The following figures show an E5760 controller shelf with two controller canisters before and after installing a HIC into each controller.



Note: The figures show example controller canisters with example HICs. You might have different types and numbers of baseboard ports and HIC ports.

The following table shows which types of HICs you can add to each model of the E5700 controller.

E5700 controller has...	You can install these HICs...	Maximum data rate and protocol
Two SFP+ (optical) baseboard ports	Four-port SFP+ (optical) HIC	8/16/32 Gbps Fibre Channel (FC)
	Four-port SFP28 HIC	10/25 Gbps iSCSI
	Two-port QSFP28 HIC	56/100 Gbps Infiniband (iSER/SRP)
	Four-port SAS HIC	6/12 Gbps SAS

Steps

1. Preparing to add host interface cards on page 3
2. Removing a controller canister on page 5
3. Installing a host interface card on page 6
4. Installing a controller canister on page 8
5. After adding a host interface card on page 10

Related information

SANtricity 11.40 Installing and Configuring for Linux Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for Windows Power Guide for Advanced Users
NetApp Interoperability Matrix Tool
NetApp Hardware Universe

Preparing to add host interface cards

Before adding HICs to E5700 controller shelves, you must perform a number of steps using SANtricity System Manager and SANtricity Storage Manager to prepare your system. You must back up the storage array's configuration database, collect support data, and stop host I/O operations. You must also power down the controller shelf.

Steps

1. From the home page of SANtricity System Manager, ensure that the storage array has Optimal status.

   If the status is not Optimal, use the Recovery Guru or contact technical support to resolve the problem. Do not continue with this procedure.

2. Back up the storage array's configuration database.

   If a problem occurs when you remove a controller, you can use the saved file to restore your configuration.

   a. Open the Enterprise Management Window (EMW) for SANtricity Storage Manager on your management station.

   b. Select the storage array.

   c. Select **Tools > Execute Script**.

   d. Type the following command in the text box.

   ```
   save storageArray dbmDatabase sourceLocation=onboard contentType=all file="filename";
   ```

   In this command, *filename* is the file path and file name to which you want to save the database. Enclose the file name in double quotation marks (" "). For example:

   ```
   file="C:\Program Files\CLI\logs\dbmdata.zip"
   ```

This command does not automatically append a file extension to the saved file. You must specify a file extension when entering the file name.

e. Select **Tools > Verify and Execute**.

3. Collect support data for your storage array.

Collecting support data before and after replacing a component ensures you can send a full set of logs to technical support in case the replacement does not resolve the problem.

Option	Description
SANtricity System Manager	**a.** Select **Support > Support Center > Diagnostics**. **b.** Select **Collect Support Data**. **c.** Click **Collect**. The file is saved in the Downloads folder for your browser with the name *support-data.7z*.

Script editor in the EMW	**a.** Open the Enterprise Management Window (EMW) in SANtricity Storage Manager on your local host.
	b. Select the storage array.
	c. Select **Tools > Execute Script**.
	d. Type the following command in the text box.
	`save storageArray supportData file="filename";`
	In this command, *filename* is the file path and the file name to which you want to save the support data. Enclose the file path and the file name in double quotation marks (" "). For example:
	`file="C:\Program Files\CLI\logs\support-data.7z"`
	e. Select **Tools > Verify and Execute**.

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 logical unit numbers (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 any LUNs mapped from the storage to the hosts.

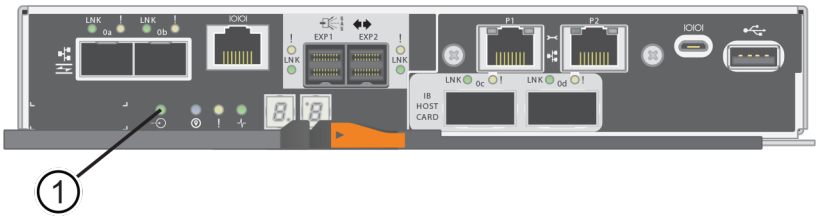
Note: The exact steps to stop host I/O operations depend on the host operating system and the configuration, which are beyond the scope of these instructions. If you are not sure how to stop host I/O operations in your environment, consider shutting down the host.

Attention: Possible data loss – If you continue this procedure while I/O operations are occurring, the host application might lose data because the storage array will not be accessible.

5. If the storage array participates in a mirroring relationship, stop all mirroring I/O operations between the primary and secondary storage arrays.

6. Wait for any data in cache memory to be written to the drives.

The green Cache Active LED on the back of each controller is on when cached data needs to be written to the drives. You must wait for this LED to turn off.



Callout	Type of host ports
1	Cache Active LED

7. Wait for all operations to complete before continuing with the next step.
8. From the Home page of SANtricity System Manager, select **View Operations in Progress**.
9. Power down the controller shelf.
   a. Turn off both power switches on the controller shelf.
   b. Wait for all LEDs on the controller shelf to turn off.

Removing a controller canister

When you remove a controller canister, you must disconnect all cables. Then, you can slide the controller canister out of the controller shelf.

Steps

1. Put on an ESD wristband or take other antistatic precautions.
2. Label each cable that is attached to the controller canister.
3. Disconnect all of the cables and remove SFPs from the controller canister.

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

4. Using two hands and the cam handle, slide the controller canister out of the shelf.

   Attention: Always use two hands to support the weight of a controller canister.

   If you are removing the controller canister from an E5724 controller shelf, a flap swings into place to block the empty bay, helping to maintain air flow and cooling.

5. Turn the controller canister over, so that the removable cover faces up.
6. Place the controller canister on a flat, static-free surface.

Installing a host interface card

After removing the controller canister and HIC faceplate, you can install a HIC and re-attach the HIC faceplate.

Steps

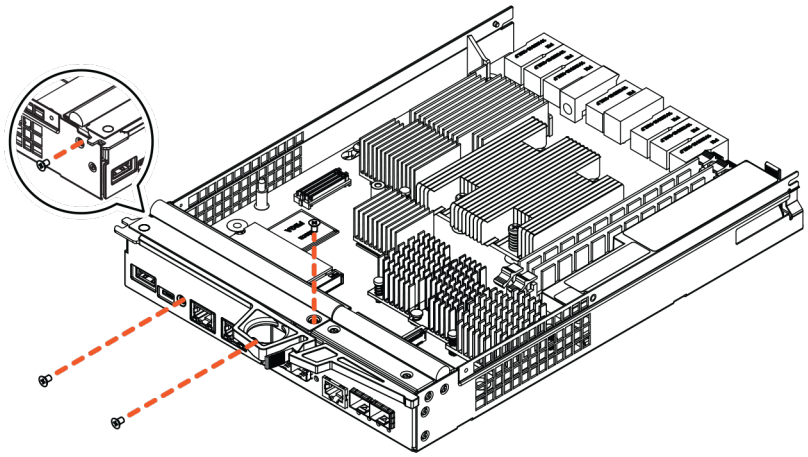
1. Unpack the new HIC and the new HIC faceplate.
2. Press the button on the cover of the controller canister, and slide the cover off.
3. Confirm that the green LED inside the controller (between the battery and the DIMMs) is off.

   If this green LED is on, the controller is still using battery power. You must wait for this LED to go off before removing any components.

Item	Description
1	Internal Cache Active LED
2	Battery

4. Using a #1 Phillips screwdriver, remove the screws that attach the HIC faceplate to the controller canister.

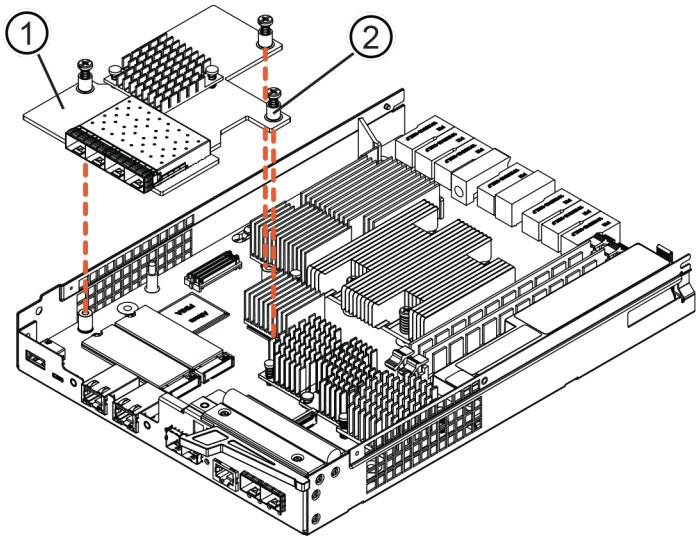
   There are four screws: one on the top, one on the side, and two on the front.



5. Remove the HIC faceplate.
6. Align the three thumbscrews on the HIC with the corresponding holes on the controller, and align the connector on the bottom of the HIC with the HIC interface connector on the controller card.

   Be careful not to scratch or bump the components on the bottom of the HIC or on the top of the controller card.
7. Carefully lower the HIC into place, and seat the HIC connector by pressing gently on the HIC.

   Attention: Possible equipment damage – Be very careful not to pinch the gold ribbon connector for the controller LEDs between the HIC and the thumbscrews.



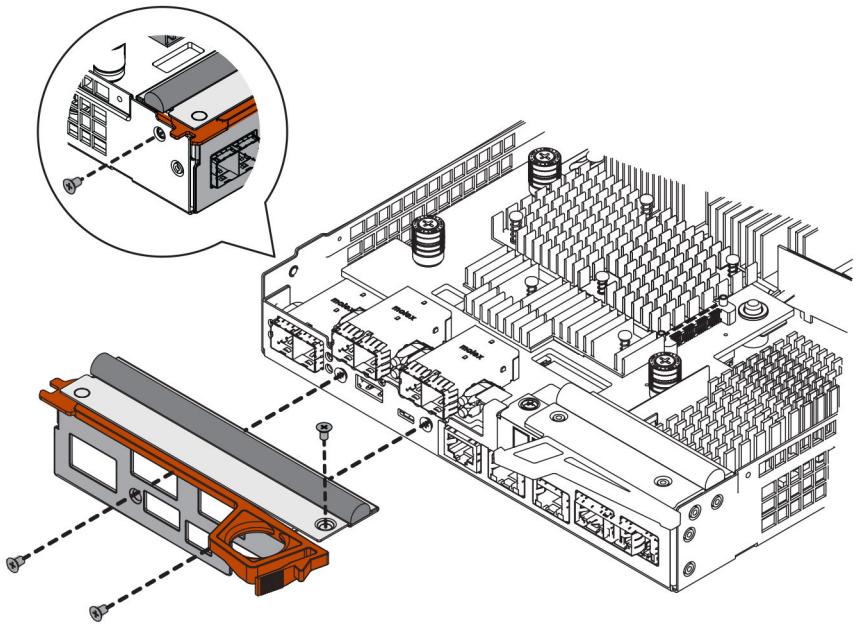
Item	Description
1	Host interface card (HIC)

Item	Description
❷	Thumbscrews

8. Hand-tighten the HIC thumbscrews.

   Do not use a screwdriver, or you might over tighten the screws.

9. Using a #1 Phillips screwdriver, attach the new HIC faceplate to the controller canister with four screws.



10. Reinstall the cover on the controller canister by sliding the cover from back to front until the button clicks.
11. Set the controller canister aside until you are ready to install it.

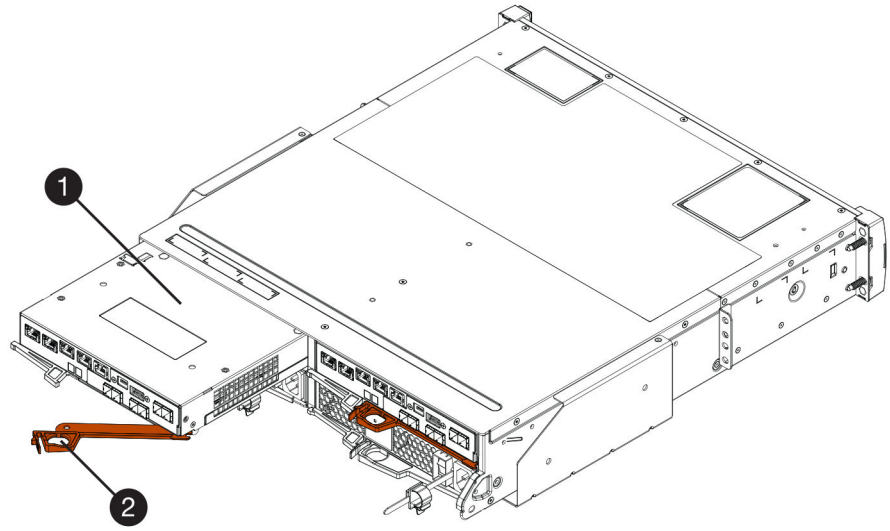
Installing a controller canister

After installing the new HIC, you can reinstall the controller canister into the controller shelf.

Steps

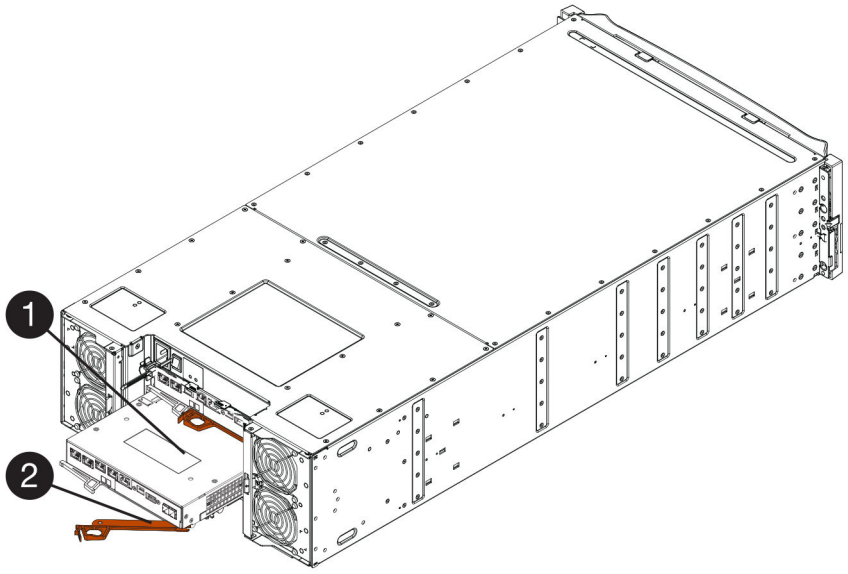
1. Turn the controller canister over, so that the removable cover faces down.
2. With the cam handle in the open position, slide the controller canister all the way into the controller shelf.

The following figure is an example of an E5724 controller shelf:



Item	Description
1	Controller canister
2	Cam handle

The following figure is an example of an E5760 controller shelf:



Item	Description
1	Controller canister

Item	Description
2	Cam handle

3. Move the cam handle to the left to lock the controller canister in place.
4. Install the SFPs in the host ports on the controller, and reconnect all of the cables.

   If you are using more than one host protocol, be sure to install the SFPs in the correct host ports.
5. If you are adding HICs to a duplex configuration, repeat all steps to remove the second controller canister, install the second HIC, and replace the second controller canister.

After adding a host interface card

After adding a HIC, you might need to perform additional steps before attaching data cables. For the additional steps you must check the controller LEDs and seven-segment display and confirm that the controller's status is Optimal.

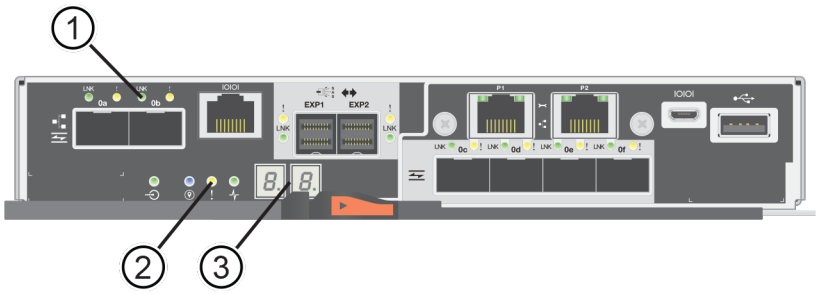
Before you begin

You have installed any new host hardware needed for the new host ports, such as switches or host bus adapters (HBAs).

Steps

1. Turn on the two power switches at the back of the controller shelf.
   - Do not turn off the power switches during the power-on process, which typically takes 90 seconds or less to complete.
   - The fans in each shelf are very loud when they first start up. The loud noise during start-up is normal.
2. As the controller boots, check the controller LEDs and seven-segment display.
   - The seven-segment display shows the repeating sequence **OS**, **Sd**, ***blank*** to indicate that the controller is performing Start-of-day (SOD) processing. After a controller has successfully booted up, its seven-segment display should show the tray ID.
   - The amber Attention LED on the controller turns on and then turns off, unless there is an error.
   - The green Host Link LEDs remain off until you connect the host cables.

   Note: The figure shows an example controller canister. Your controller might have a different number and a different type of host ports.



Item	Description
1	Host Link LEDs

Item	Description
2	Attention LED (amber)
3	Seven-segment display

3. From SANtricity System Manager, confirm that the controller's status is Optimal.

   If the status is not Optimal or if any of the Attention LEDs are on, confirm that all cables are correctly seated, and check that the HIC and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the HIC.

   Note: If you cannot resolve the problem, contact technical support.

4. If the new HIC ports require SFP+ transceivers, install these SFPs.
5. Connect the cables from the controller's host ports to the data hosts.
6. If you need instructions for configuring and using a new host protocol, download the *SANtricity System Manager Express Guide* or *SANtricity Power Guide for Advanced Users* for your operating system.
7. Follow the instructions in that document to perform any additional steps, such as the following:
   - Adding or updating the host mappings for the new host ports.
   - Configuring the controller's settings.

Related information

SANtricity 11.40 Installing and Configuring for Linux Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for Windows Power Guide for Advanced Users
SANtricity System Manager 11.40 Installing and Configuring for Linux Express Guide
SANtricity System Manager 11.40 Installing and Configuring for VMware Express Guide
SANtricity System Manager 11.40 Installing and Configuring for Windows Express Guide

Upgrading Host Interface Cards in E5700 Controller Shelves

You can upgrade the host interface cards (HICs) in E5700 controller shelves to increase the number of host ports or to change host protocols. When you upgrade the HICs, you must power off the storage array, remove the existing HIC from each controller, install a new HIC, and reapply power.

Before you begin

- You have two HICs. The HICs must be compatible with your controllers.

  Attention: Possible loss of data access – Never install a HIC in an E5700 controller canister if that HIC was designed for another E-Series controller. In addition, if you have a duplex configuration, both HICs must be identical. The presence of incompatible or mismatched HICs will cause both controllers to lock down when you apply power. You will lose access to your data until the problem is corrected.

- You have all cables, transceivers, switches, and host bus adapters (HBAs) needed to connect the new host ports.

Note: For information about compatible hardware, refer to the *NetApp Interoperability Matrix Tool* and the *NetApp Hardware Universe*.

- You have an ESD wristband, or you have taken other antistatic precautions.
- You have a #1 Phillips screwdriver.
- You have labels to identify the new host cables.
- You have installed SANtricity Storage Manager on a management station, so you can use the storage array's command line interface (CLI).

  Note: If this software has not yet been installed, follow the instructions in the *SANtricity Storage Manager Express Guide* or the *SANtricity Power Guide for Advanced Users* for your operating system to download and install it.

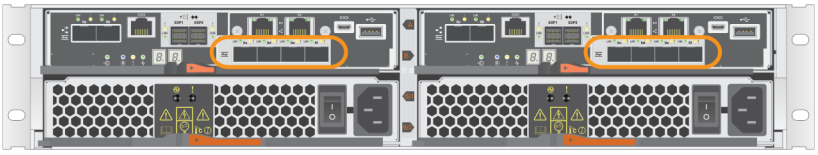
- You have scheduled a downtime maintenance window for this procedure. The power must be off when you upgrade HICs, so you will not be able to access data on the storage array until you have successfully completed this procedure.

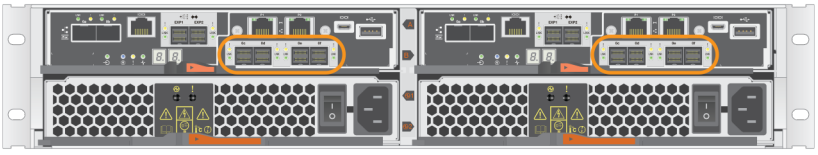
About this procedure

Use this procedure to change the host protocol by replacing the HIC currently installed in an E5700 controller canister with a different type of HIC. The table shows which types of HICs you can install in each E5700 controller model.

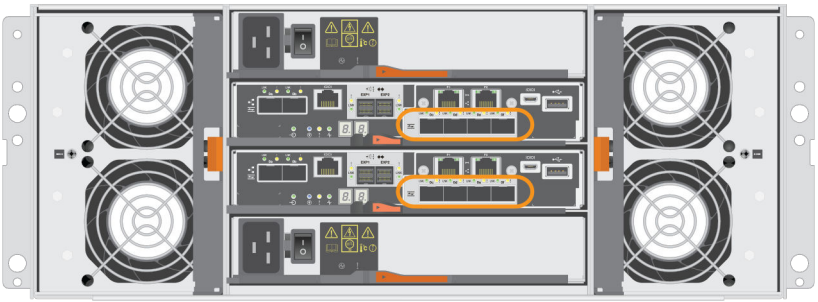
E5700 controller has...	You can install these HICs...	Maximum data rate and protocol
Two SFP+ (optical) baseboard ports	Four-port SFP+ (optical) HIC	8 Gb, 16 Gb, or 32 Gb Fibre Channel (FC)
	Four-port SFP28 HIC	10 Gbps, 25 Gbps iSCSI
	Two-port QSFP28 HIC	56 Gbps, 100 Gbps Infiniband (iSER/SRP)
	Four-port SAS HIC	6 Gbps,12 Gbps SAS

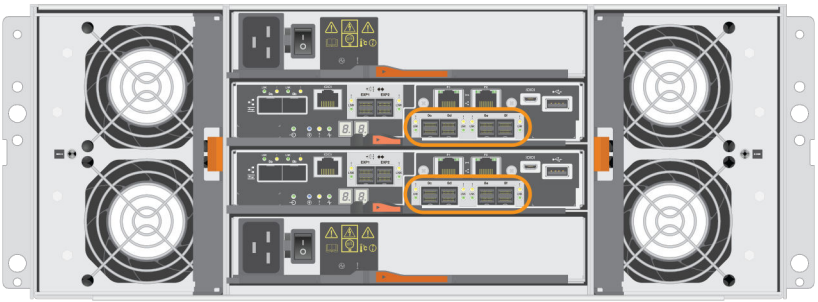
The following figures show an E5724 controller shelf before and after a HIC upgrade. The two HICs in the first figure have four SFP+ (optical) host ports, and the two HICs in the second figure have four SAS ports.





The following figures show an E5760 controller shelf before and after a HIC upgrade. The two HICs in the first figure have four SFP+ (optical) host ports, and the two HICs in the second figure have four SAS ports.





Note: The figures show example controller canisters with example HICs. You might have different types and numbers of baseboard ports and HIC ports.

Steps

1. Preparing to upgrade host interface cards on page 14
2. Removing a controller canister on page 17
3. Removing a host interface card on page 18
4. Installing a host interface card on page 20
5. Installing a controller canister on page 21
6. After upgrading a host interface card on page 21

Related information

SANtricity 11.40 Installing and Configuring for Linux Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for Windows Power Guide for Advanced Users
SANtricity Storage Manager 11.40 Installing and Configuring for Linux Express Guide
SANtricity Storage Manager 11.40 Installing and Configuring for VMware Express Guide
SANtricity Storage Manager 11.40 Installing and Configuring for Windows Express Guide
NetApp Interoperability Matrix Tool
NetApp Hardware Universe

Preparing to upgrade host interface cards

Before upgrading the HICs in E5700 controller shelves, you must perform a number of steps using SANtricity System Manager and SANtricity Storage Manager to prepare your system.You must back up the storage array's configuration database, collect support data, and stop host I/O operations. You also must power down the controller shelf.

Steps

1. From the home page of SANtricity System Manager, ensure that the storage array has Optimal status.

   If the status is not Optimal, use the Recovery Guru or contact technical support to resolve the problem. Do not continue with this procedure.

2. Back up the storage array's configuration database.

   If a problem occurs when you remove a controller, you can use the saved file to restore your configuration.

   a. Open the Enterprise Management Window (EMW) for SANtricity Storage Manager on your management station.

   b. Select the storage array.

   c. Select **Tools > Execute Script**.

   d. Type the following command in the text box.

   ```
   save storageArray dbmDatabase sourceLocation=onboard contentType=all file="filename";
   ```

   In this command, *filename* is the file path and file name to which you want to save the database. Enclose the file name in double quotation marks (" "). For example:

   ```
   file="C:\Program Files\CLI\logs\dbmdata.zip"
   ```

   This command does not automatically append a file extension to the saved file. You must specify a file extension when entering the file name.

   e. Select **Tools > Verify and Execute**.

3. Collect support data for your storage array.

   Collecting support data before and after replacing a component ensures you can send a full set of logs to technical support in case the replacement does not resolve the problem.

Option	Description
SANtricity System Manager	**a.** Select **Support > Support Center > Diagnostics**. **b.** Select **Collect Support Data**. **c.** Click **Collect**. The file is saved in the Downloads folder for your browser with the name *support-data.7z*.

Option	Description

Script editor in the EMW	**a.** Open the Enterprise Management Window (EMW) in SANtricity Storage Manager on your local host.
	b. Select the storage array.
	c. Select **Tools > Execute Script**.
	d. Type the following command in the text box.
	`save storageArray supportData file="filename";`
	In this command, *filename* is the file path and the file name to which you want to save the support data. Enclose the file path and the file name in double quotation marks (" "). For example:
	`file="C:\Program Files\CLI\logs\support-data.7z"`
	e. Select **Tools > Verify and Execute**.

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 logical unit numbers (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 any LUNs mapped from the storage to the hosts.

   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.

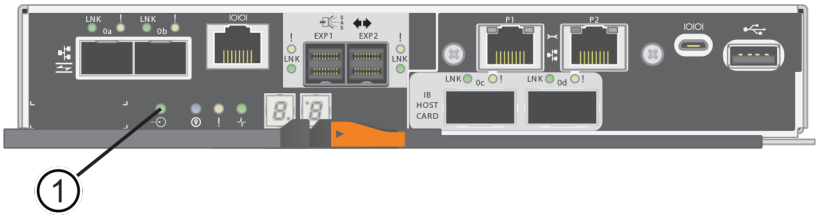
   Attention: Possible data loss – If you continue this procedure while I/O operations are occurring, the host application might lose data because the storage array will not be accessible.

5. If the storage array participates in a mirroring relationship, stop all mirroring 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) **Attention:** If you do not deactivate these relationships before upgrading the HICs, your system loses data access and data loss might occur.	**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. **Attention:** If you do not delete all mirroring relationships before deactivating mirroring, you receive an error.
Asynchronous Mirroring (supported for iSCSI and Fibre Channel only)	**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. **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 any data in cache memory to be written to the drives.

   The green Cache Active LED on the back of each controller is on when cached data needs to be written to the drives. You must wait for this LED to turn off.



Callout	Type of host ports
1	Cache Active LED

8. Wait for all operations to complete before continuing with the next step.
9. From the Home page of SANtricity System Manager, select **View Operations in Progress**.
10. Power down the controller shelf.
    a. Turn off both power switches on the controller shelf.
    b. Wait for all LEDs on the controller shelf to turn off.

Removing a controller canister

When you remove a controller canister, you must disconnect all cables. Then, you can slide the controller canister out of the controller shelf.

Steps

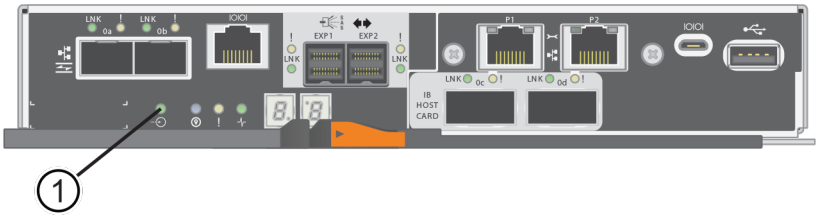
1. Put on an ESD wristband or take other antistatic precautions.
2. Label each cable that is attached to the controller shelf.
3. Disconnect all of the cables and remove SFPs from the controller shelf.

   Attention: To prevent degraded performance, do not twist, fold, pinch, or step on the cables.
4. If the HIC ports use SFP+ transceivers, remove them.

   Depending on what type of HIC you are upgrading to, you might be able to reuse these SFPs.
5. If the baseboard host ports on the controller canister use SFP+ transceivers, leave them installed.
6. Confirm that the Cache Active LED on the back of the controller is off.

   The green Cache Active LED on the back of the controller is on when cached data needs to be written to the drives. You must wait for this LED to turn off before removing the controller shelf.

   Note: The figure shows an example controller canister. Your controller might have a different number and a different type of host ports.



Callout	Type of host ports
1	Cache Active LED

7. Using two hands and the cam handle, slide the controller canister out of the shelf.

   Attention: Always use two hands to support the weight of a controller canister.

   If you are removing the controller canister from an E5724 controller shelf, a flap swings into place to block the empty bay, helping to maintain air flow and cooling.
8. Turn the controller canister over, so that the removable cover faces up.
9. Place the controller canister on a flat, static-free surface.

Removing a host interface card

When you upgrade a HIC, you must remove the original HIC from the controller canister.

Steps

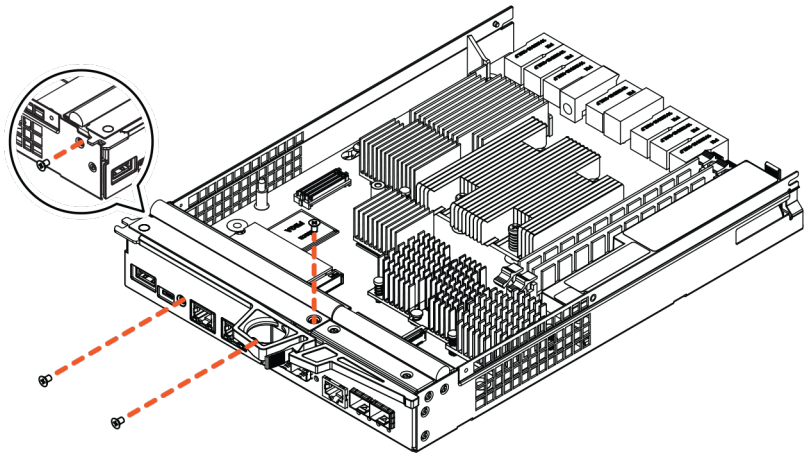
1. Remove the controller canister's cover by pressing down on the button and sliding the cover off.
2. Confirm that the green LED inside the controller (between the battery and the DIMMs) is off.

   If this green LED is on, the controller is still using battery power. You must wait for this LED to go off before removing any components.

Item	Description
1	Internal Cache Active LED
2	Battery

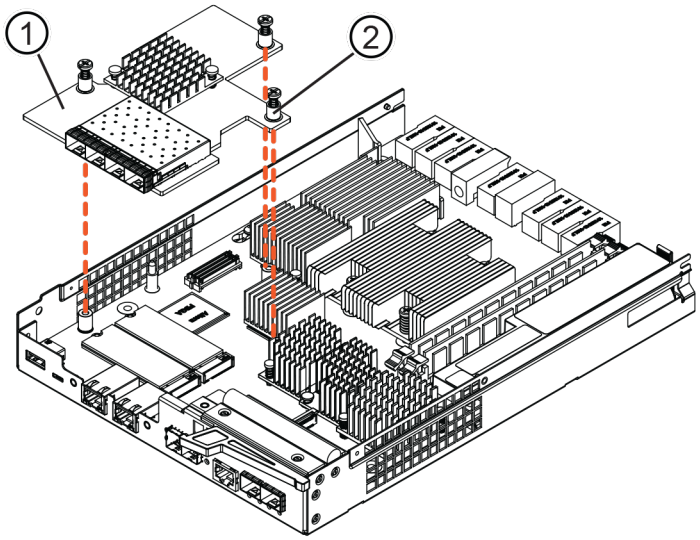
3. Using a #1 Phillips screwdriver, remove the screws that attach the HIC faceplate to the controller canister.

   There are four screws: one on the top, one on the side, and two on the front.



4. Remove the HIC faceplate.
5. Using your fingers or a Phillips screwdriver, loosen the three thumbscrews that secure the HIC to the controller card.
6. Carefully detach the HIC from the controller card by lifting the card up and sliding it back.

   Attention: Be careful not to scratch or bump the components on the bottom of the HIC or on the top of the controller card.



Item	Description
1	Host interface card (HIC)
2	Thumbscrews

7. Place the HIC on a static-free surface.

Installing a host interface card

After removing the original HIC, you can install the new HIC.

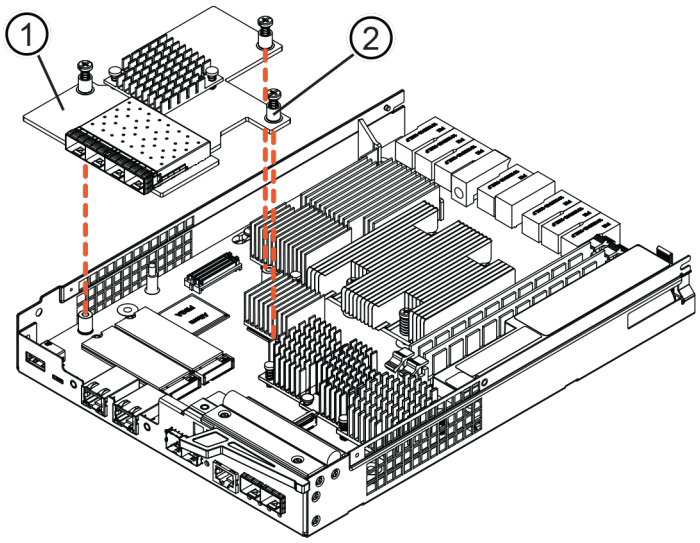
Steps

1. Unpack the new HIC and the new HIC faceplate.
2. Align the three thumbscrews on the HIC with the corresponding holes on the controller, and align the connector on the bottom of the HIC with the HIC interface connector on the controller card.

   Attention: Be careful not to scratch or bump the components on the bottom of the HIC or on the top of the controller card.

3. Carefully lower the HIC into place, and seat the HIC connector by pressing gently on the HIC.

   Attention: Possible equipment damage – Be very careful not to pinch the gold ribbon connector for the controller LEDs between the HIC and the thumbscrews.



Item	Description
1	Host interface card (HIC)
2	Thumbscrews

4. Hand-tighten the HIC thumbscrews.

   Do not use a screwdriver, or you might over tighten the screws.

5. Using a #1 Phillips screwdriver, attach the new HIC faceplate to the controller canister with four screws.
6. Upgrade the HIC on the other controller with an identical new HIC to avoid mismatch of HICs.

Installing a controller canister

After installing the new HIC, you can reinstall the controller canister into the controller shelf.

Steps

1. Reinstall the cover on the controller canister by sliding the cover from back to front until the button clicks.
2. Turn the controller canister over, so that the removable cover faces down.
3. Move the cam handle to the left to lock the controller canister in place.
4. Reconnect all of the cables you removed.

   Attention: Do not connect data cables to the new HIC ports at this time.
5. If you are upgrading the HICs in a duplex configuration, repeat all steps to remove the other controller canister, remove the HIC, install the new HIC, and replace the second controller canister.

After upgrading a host interface card

After upgrading a HIC, you might need to perform additional steps before attaching data cables and using the new host protocol.

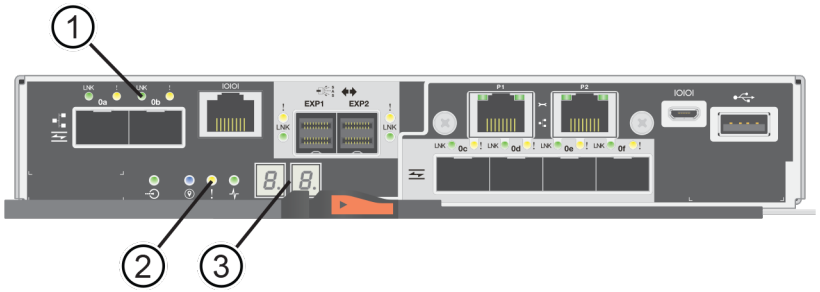
Before you begin

You have installed any new host hardware needed for the new host ports, such as switches or host bus adapters (HBAs).

Steps

1. Turn on the two power switches at the back of the controller shelf.
   - Do not turn off the power switches during the power-on process, which typically takes 90 seconds or less to complete.
   - The fans in each shelf are very loud when they first start up. The loud noise during start-up is normal.
2. As the controller boots, check the controller LEDs and seven-segment display.
   - The seven-segment display shows the repeating sequence **OS**, **Sd**, ***blank*** to indicate that the controller is performing Start-of-day (SOD) processing. After a controller has successfully booted up, its seven-segment display should show the tray ID.
   - The amber Attention LED on the controller turns on and then turns off, unless there is an error.
   - The green Host Link LEDs remain off until you connect the host cables.

   Note: The figure shows an example controller canister. Your controller might have a different number and a different type of host ports.



Item	Description
1	Host Link LEDs
2	Attention LED (amber)
3	Seven-segment display

3. From SANtricity System Manager, confirm that the controller's status is Optimal.

   If the status is not Optimal or if any of the Attention LEDs are on, confirm that all cables are correctly seated, and check that the HIC and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the HIC.

   Note: If you cannot resolve the problem, contact technical support.

4. If the new HIC ports require SFP+ transceivers, install these SFPs.
5. Connect the cables from the controller's host ports to the data hosts.
6. If you need instructions for configuring and using a new host protocol, download the *SANtricity Storage Manager Express Guide* or *SANtricity Power Guide for Advanced Users* for your operating system.
7. Follow the instructions in that document to perform any additional steps, such as the following:
   - Adding or updating the host mappings for the new host ports.
   - Configuring the controller's settings.

Related information

SANtricity 11.40 Installing and Configuring for Linux Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for Windows Power Guide for Advanced Users
SANtricity Storage Manager 11.40 Installing and Configuring for Linux Express Guide
SANtricity Storage Manager 11.40 Installing and Configuring for VMware Express Guide
SANtricity Storage Manager 11.40 Installing and Configuring for Windows Express Guide

Replacing a Failed Host Interface Card in E5700 Controller Shelves

When you replace a failed host interface card (HIC) in an E5700 controller shelf, you must remove the controller canister, replace the HIC, and reinstall the controller canister.

Before you begin

- You have a replacement HIC that is identical to the HIC you are replacing.

  Attention: Possible loss of data access – The HICs installed in the two controller canisters must be identical. If the replacement HIC is not identical to the HIC you are replacing, do not attempt this procedure. The presence of mismatched HICs causes the controller with the replacement HIC to lock down when you bring it online.

- You have an ESD wristband, or you have taken other antistatic precautions.
- You have a #1 Phillips screwdriver.
- You have labels to identify each cable that is connected to the controller canister.
- You have installed SANtricity System Manager on a management station, so you can use the storage array's command line interface (CLI).

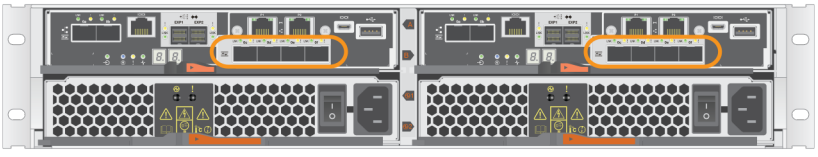
  Note: If this software has not yet been installed, follow the instructions in the *SANtricity Storage Manager Express Guide* or the *SANtricity Power Guide for Advanced Users* for your operating system to download and install it.

About this procedure

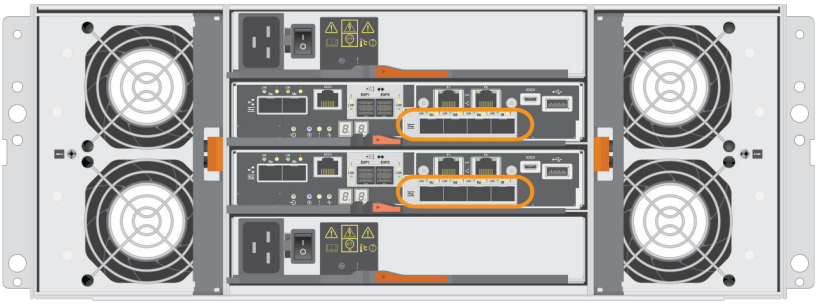
Use this procedure to change the host protocol by replacing the HIC currently installed in an E5700 controller canister with a different type of HIC. The table shows which types of HICs you can replace in each E5700 controller model.

E5700 controller has...	You can install these HICs...	Maximum data rate and protocol
Two SFP+ (optical) baseboard ports	Four-port SFP+ (optical) HIC	8 Gb, 16 Gb, or 32 Gb Fibre Channel (FC)
	Four-port SFP28 HIC	10 Gbps, 25 Gbps iSCSI
	Two-port QSFP28 HIC	56 Gbps, 100 Gbps Infiniband (iSER/SRP)
	Four-port SAS HIC	6 Gbps,12 Gbps SAS

The following figure shows an E5724 controller shelf with two controller canisters, each with a HIC.



The following figure shows an E5760 controller shelf with two controller canisters, each with a HIC.



Note: The figures shows two example controller canisters with example HICs in each controller shelf. You might have different types and numbers of baseboard ports and HIC ports.

Steps

1. Preparing to remove a host interface card on page 24
2. Removing a controller canister on page 26
3. Removing a host interface card on page 28
4. Installing a host interface card on page 30
5. Installing a controller canister on page 32
6. After replacing a HIC on page 33

Related information

SANtricity 11.40 Installing and Configuring for Linux Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for VMware Power Guide for Advanced Users
SANtricity 11.40 Installing and Configuring for Windows Power Guide for Advanced Users
SANtricity Storage Manager 11.40 Installing and Configuring for Linux Express Guide
SANtricity Storage Manager 11.40 Installing and Configuring for VMware Express Guide
SANtricity Storage Manager 11.40 Installing and Configuring for Windows Express Guide

Preparing to remove a host interface card

If a HIC has failed, you must back up the configuration and collect support data. Then, you can take the controller offline.

About this task

If a HIC has failed, the Recovery Guru in SANtricity System Manager directs you to replace it (in the software, a HIC might be referred to as a *host I/O card*).

Steps

1. From SANtricity System Manager, review the details in the Recovery Guru to confirm that you have a failed HIC and to ensure no other items must be addressed before you can remove and replace the HIC.
2. From the Details area of the Recovery Guru, determine which of the controller canisters has the failed HIC.
3. Back up the storage array's configuration database.

   If a problem occurs when you remove a controller, you can use the saved file to restore your configuration.

   a. Open the Enterprise Management Window (EMW) for SANtricity Storage Manager on your management station.

b. Select the storage array.

c. Select **Tools > Execute Script**.

d. Type the following command in the text box.

```
save storageArray dbmDatabase sourceLocation=onboard contentType=all file="filename";
```

In this command, *filename* is the file path and file name to which you want to save the database. Enclose the file name in double quotation marks (" "). For example:

```
file="C:\Program Files\CLI\logs\dbmdata.zip"
```

This command does not automatically append a file extension to the saved file. You must specify a file extension when entering the file name.

e. Select **Tools > Verify and Execute**.

4. Collect support data for your storage array.

Collecting support data before and after replacing a component ensures you can send a full set of logs to technical support in case the replacement does not resolve the problem.

Option	Description
SANtricity System Manager	**a.** Select **Support > Support Center > Diagnostics**. **b.** Select **Collect Support Data**. **c.** Click **Collect**. The file is saved in the Downloads folder for your browser with the name *support-data.7z*.

Script editor in the EMW	**a.** Open the Enterprise Management Window (EMW) in SANtricity Storage Manager on your local host.
	b. Select the storage array.
	c. Select **Tools > Execute Script**.
	d. Type the following command in the text box.
	`save storageArray supportData file="filename";`
	In this command, *filename* is the file path and the file name to which you want to save the support data. Enclose the file path and the file name in double quotation marks (" "). For example:
	`file="C:\Program Files\CLI\logs\support-data.7z"`
	e. Select **Tools > Verify and Execute**.

5. If the controller is not already offline, take it offline now using either SANtricity System Manager or the Enterprise Management Window's (EMW) script editor:

Option	Description
SANtricity System Manager	**a.** Select **Hardware**. **b.** If the graphic shows the drives, select **Show back of shelf** to show the controllers. **c.** Select the controller that you want to place offline. **d.** From the context menu, select **Place offline**, and confirm that you want to perform the operation. **Note:** If you are accessing SANtricity System Manager using the controller you are attempting to take offline, a System Manager Unavailable message is displayed. Select **Connect to an alternate network connection** to automatically access SANtricity System Manager using the other controller.

Script Editor in the EMW	**a.** Open the Enterprise Management Window (EMW) in SANtricity Storage Manager on your local host.
	b. Select the storage array.
	c. Select **Tools > Execute Script**.
	d. Type one of the following commands in the text box.
	`For controller A: set controller [a] availability=offline`
	`For controller B: set controller [b] availability=offline`
	e. Select **Tools > Verify and Execute**

6. Wait for System Manager to update the controller's status to offline.

   Attention: Do not begin any other operations until after the status has been updated.

Removing a controller canister

When you remove a controller canister, you must disconnect all cables. Then, you can slide the controller canister out of the controller shelf.

Steps

1. Put on an ESD wristband or take other antistatic precautions.
2. Label each cable that is attached to the controller canister.
3. Disconnect all of the cables and remove SFPs from the controller canister.

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

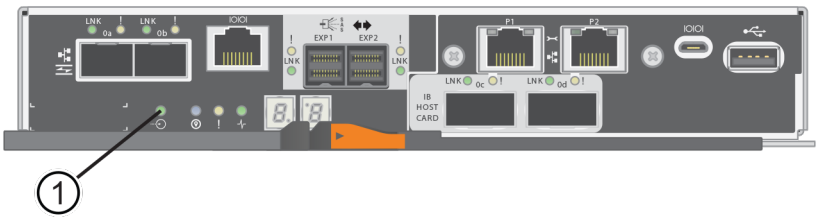
4. If the HIC ports use SFP+ transceivers, remove them.

   You will reuse these SFPs when you install the new HIC.

5. Confirm that the Cache Active LED on the back of the controller is off.

   The green Cache Active LED on the back of the controller is on when cached data needs to be written to the drives. You must wait for this LED to turn off before removing the controller canister.

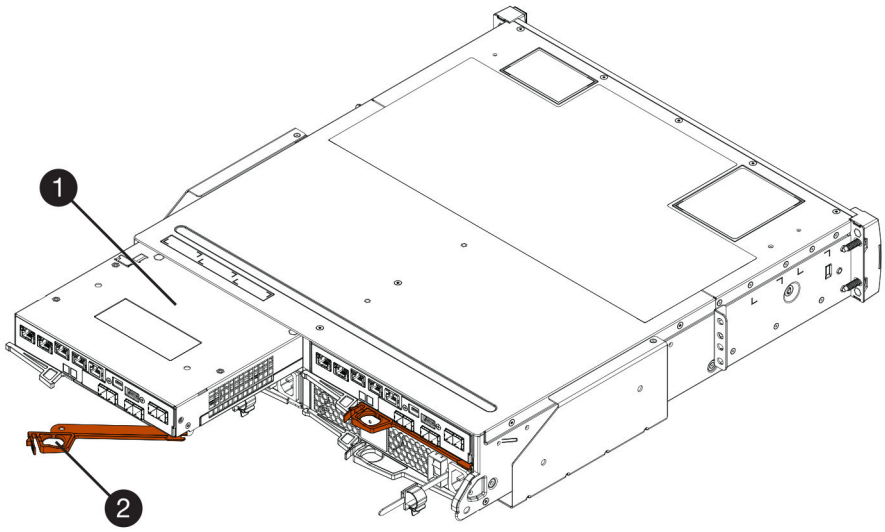
Note: The figure shows an example controller canister. Your controller might have a different number and a different type of host ports.



Item	Description
1	Cache Active LED

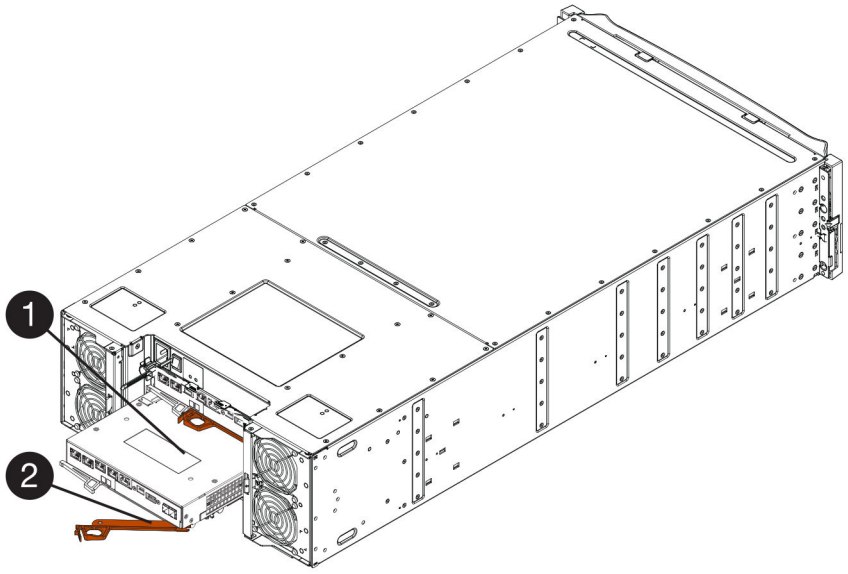
6. Squeeze the latch on the cam handle until it releases, and then open the cam handle to the right to release the controller canister from the shelf.

   The following figure is an example of an E5724 controller shelf:



Item	Description
1	Controller canister
2	Cam handle

The following figure is an example of an E5760 controller shelf:



Item	Description
1	Controller canister
2	Cam handle

7. Using two hands and the cam handle, slide the controller canister out of the shelf.

   Attention: Always use two hands to support the weight of a controller canister.

   If you are removing the controller canister from an E5724 controller shelf, a flap swings into place to block the empty bay, helping to maintain air flow and cooling.

8. Turn the controller canister over, so that the removable cover faces up.
9. Place the controller canister on a flat, static-free surface.

Removing a host interface card

When you replace a HIC, you must remove the original HIC from the controller canister.

Steps

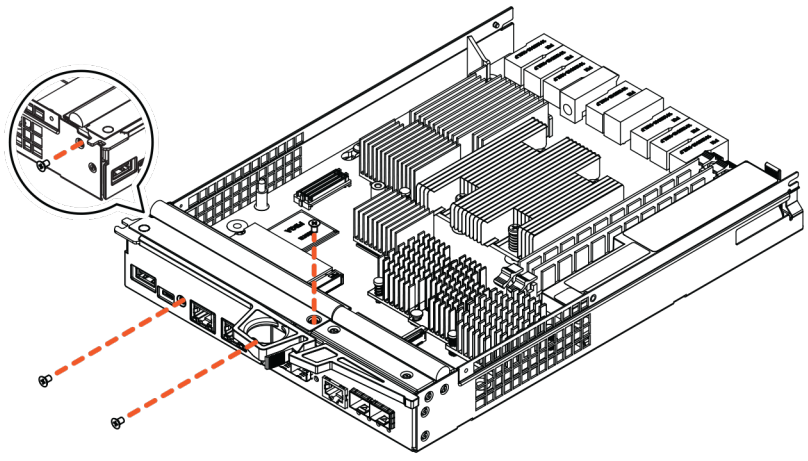
1. Remove the controller canister's cover by pressing down on the button and sliding the cover off.
2. Confirm that the green LED inside the controller (between the battery and the DIMMs) is off.

   If this green LED is on, the controller is still using battery power. You must wait for this LED to go off before removing any components.

Item	Description
1	Internal Cache Active LED
2	Battery

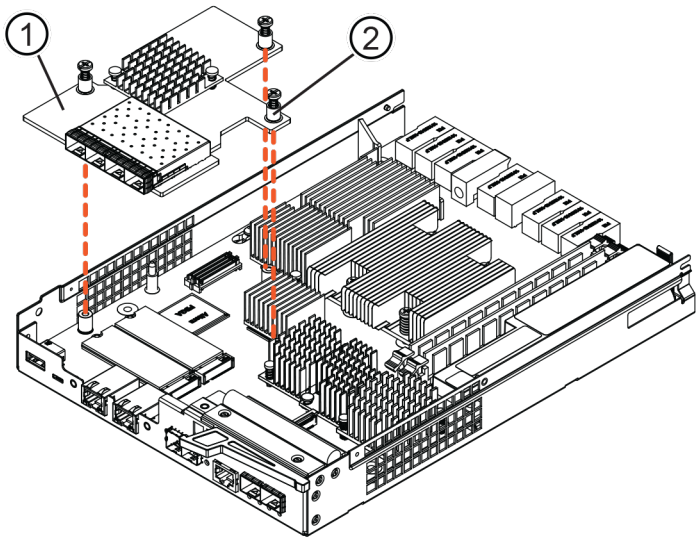
3. Using a #1 Phillips screwdriver, remove the screws that attach the HIC faceplate to the controller canister.

   There are four screws: one on the top, one on the side, and two on the front.



4. Remove the HIC faceplate.
5. Using your fingers or a Phillips screwdriver, loosen the three thumbscrews that secure the HIC to the controller card.
6. Carefully detach the HIC from the controller card by lifting the card up and sliding it back.

Attention: Possible equipment damage--Be careful not to scratch or bump the components on the bottom of the HIC or on the top of the controller card.



Item	Description
1	Host interface card (HIC)
2	Thumbscrews

7. Place the HIC on a static-free surface.

Installing a host interface card

After removing the controller canister and HIC faceplate, you can replace the HIC and reattach the HIC faceplate.

Steps

1. Unpack the new HIC, and confirm it is identical to the HIC you are replacing.

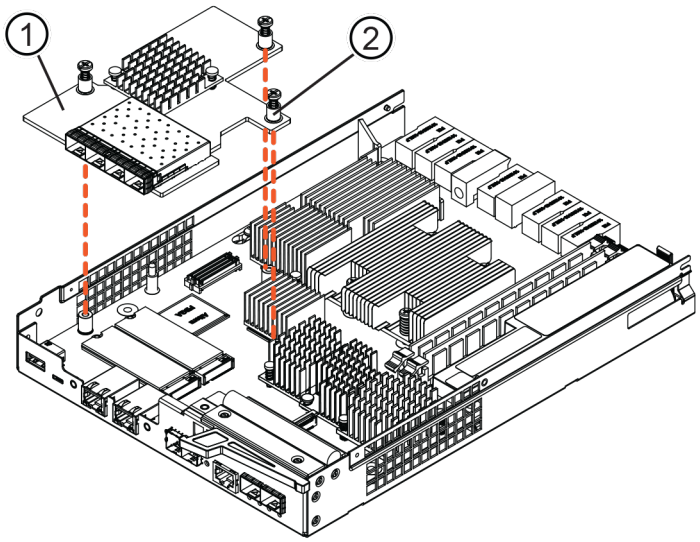
   Attention: Possible loss of data access – If you have two controllers, the HICs installed in the two controller canisters must be identical. If the replacement HIC is not identical to the HIC you are replacing, do not attempt this procedure. The presence of mismatched HICs will cause the controller with the replacement HIC to lock down when you bring it online.

2. Align the three thumbscrews on the HIC with the corresponding holes on the controller, and align the connector on the bottom of the HIC with the HIC interface connector on the controller card.

   Attention: Be careful not to scratch or bump the components on the bottom of the HIC or on the top of the controller card.

3. Carefully lower the HIC into place, and seat the HIC connector by pressing gently on the HIC.

   Attention: Possible equipment damage – Be very careful not to pinch the gold ribbon connector for the controller LEDs between the HIC and the thumbscrews.

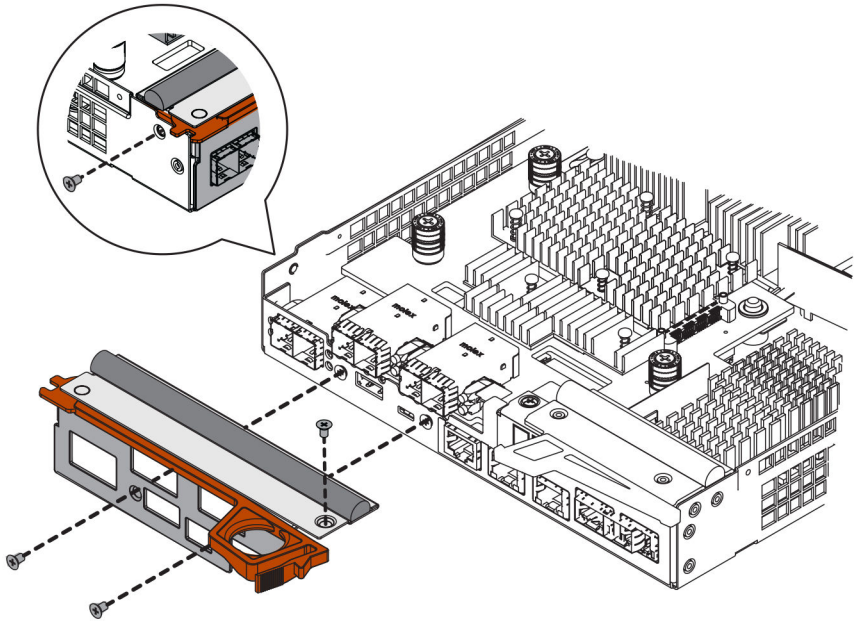


Item	Description
1	Host interface card (HIC)
2	Thumbscrews

4. Hand-tighten the HIC thumbscrews.

   Do not use a screwdriver, or you might over tighten the screws.

5. Using a #1 Phillips screwdriver, attach the HIC faceplate to the controller canister with the four screws you removed previously.



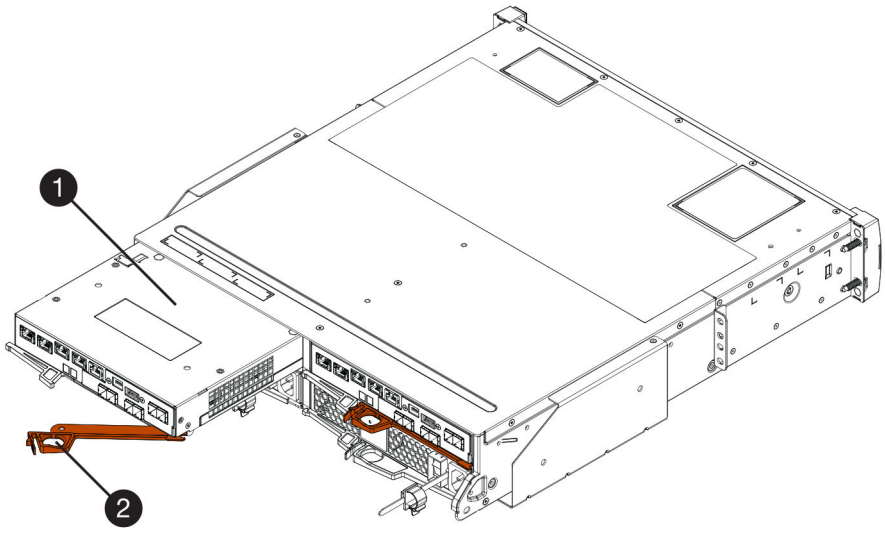
Installing a controller canister

After replacing the failed HIC, you can install the new controller canister into the controller shelf.

Steps

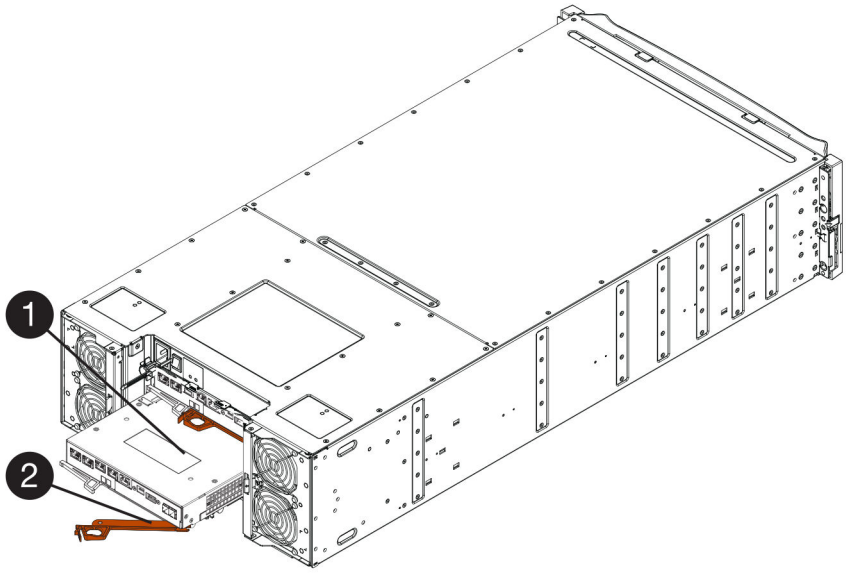
1. Reinstall the cover on the controller canister by sliding the cover from back to front until the button clicks.
2. Turn the controller canister over, so that the removable cover faces down.
3. With the cam handle in the open position, slide the controller canister all the way into the controller shelf.

   The following figure is an example of an E5724 controller shelf:



Item	Description
1	Controller canister
2	Cam handle

The following figure is an example of an E5760 controller shelf:



Item	Description
1	Controller canister
2	Cam handle

4. Move the cam handle to the left to lock the controller canister in place.
5. Install the SFPs from the original HIC in the host ports on the new HIC, as well as in host ports on controller canister, and reconnect all of the cables.

   If you are using more than one host protocol, be sure to install the SFPs in the correct host ports.

After replacing a HIC

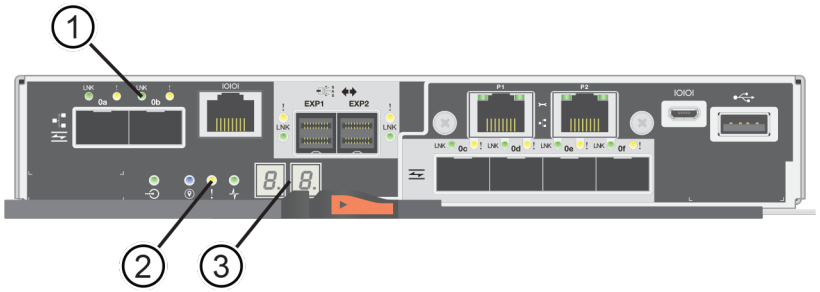
After replacing a HIC, you must bring the controller online and confirm the storage array is working correctly. Then, you can collect support data and resume operations.

Steps

1. As the controller boots, check the controller LEDs and the seven-segment display.

   When communication with the other controller is reestablished:

   - The seven-segment display shows the repeating sequence **OS**, **OL**, ***blank*** to indicate that the controller is offline.
   - The amber Attention LED remains lit.
   - The Host Link LEDs might be on, blinking, or off, depending on the host interface.



Item	Description
1	Host Link LEDs
2	Attention LED (amber)
3	Seven-segment display

2. Bring the controller online using either SANtricity System Manger or the Enterprise Management Window's (EMW) script editor:

Option	Description
SANtricity System Manager	**a.** Select **Hardware**. **b.** If the graphic shows the drives, select **Show back of shelf**. **c.** Select the controller you want to place online. **d.** Select **Place Online** from the context menu, and confirm that you want to perform the operation.

Enterprise Management Window (EMW)	**a.** Open the Enterprise Management Window (EMW) in SANtricity Storage Manager on your local host.
	b. Select the storage array.
	c. Select **Tools > Execute Script**.
	d. Type one of the following commands in the text box.
	`For controller A: set controller [a] availability=online;`
	`For controller B: set controller [b] availability=online;`
	e. Select **Tools > Verify and Execute**.

The system places the controller online.

3. Check the codes on the controller's seven-segment display as it comes back online. If the display shows one of the following repeating sequences, immediately remove the controller.

- **OE**, **L0**, ***blank*** (mismatched controllers)

- **OE**, **L6**, ***blank*** (unsupported HIC)

  Attention: Possible loss of data access – If the controller you just installed shows one of these codes, and the other controller is reset for any reason, the second controller could also lock down resulting in loss of data access.

4. When the controller is back online, confirm that its status is Optimal, and check the controller shelf's Attention LEDs.

   If the status is not Optimal or if any of the Attention LEDs are on, confirm that all cables are correctly seated, and check that the HIC and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the HIC.

   Note: If you cannot resolve the problem, contact technical support.

5. Collect support data for your storage array.

   Collecting support data before and after replacing a component ensures you can send a full set of logs to technical support in case the replacement does not resolve the problem.

Option	Description
SANtricity System Manager	**a.** Select **Support > Support Center > Diagnostics**. **b.** Select **Collect Support Data**. **c.** Click **Collect**. The file is saved in the Downloads folder for your browser with the name *`support-data.7z`*.

Script editor in the EMW	**a.** Open the Enterprise Management Window (EMW) in SANtricity Storage Manager on your local host.
	b. Select the storage array.
	c. Select **Tools > Execute Script**.
	d. Type the following command in the text box.
	`save storageArray supportData file="filename";`
	In this command, *`filename`* is the file path and the file name to which you want to save the support data. Enclose the file path and the file name in double quotation marks (" "). For example:
	`file="C:\Program Files\CLI\logs\support-data.7z"`
	e. Select **Tools > Verify and Execute**.

6. Return the failed part to NetApp, as described in the RMA instructions shipped with the kit.

   Contact technical support at *NetApp Support*, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific) if you need the RMA number.

Copyright information

Copyright © 2018 NetApp, Inc. All rights reserved. Printed in the U.S.

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.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

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, and the marks listed on the NetApp Trademarks page are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.

http://www.netapp.com/us/legal/netapptmlist.aspx

How to send comments about documentation and receive update notifications

You can help us to improve the quality of our documentation by sending us your feedback. You can receive automatic notification when production-level (GA/FCS) documentation is initially released or important changes are made to existing production-level documents.

If you have suggestions for improving this document, send us your comments by email.

doccomments@netapp.com

To help us direct your comments to the correct division, include in the subject line the product name, version, and operating system.

If you want to be notified automatically when production-level documentation is released or important changes are made to existing production-level documents, follow Twitter account @NetAppDoc.

You can also contact us in the following ways:

- NetApp, Inc., 495 East Java Drive, Sunnyvale, CA 94089 U.S.
- Telephone: +1 (408) 822-6000
- Fax: +1 (408) 822-4501
- Support telephone: +1 (888) 463-8277