Host interface cards

E-Series storage systems

NetApp
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Host interface cards

Upgrade the host interface card (HIC) - E4000

You can upgrade the host interface cards (HICs) to increase the number of host ports or to change host protocols.

About this task

- When you upgrade HICs, you must power off the storage array, upgrade the HICs, and reapply power.
- When upgrading HICs in an E4000 controller repeat all steps to remove the second controller, upgrade the second controller's HICs, and reinstall the second controller before reapplying power to the controller shelf.

Before you begin

- Schedule a downtime maintenance window for this procedure. You cannot access data on the storage array until you have successfully completed this procedure. Because both controllers must have the same HIC configuration when they are powered on, the power must be off when you change HIC configuration. The presence of mismatched HICs causes the controller with the replacement HIC to lock down when you bring it online.
- Make sure you have the following:
  - Two HICs that are compatible with your controllers.
  - An ESD wristband, or you have taken other antistatic precautions.
  - A flat, static free work area.
  - Labels to identify each cable that is connected to the controller canister.
  - A #1 Phillips screwdriver.
  - A management station with a browser that can access SANtricity System Manager for the controller. (To open the System Manager interface, point the browser to the controller's domain name or IP address.)

Possible loss of data access — Never install a HIC in an E4000 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 causes the controllers to lock down when you apply power.

Step 1: Place controller shelf offline

Place the controller shelf offline so you can safely upgrade the HICs.

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. Click **Support > Upgrade Center** to ensure that the latest version of SANtricity OS is installed.

   As needed, install the latest version.

3. Back up the storage array's configuration database using SANtricity System Manager.

   If a problem occurs when you remove a controller, you can use the saved file to restore your configuration. The system will save the current state of the RAID configuration database, which includes all data for volume groups and disk pools on the controller.

   - From System Manager:
     a. Select **Support > Support Center > Diagnostics**.
     b. Select **Collect Configuration Data**.
     c. Click **Collect**.

        The file is saved in the Downloads folder for your browser with the name, **configurationData-<arrayName>-<dateTime>.7z**.

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.

   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.

   Possible data loss — If you continue this procedure while I/O operations are occurring, the host application might lose access to the data because the storage is not accessible.

5. 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.

6. From the Home page of SANtricity System Manager, select **View Operations in Progress**. Wait for all operations to complete before continuing with the next step.
7. Power down the controller shelf.
   a. Label and then unplug both power cables from controller shelf.
   b. Wait for all LEDs on the controller shelf to turn off.

Step 2: Remove controller canister

Remove the controller canister from the system and then remove the controller canister cover.

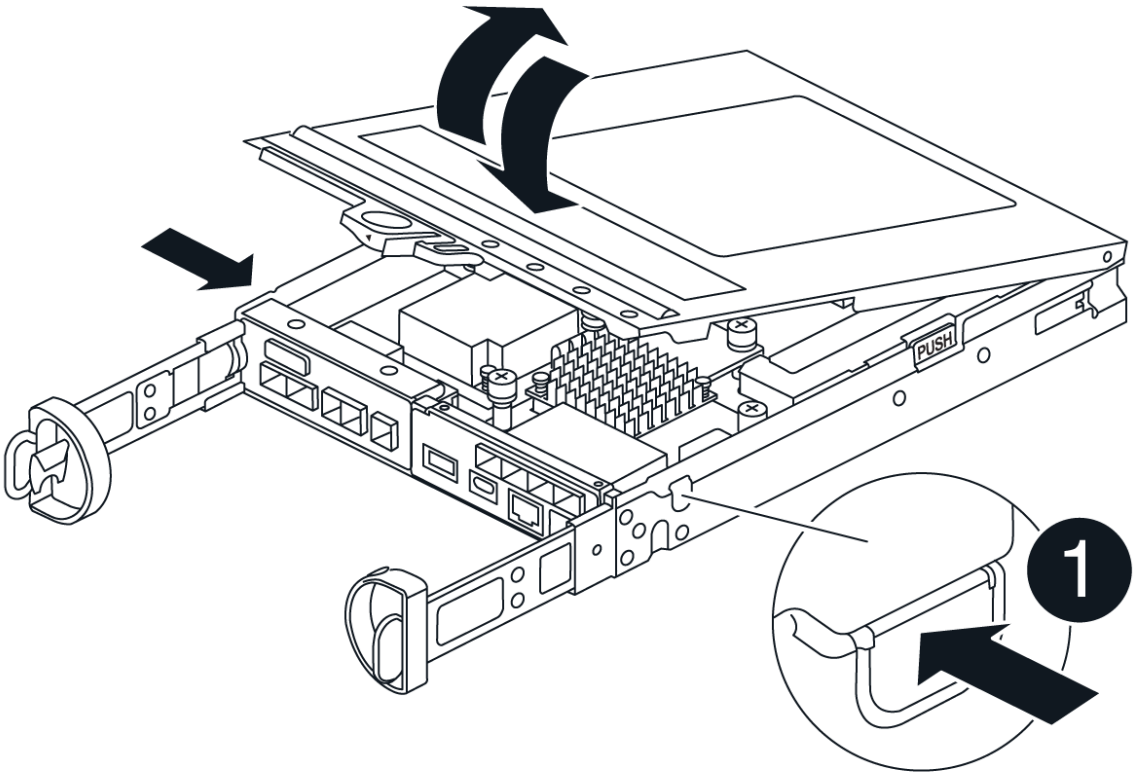
Steps

1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller canister, keeping track of where the cables were connected.

   Leave the cables in the cable management device so that when you reinstall the cable management

device, the cables are organized.

3. Remove and set aside the cable management devices from the left and right sides of the controller canister.
4. Squeeze the latch on the cam handle until it releases, open the cam handle fully to release the controller canister from the midplane, and then, using two hands, pull the controller canister out of the chassis.
5. Turn the controller canister over and place it on a flat, stable surface.
6. Open the cover by pressing the blue buttons on the sides of the controller canister to release the cover, and then rotate the cover up and off of the controller canister.

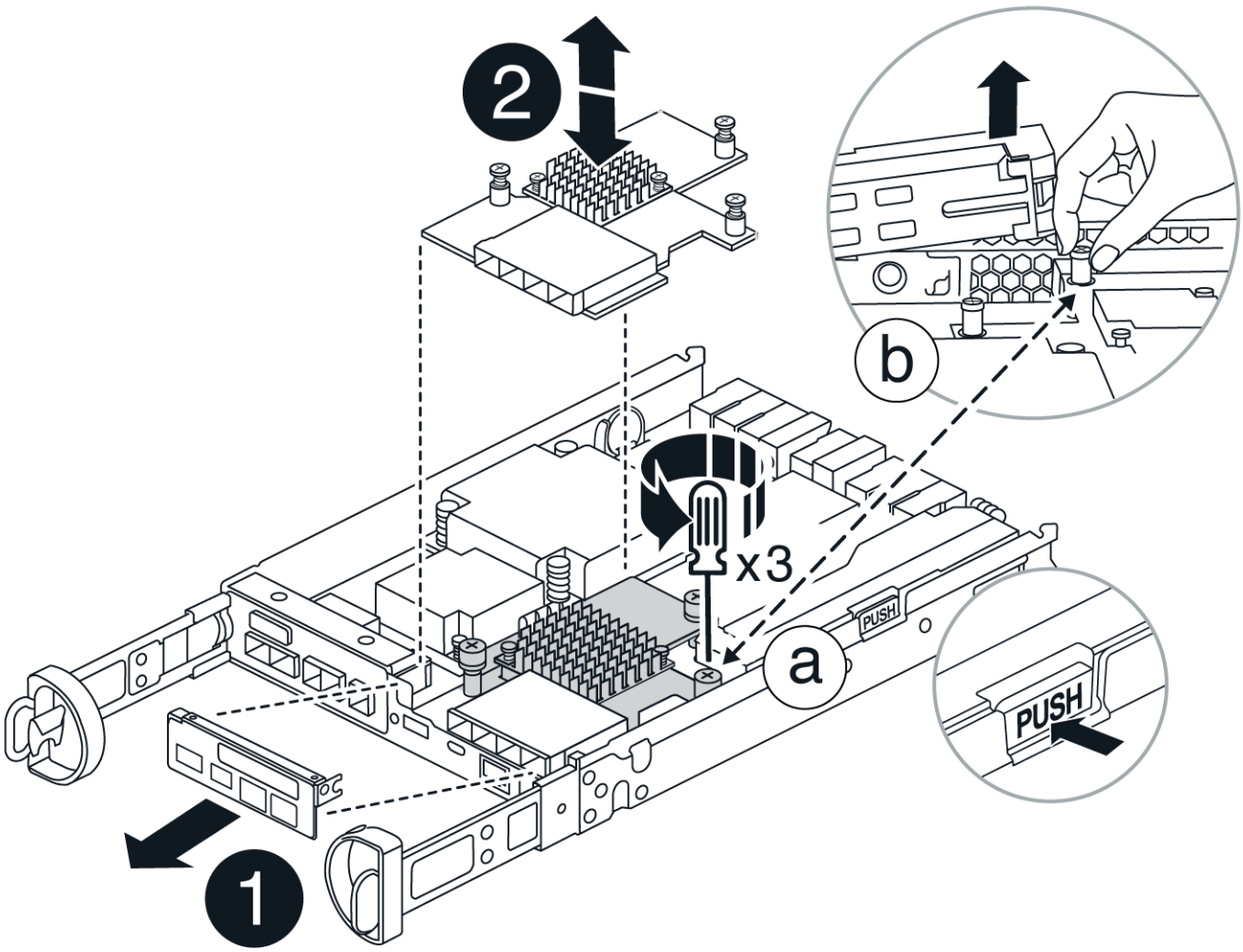


Step 3: Upgrade the HIC

Remove and replace the HIC.

Steps

1. If you are not already grounded, properly ground yourself.
2. Remove the HIC:



a. Remove the HIC faceplate by loosening all screws and sliding it straight out from the controller module.

b. Loosen the thumbscrews on the HIC and lift the HIC straight up.

3. Reinstall the HIC:

a. Align the socket on the replacement HIC plug with the socket on the motherboard, and then gently seat the card squarely into the socket.

b. Tighten the three thumbscrews on the HIC.

c. Reinstall the HIC faceplate.

4. Reinstall the controller module cover and lock it into place.

Step 4: Reinstall controller canister

Reinstall the controller canister into the chassis.

Steps

1. If you are not already grounded, properly ground yourself.
2. If you have not already done so, replace the cover on the controller canister.
3. Turn the controller over, so that the removable cover faces down.
4. With the cam handle in the open position, slide the controller all the way into the shelf.

5. Replace the cables.

   If you removed the media converters (QSFPs or SFPs), remember to reinstall them if you are using fiber optic cables.

6. Bind the cables to the cable management device with the hook and loop strap.
7. Repeat Step 2: Remove controller canister, Step 3: Upgrade the HIC, and Step 4: Reinstall controller canister for the second controller.

Step 5: Complete the HIC upgrade

Place both controllers online, collect support data, and resume operations.

Steps

1. Place controllers online.
   a. Plug in power cables.
2. As the controllers boot, check the controller LEDs.
   - The amber Attention LED remains on.
   - The Host Link LEDs might be on, blinking, or off, depending on the host interface.
3. When the controllers are back online, confirm that their 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 the controller canisters are installed correctly. If necessary, remove and reinstall the controller canisters.

   If you cannot resolve the problem, contact technical support.

4. Verify that all volumes have been returned to the preferred owner.
   a. Select **Storage › Volumes**. From the **All Volumes** page, verify that volumes are distributed to their preferred owners. Select **More › Change ownership** to view volume owners.
   b. If volumes are all owned by preferred owner continue to Step 6.
   c. If none of the volumes are returned, you must manually return the volumes. Go to **More › Redistribute volumes**.
   d. If only some of the volumes are returned to their preferred owners after auto-distribution or manual distribution you must check the Recovery Guru for host connectivity issues.
   e. If there is no Recovery Guru present or if following the recovery guru steps the volumes are still not returned to their preferred owners contact support.
5. Collect support data for your storage array using 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**.

What's next?

The process of upgrading a host interface card in your storage array is complete. You can resume normal operations.

Replace the host interface card (HIC) - E4000

Follow this procedure to replace a failed host interface card (HIC) in an E4000 array.

About this task

When you replace a failed HIC, you must power off the storage array (simplex) or place affected controller offline (duplex), replace the HIC, and reapply power (simplex) or bring controller online (duplex).

Before you begin

- If you have a simplex configuration, schedule a downtime maintenance window for this procedure. You cannot access data on the storage array until you have successfully completed this procedure.
- Make sure you have the following:
  - HICs that are compatible with your controller(s).
  - An ESD wristband, or you have taken other antistatic precautions.
  - A flat, static free work area.
  - Labels to identify each cable that is connected to the controller canister.
  - A #1 Phillips screwdriver.
  - A management station with a browser that can access SANtricity System Manager for the controller. (To open the System Manager interface, point the browser to the controller's domain name or IP address.)

Possible loss of data access — Never install a HIC in an E4000 controller canister if that HIC was designed for another E-Series controller. In addition, both controllers and both HICs must be identical in a duplex configuration. The presence of incompatible or mismatched HICs causes the controllers to lock down when you apply power.

Step 1: Prepare to replace HIC

Power down the controller shelf (simplex) or place the affected controller offline (duplex) so you can safely replace the HICs.

Power down the controller shelf (simplex)

Steps

1. If possible, make a note of which version of SANtricity OS software is currently installed on the controller. Open SANtricity System Manager and select **Support › Upgrade Center › View Software and Firmware Inventory**.
2. If the Drive Security feature is enabled, be sure a saved key exists and that you know the pass phrase required to install it.

   Possible loss of data access — If all drives in the storage array are security enabled, the new controller will not be able to access the storage array until you unlock the secured drives using the Enterprise Management Window in SANtricity Storage Manager.

   To save the key (might not be possible, depending on the state of the controller):

   a. From SANtricity System Manager, select **Settings › System**.
   b. Under **Security key management**, select **Back Up Key**.
   c. In the **Define a pass phrase/Re-enter pass phrase** fields, enter and confirm a pass phrase for this backup copy.
   d. Click **Backup**.
   e. Record your key information in a secure location, and then click **Close**.
3. Back up the storage array's configuration database using SANtricity System Manager.

   If a problem occurs when you remove a controller, you can use the saved file to restore your configuration. The system will save the current state of the RAID configuration database, which includes all data for volume groups and disk pools on the controller.

   - From System Manager:
     a. **Select Support › Support Center › Diagnostics**.
     b. Select **Collect Configuration Data**.
     c. Click **Collect**.

        The file is saved in the Downloads folder for your browser with the name, **configurationData-<arrayName>-<dateTime>.7z**.
   - Alternatively, you can back up the configuration database by using the following CLI command:

     ```
     save storageArray dbmDatabase sourceLocation=onboard contentType=all
     file="filename";
     ```
4. Collect support data for your storage array using SANtricity System Manager.

   If a problem occurs when you remove a controller, you can use the saved file to troubleshoot the issue. The system will save inventory, status, and performance data about your storage array in a single file.

   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**.

5. 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.

   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.

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

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

   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.

7. From the home page of SANtricity System Manager, select **View Operations in Progress**.
8. Confirm that all operations have completed before continuing with the next step.
9. Turn off both power switches on the controller shelf.
10. Wait for all LEDs on the controller shelf to turn off.
11. Select **Recheck** from the Recovery Guru, and confirm that the **OK to remove** field in the Details area displays **Yes**, indicating that it is safe to remove this component. Data on the storage array will not be accessible until you replace the controller canister.

Place controller offline (duplex)

Steps

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

   Save the packing materials to use when shipping the failed controller canister.

2. Locate the MAC address and FRU part number labels on the back of the controller canister.
3. From SANtricity System Manager, locate the replacement part number for the controller canister you are replacing.

   When a controller has a fault and needs to be replaced, the replacement part number is displayed in the Details area of the Recovery Guru. If you need to find this number manually, follow these steps:

   a. Select **Hardware**.
   b. Locate the controller shelf, which is marked with the controller icon.
   c. Click the controller icon.
   d. Select the controller, and click **Next**.

e. On the **Base** tab, make a note of the **Replacement Part Number** for the controller.

4. Confirm that the replacement part number for the failed controller is the same as the FRU part number for the replacement controller.

> **Possible loss of data access** — If the two part numbers are not the same, do not attempt this procedure. The presence of mismatched controllers will cause the new controller to lock down when you bring it online.

5. Back up the storage array's configuration database using SANtricity System Manager.

   If a problem occurs when you remove a controller, you can use the saved file to restore your configuration. The system will save the current state of the RAID configuration database, which includes all data for volume groups and disk pools on the controller.

   - From System Manager:
     a. Select **Support › Support Center › Diagnostics**.
     b. Select **Collect Configuration Data**.
     c. Click **Collect**.

     The file is saved in the Downloads folder for your browser with the name, **configurationData-<arrayName>-<dateTime>.7z**.

   - Alternatively, you can back up the configuration database by using the following CLI command:

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

6. If the controller is not already offline, take it offline now using SANtricity System Manager.
   - From 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.

> If you are accessing SANtricity System Manager using the controller you are attempting to take offline, a SANtricity System Manager Unavailable message is displayed. Select Connect to an alternate network connection to automatically access SANtricity System Manager using the other controller.

   - Alternatively, you can take the controllers offline by using the following CLI commands:

     For controller A: `set controller [a] availability=offline`

     For controller B: `set controller [b] availability=offline`

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

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

8. Select **Recheck** from the Recovery Guru, and confirm that the **OK to remove** field in the Details area displays **Yes**, indicating that it is safe to remove this component.

Step 2: Remove controller canister

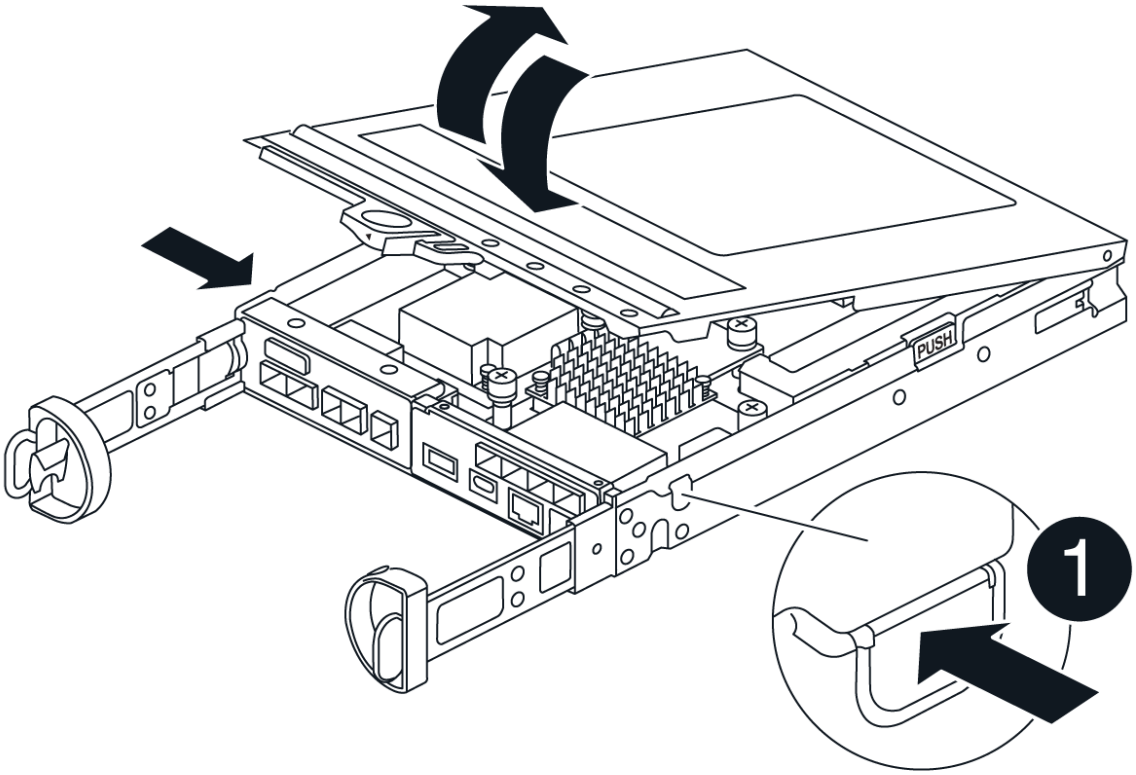
Remove the controller canister from the system and then remove the controller canister cover.

Steps

1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller canister, keeping track of where the cables were connected.

   Leave the cables in the cable management device so that when you reinstall the cable management device, the cables are organized.

3. Remove and set aside the cable management devices from the left and right sides of the controller canister.
4. Squeeze the latch on the cam handle until it releases, open the cam handle fully to release the controller canister from the midplane, and then, using two hands, pull the controller canister out of the chassis.
5. Turn the controller canister over and place it on a flat, stable surface.
6. Open the cover by pressing the blue buttons on the sides of the controller canister to release the cover, and then rotate the cover up and off of the controller canister.

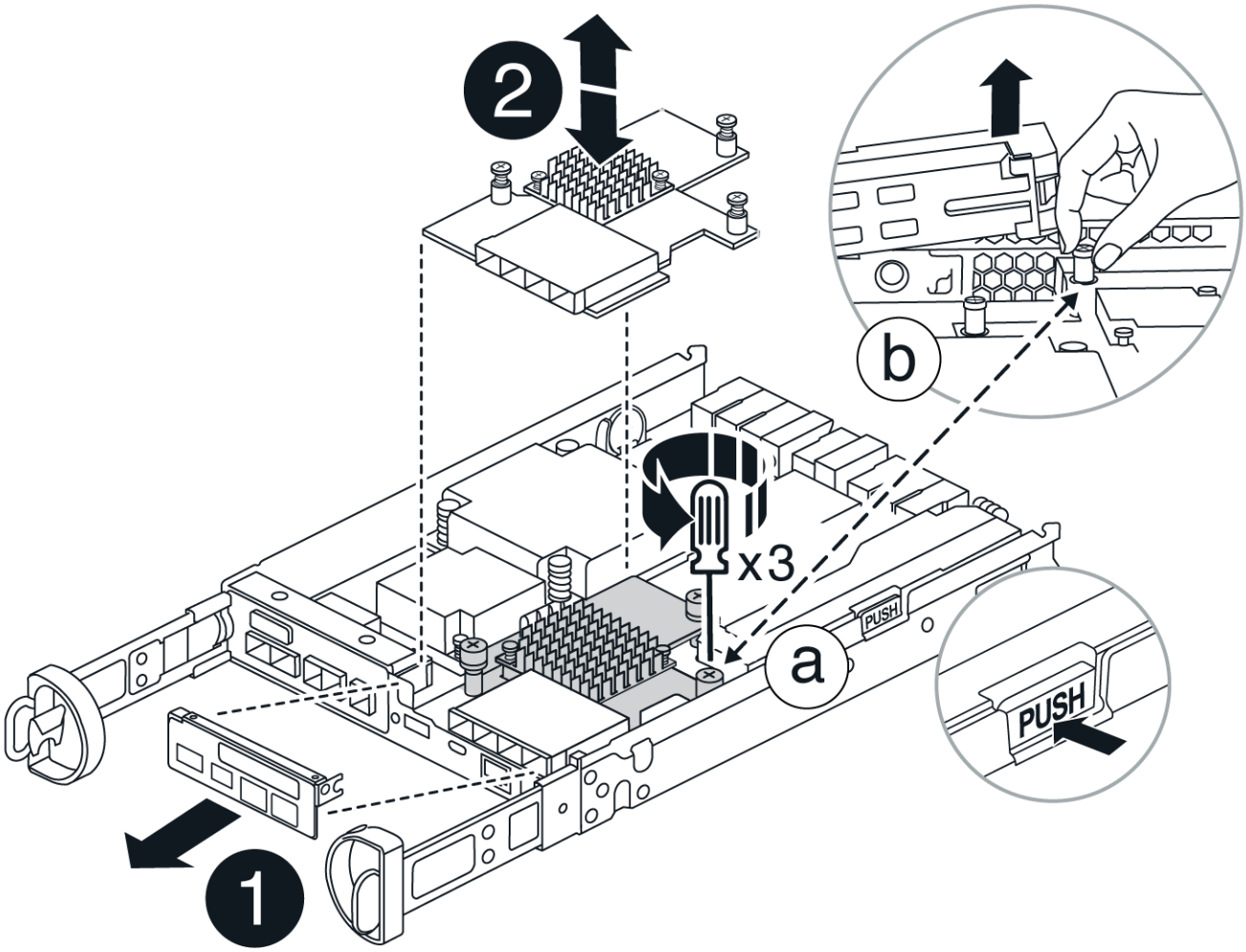


Step 3: Replace the HIC

Replace the HIC.

Steps

1. If you are not already grounded, properly ground yourself.
2. Remove the HIC:



a. Remove the HIC faceplate by sliding it straight out from the controller module.

b. Loosen the thumbscrews on the HIC and lift it straight up.

> If you are using your fingers to the loosen the thumbscrew, you may need to press the battery release tab and rotate the battery up for better access.

3. Reinstall the HIC:

   a. Align the socket on the replacement HIC plug with the socket on the motherboard, and then gently seat the card squarely into the socket.

   b. Hand-tighten the three thumbscrews on the HIC.

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

   c. Reinstall the HIC faceplate.

4. Reinstall the controller module cover and lock it into place.

Step 4: Reinstall controller canister

Reinstall the controller canister into the chassis.

Steps

1. If you are not already grounded, properly ground yourself.
2. If you have not already done so, replace the cover on the controller canister.
3. Turn the controller over, so that the removable cover faces down.
4. With the cam handle in the open position, slide the controller all the way into the shelf.
5. Replace the cables.

> If you removed the media converters (QSFPs or SFPs), remember to reinstall them if you are using fiber optic cables.

6. Bind the cables to the cable management device with the hook and loop strap.

Step 5: Complete HIC replacement

Power up the controller (simplex) or place the controller online (duplex), collect support data, and resume operations.

Power up controller (simplex)

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. When the controller is back online, 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 battery and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the battery.

   If you cannot resolve the problem, contact technical support. If needed, collect support data for your storage array using SANtricity System Manager.

3. Collect support data for your storage array using 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**.

Place controller online (duplex)

Steps

1. Bring the controller online using SANtricity System Manager.
   - From 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.

        The system places the controller online.
   - Alternatively, you can bring the controller back online by using the following CLI commands:

     For controller A: `set controller [a] availability=online;`

     For controller B: `set controller [b] availability=online;`
2. When the controller is back online, 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 battery and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the battery.

If you cannot resolve the problem, contact technical support. If needed, collect support data for your storage array using SANtricity System Manager.

3. Verify that all volumes have been returned to the preferred owner.
   a. Select **Storage › Volumes**. From the **All Volumes** page, verify that volumes are distributed to their preferred owners. Select **More › Change ownership** to view volume owners.
   b. If volumes are all owned by preferred owner continue to step 5.
   c. If none of the volumes are returned, you must manually return the volumes. Go to **More › Redistribute volumes**.
   d. If only some of the volumes are returned to their preferred owners after auto-distribution or manual distribution, you must check the Recovery Guru for host connectivity issues.
   e. If there is no Recovery Guru present or if after following the recovery guru steps the volumes are still not returned to their preferred owners, contact support.
4. Collect support data for your storage array using 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**.

What's next?

Your host interface card replacement is complete. You can resume normal operations.

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