



Maintain

Install and maintain

NetApp
August 22, 2025

This PDF was generated from <https://docs.netapp.com/us-en/ontap-systems/fas8300/maintain-overview.html> on August 22, 2025. Always check docs.netapp.com for the latest.

Table of Contents

Maintain	1
Maintain FAS8300 and FAS8700 hardware	1
Boot media	1
Caching module	1
Chassis	1
Controller	1
DIMM	1
Fan	1
NVDIMM battery	1
NVDIMM	1
PCIe or Mezzanine card	1
Power supply	2
Real-time clock battery	2
Boot media	2
Overview of boot media replacement - AFF FAS8300 and FAS8700	2
Check encryption key support and status - AFF fas8300 and FAS8700	2
Shut down the impaired controller - AFF FAS8300 and FAS8700	6
Replace the boot media - FAS8300 and FAS8700	10
Boot the recovery image - AFF FAS8300 and FAS8700	15
Switch back aggregates in a two-node MetroCluster configuration - AFF fas8300 and FAS8700	17
Restore encryption - AFF fas8300 and FAS8700	18
Return the failed part to NetApp - AFF fas8300 and FAS8700	27
Replace the caching module - FAS8300 and FAS8700	27
Step 1: Shut down the impaired controller	28
Step 2: Remove the controller module	31
Step 3: Replace a caching module	32
Step 4: Install the controller module	34
Step 5: Restore the controller module to operation	35
Step 7: Switch back aggregates in a two-node MetroCluster configuration	35
Step 8: Complete the replacement process	37
Chassis	37
Overview of chassis replacement - FAS8300 and FAS8700	37
Shut down the controllers - FAS8300 and FAS8700	37
Move and replace hardware - FAS8300 and FAS8700	40
Complete the restoration and replacement process - FAS8300 and FAS8700	42
Controller	45
Overview of controller module replacement - FAS8300 and FAS8700	45
Shut down the impaired controller - FAS8300 and FAS8700	45
Replace the controller module hardware - FAS8300 and FAS8700	49
Restore and verify the system configuration - FAS8300 and FAS8700	60
Recable the system and reassign disks - FAS8300 and FAS8700	61
Complete system restoration - FAS8300 and FAS8700	67
Replace a DIMM - FAS8300 and FAS8700	70

Step 1: Shut down the impaired controller	70
Step 2: Remove the controller module	74
Step 3: Replace system DIMMs	75
Step 4: Install the controller module	76
Step 5: Restore the controller module to operation	78
Step 6: Switch back aggregates in a two-node MetroCluster configuration	78
Step 7: Return the failed part to NetApp	79
Hot-swap a fan module - FAS8300 and FAS8700	79
Replace an NVDIMM - FAS8300 and FAS8700	81
Step 1: Shut down the impaired controller	81
Step 2: Remove the controller module	85
Step 3: Replace the NVDIMM	86
Step 4: Install the controller module	88
Step 5: Restore the controller module to operation	89
Step 6: Switch back aggregates in a two-node MetroCluster configuration	89
Step 7: Return the failed part to NetApp	91
Replace the NVDIMM battery - FAS8300 and FAS8700	91
Step 1: Shut down the impaired controller	91
Step 2: Remove the controller module	95
Step 3: Replace the NVDIMM battery	96
Step 4: Install the controller module	97
Step 5: Restore the controller module to operation	98
Step 6: Switch back aggregates in a two-node MetroCluster configuration	98
Step 7: Return the failed part to NetApp	100
Replace a PCIe or mezzanine card - FAS8300 and FAS8700	100
Step 1: Shut down the impaired controller	100
Step 2: Remove the controller module	104
Step 3: Replace a PCIe card	105
Step 4: Replace the mezzanine card	106
Step 5: Install the controller module	108
Step 6: Switch back aggregates in a two-node MetroCluster configuration	109
Step 7: Restore the controller module to operation	111
Step 8: Return the failed part to NetApp	111
Replace a power supply - FAS8300 and FAS8700	111
Replace the real-time clock battery - FAS8300 and FAS8700	113
Step 1: Shut down the impaired controller	113
Step 2: Remove the controller module	117
Step 3: Replace the RTC battery	118
Step 4: Reinstall the controller module and sett time/date after RTC battery replacement	119
Step 5: Switch back aggregates in a two-node MetroCluster configuration	120
Step 6: Return the failed part to NetApp	122

Maintain

Maintain FAS8300 and FAS8700 hardware

For the FAS8300 and FAS8700 storage systems, you can perform maintenance procedures on the following components.

Boot media

The boot media stores a primary and secondary set of boot image files that the system uses when it boots.

Caching module

You must replace the controller's caching module when your system registers a single AutoSupport (ASUP) message that the module has gone offline.

Chassis

The chassis is the physical enclosure housing all the controller components such as the controller/CPU unit, power supply, and I/O.

Controller

A controller consists of a board, firmware, and software. It controls the drives and implements the ONTAP functions.

DIMM

You must replace a DIMM (dual in-line memory module) when a memory mismatch is present, or you have a failed DIMM.

Fan

The fan cools the controller.

NVDIMM battery

A NVDIMM battery is responsible for maintaining power to the NVDIMM module.

NVDIMM

The NVDIMM (non-volatile dual in-line memory module) manages the data transfer from the volatile memory to the non-volatile storage, and maintains data integrity in the event of a power loss or system shutdown.

PCIe or Mezzanine card

A PCIe (peripheral component interconnect express) card is an expansion card that plugs into the PCIe slot on

the motherboard.

A Mezzanine card is an expansion card that is designed to be inserted into a specialized slot on the motherboard.

Power supply

A power supply provides a redundant power source in a controller shelf.

Real-time clock battery

A real time clock battery preserves system date and time information if the power is off.

Boot media

Overview of boot media replacement - AFF FAS8300 and FAS8700

The boot media stores a primary and secondary set of system (boot image) files that the system uses when it boots. Depending on your network configuration, you can perform either a nondisruptive or disruptive replacement.

You must have a USB flash drive, formatted to FAT32, with the appropriate amount of storage to hold the `image_XXX.tgz` file.

You also must copy the `image_XXX.tgz` file to the USB flash drive for later use in this procedure.

- The nondisruptive and disruptive methods for replacing a boot media both require you to restore the `var` file system:
 - For nondisruptive replacement, the HA pair must be connected to a network to restore the `var` file system.
 - For disruptive replacement, you do not need a network connection to restore the `var` file system, but the process requires two reboots.
- You must replace the failed component with a replacement FRU component you received from your provider.
- It is important that you apply the commands in these steps on the correct node:
 - The *impaired* node is the node on which you are performing maintenance.
 - The *healthy node* is the HA partner of the impaired node.

Check encryption key support and status - AFF fas8300 and FAS8700

To ensure data security on your storage system, you need to verify the encryption key support and status on your boot media. Check if your ONTAP version supports NetApp Volume Encryption (NVE), and before you shut down the controller check if the key manager is active.

Step 1: Check if your version of ONTAP supports NetApp Volume Encryption

Check whether your ONTAP version supports NetApp Volume Encryption (NVE). This information is crucial for

downloading the correct ONTAP image.

Steps

1. Determine if your ONTAP version supports encryption by running the following command:

```
version -v
```

If the output includes `1Ono-DARE`, NVE is not supported on your cluster version.

2. Depending on whether NVE is supported on your system, take one of the following actions:
 - If NVE is supported, download the ONTAP image with NetApp Volume Encryption.
 - If NVE is not supported, download the ONTAP image **without** NetApp Volume Encryption.

Step 2: Determine if it is safe to shut down the controller

To safely shut down a controller, first identify whether the External Key Manager (EKM) or the Onboard Key Manager (OKM) is active. Then, verify the key manager in use, display the appropriate key information, and take action based on the status of the authentication keys.

Steps

1. Determine which key manager is enabled on your system:

ONTAP version	Run this command
ONTAP 9.14.1 or later	<pre>security key-manager keystore show</pre> <ul style="list-style-type: none">• If EKM is enabled, <code>EKM</code> is listed in the command output.• If OKM is enabled, <code>OKM</code> is listed in the command output.• If no key manager is enabled, <code>No key manager keystores configured</code> is listed in the command output.
ONTAP 9.13.1 or earlier	<pre>security key-manager show-key-store</pre> <ul style="list-style-type: none">• If EKM is enabled, <code>external</code> is listed in the command output.• If OKM is enabled, <code>onboard</code> is listed in the command output.• If no key manager is enabled, <code>No key managers configured</code> is listed in the command output.

2. Depending on whether a key manger is configured on your system, select one of the following options.

No key manager configured

You can safely shut down the impaired controller. Go to [shutdown the impaired controller](#).

External or Onboard key manager configured

- a. Enter the following query command to display the status of the authentication keys in your key manager.

```
security key-manager key query
```

- b. Check the output for the value in the `Restored` column for your key manager.

This column indicates whether the authentication keys for your key manager (either EKM or OKM) have been successfully restored.

3. Depending on whether your system is using the External Key Manager or Onboard Key Manager, select one of the following options.

External Key Manager

Depending on the output value displayed in the `Restored` column, follow the appropriate steps.

Output value in <code>Restored</code> column	Follow these steps...
<code>true</code>	You can safely shut down the impaired controller. Go to shutdown the impaired controller .
Anything other than <code>true</code>	<ol style="list-style-type: none">Restore the external key management authentication keys to all nodes in the cluster using the following command: <pre>security key-manager external restore</pre> If the command fails, contact NetApp Support.Verify that the <code>Restored</code> column displays <code>true</code> for all authentication keys by entering the <code>security key-manager key query</code> command. If all the authentication keys are <code>true</code>, you can safely shut down the impaired controller. Go to shutdown the impaired controller.

Onboard Key Manager

Depending on the output value displayed in the `Restored` column, follow the appropriate steps.

Output value in <code>Restored</code> column	Follow these steps...
<code>true</code>	<p>Manually back up the OKM information.</p> <ol style="list-style-type: none">Go to the advanced mode by entering <code>set -priv advanced</code> and then enter <code>Y</code> when prompted.Enter the following command to display the key management information: <pre>security key-manager onboard show-backup</pre>Copy the contents of the backup information to a separate file or your log file. You'll need it in disaster scenarios where you might need to manually recover OKM.You can safely shut down the impaired controller. Go to shutdown the impaired controller.

Output value in Restored column	Follow these steps...
Anything other than true	<p>a. Enter the onboard security key-manager sync command:</p> <pre>security key-manager onboard sync</pre> <p>b. Enter the 32 character, alphanumeric onboard key management passphrase when prompted.</p> <p>If the passphrase cannot be provided, contact NetApp Support.</p> <p>c. Verify the Restored column displays true for all authentication keys:</p> <pre>security key-manager key query</pre> <p>d. Verify that the Key Manager type displays onboard, and then manually back up the OKM information.</p> <p>e. Enter the command to display the key management backup information:</p> <pre>security key-manager onboard show-backup</pre> <p>f. Copy the contents of the backup information to a separate file or your log file.</p> <p>You'll need it in disaster scenarios where you might need to manually recover OKM.</p> <p>g. You can safely shut down the impaired controller. Go to shutdown the impaired controller.</p>

Shut down the impaired controller - AFF FAS8300 and FAS8700

Option 1: Most systems

After completing the NVE or NSE tasks, you need to complete the shutdown of the impaired controller.

Steps

- Take the impaired controller to the LOADER prompt:

If the impaired controller displays...	Then...
The LOADER prompt	Go to Remove controller module.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller displays...	Then...
System prompt or password prompt (enter system password)	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name</pre> <p>When the impaired controller shows Waiting for giveback..., press Ctrl-C, and then respond <code>y</code>.</p>

- b. From the LOADER prompt, enter: `printenv` to capture all boot environmental variables. Save the output to your log file.



This command may not work if the boot device is corrupted or non-functional.

Option 2: Controller is in a MetroCluster

After completing the NVE or NSE tasks, you need to complete the shutdown of the impaired controller.



Do not use this procedure if your system is in a two-node MetroCluster configuration.

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).
- If you have a MetroCluster configuration, you must have confirmed that the MetroCluster Configuration State is configured and that the nodes are in an enabled and normal state (`metrocluster node show`).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message
MAINT=number_of_hours_downh
```

The following AutoSupport message suppresses automatic case creation for two hours: `cluster1:*>`

```
system node autosupport invoke -node * -type all -message MAINT=2h
```

2. Disable automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback false`
3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt (enter system password)	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name</pre> <p>When the impaired controller shows Waiting for giveback..., press Ctrl-C, and then respond <i>y</i>.</p>

Option 3: Controller is in a two-node Metrocluster

After completing the NVE or NSE tasks, you need to complete the shutdown of the impaired controller.

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
  Operation: heal-aggregates
    State: successful
Start Time: 7/25/2016 18:45:55
  End Time: 7/25/2016 18:45:56
    Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes      RAID
Status
-----
...
aggr_b2      227.1GB   227.1GB    0% online    0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A::> metrocluster operation show
  Operation: heal-root-aggregates
    State: successful
Start Time: 7/29/2016 20:54:41
  End Time: 7/29/2016 20:54:42
    Errors: -
```

8. On the impaired controller module, disconnect the power supplies.

Replace the boot media - FAS8300 and FAS8700

To replace the boot media, you must remove the impaired controller module, install the replacement boot media, and transfer the boot image to a USB flash drive.

Step 1: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)

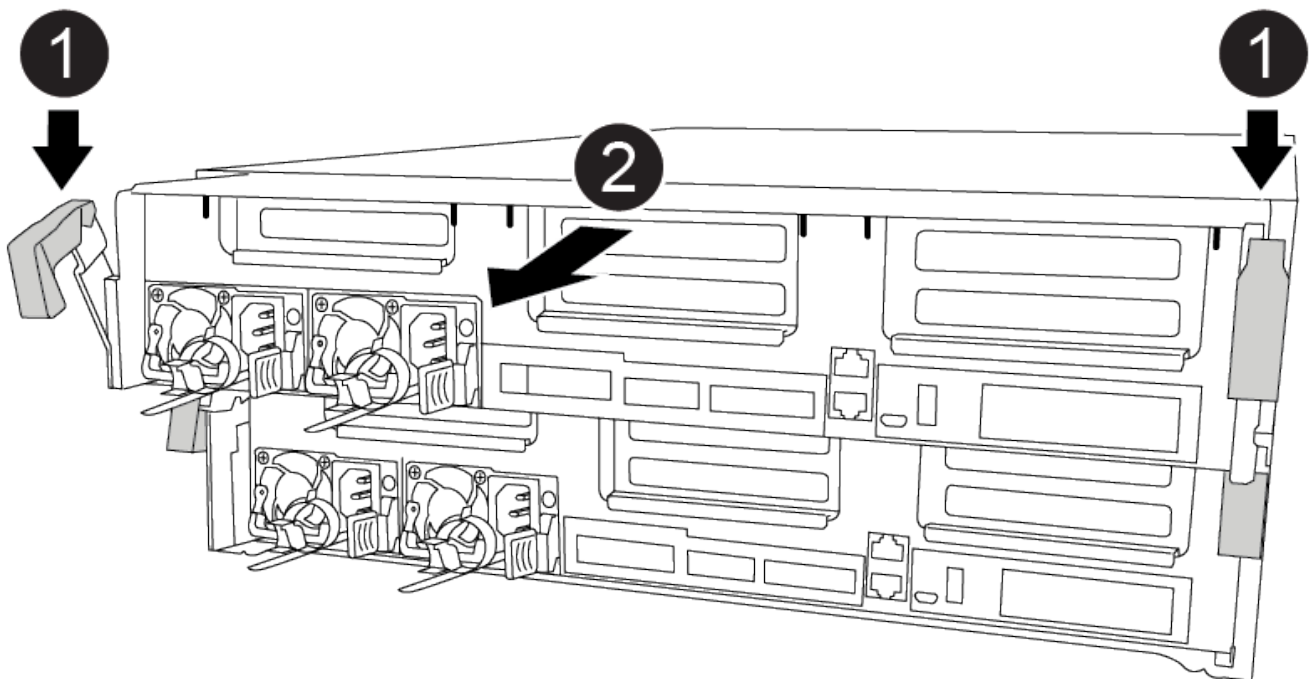
Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.



1	Locking latches
2	Slide controller out of chassis

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Place the controller module on a stable, flat surface.

Step 2: Replace the boot media

You must locate the boot media in the controller module (see the FRU map on the controller module), and then follow the directions to replace it.

Before you begin

Although the contents of the boot media is encrypted, it is a best practice to erase the contents of the boot media before replacing it. For more information, see the [Statement of Volatility](#) for your system on the NetApp Support Site.



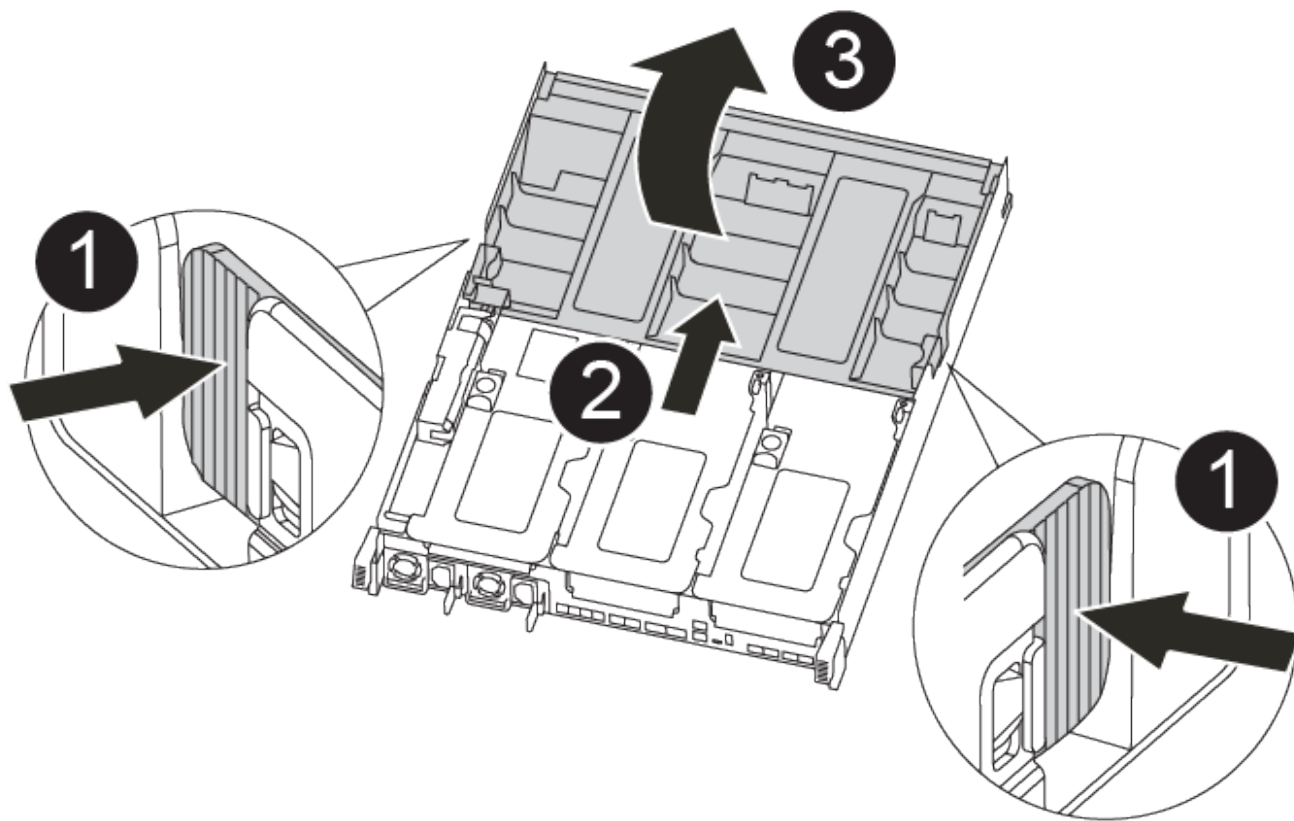
You must log into the NetApp Support Site to display the *Statement of Volatility* for your system.

You can use the following animation, illustrations, or the written steps to replace the boot media.

[Animation - Replace the boot media](#)

Steps

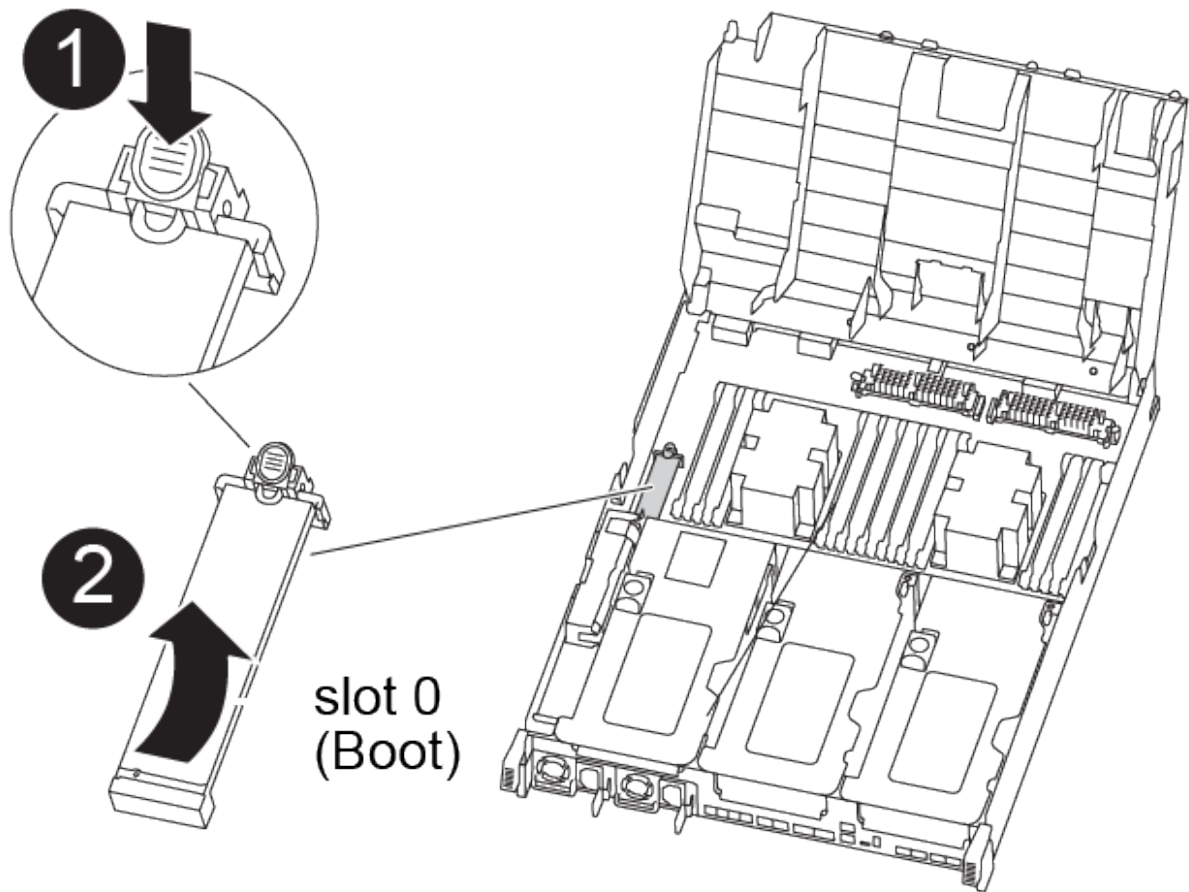
1. Open the air duct:



1	Locking tabs
2	Slide air duct toward back of controller
3	Rotate air duct up

- a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
- b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.

2. Locate and remove the boot media from the controller module:



1	Press blue button
2	Rotate boot media up and remove from socket

- a. Press the blue button at the end of the boot media until the lip on the boot media clears the blue button.
 - b. Rotate the boot media up and gently pull the boot media out of the socket.
 3. Align the edges of the replacement boot media with the boot media socket, and then gently push it into the socket.
 4. Check the boot media to make sure that it is seated squarely and completely in the socket.
- If necessary, remove the boot media and reseal it into the socket.
5. Lock the boot media in place:
 - a. Rotate the boot media down toward the motherboard.
 - b. Placing a finger at the end of the boot media by the blue button, push down on the boot media end to engage the blue locking button.
 - c. While pushing down on the boot media, lift the blue locking button to lock the boot media in place.
 6. Close the air duct.

Step 3: Transfer the boot image to the boot media

The replacement boot media that you installed does not have a boot image, so you need to transfer a boot image using a USB flash drive.

Before you begin

- You must have a USB flash drive, formatted to MBR/FAT32, with at least 4GB capacity
- A copy of the same image version of ONTAP as what the impaired controller was running. You can download the appropriate image from the Downloads section on the NetApp Support Site
 - If NVE is enabled, download the image with NetApp Volume Encryption, as indicated in the download button.
 - If NVE is not enabled, download the image without NetApp Volume Encryption, as indicated in the download button.
- If your system is an HA pair, you must have a network connection.
- If your system is a stand-alone system you do not need a network connection, but you must perform an additional reboot when restoring the `var` file system.

1. Download and copy the appropriate service image from the NetApp Support Site to the USB flash drive.
 - a. Download the service image to your work space on your laptop.
 - b. Unzip the service image.



If you are extracting the contents using Windows, do not use WinZip to extract the netboot image. Use another extraction tool, such as 7-Zip or WinRAR.

There are two folders in the unzipped service image file:

- `boot`
- `efi`

- c. Copy the `efi` folder to the top directory on the USB flash drive.



If the service image has no `efi` folder, see [EFI folder missing from Service Image download file used for boot device recovery for FAS and AFF models^](#).

The USB flash drive should have the `efi` folder and the same Service Image (BIOS) version of what the impaired controller is running.

- d. Remove the USB flash drive from your laptop.
2. If you have not already done so, close the air duct.
 3. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.
 4. Reinstall the cable management device and recable the system, as needed.

When recabling, remember to reinstall the media converters (SFPs or QSFPs) if they were removed.

5. Insert the USB flash drive into the USB slot on the controller module.

Make sure that you install the USB flash drive in the slot labeled for USB devices, and not in the USB

console port.

6. Complete the installation of the controller module:

- a. Firmly push the controller module into the chassis until it meets the midplane and is fully seated.

The locking latches rise when the controller module is fully seated.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Rotate the locking latches upward, tilting them so that they clear the locking pins, and then lower them into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.

7. Interrupt the boot process by pressing Ctrl-C to stop at the LOADER prompt.

If you miss this message, press Ctrl-C, select the option to boot to Maintenance mode, and then `halt` the controller to boot to LOADER.

8. If the controller is in a stretch or fabric-attached MetroCluster, you must restore the FC adapter configuration:

- a. Boot to Maintenance mode: `boot_ontap maint`
- b. Set the MetroCluster ports as initiators: `ucadmin modify -m fc -t initiator adapter_name`
- c. Halt to return to Maintenance mode: `halt`

The changes will be implemented when the system is booted.

Boot the recovery image - AFF FAS8300 and FAS8700

After installing the new boot media device in your system, you can boot the recovery image from a USB drive and restore the configuration from the partner node.

Steps

1. From the LOADER prompt, boot the recovery image from the USB flash drive: `boot_recovery`

The image is downloaded from the USB flash drive.

2. When prompted, either enter the name of the image or accept the default image displayed inside the brackets on your screen.
3. Restore the var file system:

Option 1: ONTAP 9.16.0 or earlier

- a. On the impaired controller, press `Y` when you see `Do you want to restore the backup configuration now?`
- b. If prompted on the impaired controller, press `Y` to overwrite `/etc/ssh/ssh_host_ecdsa_key`.
- c. On the healthy partner controller, set the impaired controller to advanced privilege level: `set -privilege advanced`.
- d. On the healthy partner controller, run the restore backup command: `system node restore-backup -node local -target-address impaired_node_IP_address`.

NOTE: If you see any message other than a successful restore, contact [NetApp Support](#).

- e. On the healthy partner controller, return the impaired controller to admin level: `set -privilege admin`.
- f. On the impaired controller, press `Y` when you see `Was the restore backup procedure successful?`.
- g. On the impaired controller, press `Y` when you see `...would you like to use this restored copy now?`.
- h. On the impaired controller, press `Y` when prompted to reboot the impaired controller and press `ctrl-c` for the Boot Menu.
- i. If the system does not use encryption, select *Option 1 Normal Boot.*, otherwise go to [Restore encryption](#).

Option 2: ONTAP 9.16.1 or later

- a. On the impaired controller, press `Y` when prompted to restore the backup configuration.

After restore procedure is successful, this message will be seen on the console -
`syncflash_partner: Restore from partner complete.`

- b. On the impaired controller, press `Y` when prompted to confirm if the restore backup was successful.
- c. On the impaired controller, press `Y` when prompted to use the restored configuration.
- d. On the impaired controller, press `Y` when prompted to reboot the node.
- e. On the impaired controller, press `Y` when prompted to reboot the impaired controller and press `ctrl-c` for the Boot Menu.
- f. If the system does not use encryption, select *Option 1 Normal Boot.*, otherwise go to [Restore encryption](#).

4. Connect the console cable to the partner controller.
5. Give back the controller using the `storage failover giveback -fromnode local` command.
6. Restore automatic giveback if you disabled it by using the `storage failover modify -node local -auto-giveback true` command.
7. If AutoSupport is enabled, restore/unsuppress automatic case creation by using the `system node autosupport invoke -node * -type all -message MAINT=END` command.

NOTE: If the process fails, contact [NetApp Support](#).

Switch back aggregates in a two-node MetroCluster configuration - AFF fas8300 and FAS8700

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show

DR                               Configuration  DR
Group Cluster Node              State          Mirroring Mode
-----
1      cluster_A
      controller_A_1 configured      enabled    heal roots
completed
      cluster_B
      controller_B_1 configured      enabled    waiting for
switchback recovery
2 entries were displayed.
```

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the `waiting-for-switchback` state:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      switchover
Remote: cluster_A configured      waiting-for-switchback
```

The switchback operation is complete when the clusters are in the `normal` state.:

```
cluster_B::> metrocluster show
Cluster              Configuration State      Mode
-----
Local: cluster_B configured          normal
Remote: cluster_A configured          normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Restore encryption - AFF fas8300 and FAS8700

Restore encryption on the replacement boot media.

You must complete steps specific to systems that have Onboard Key Manager (OKM), NetApp Storage Encryption (NSE) or NetApp Volume Encryption (NVE) enabled using the settings that you captured at the beginning of the boot media replace procedure.

Depending on which a key manger is configured on your system, select one of the following options to restore it from the boot menu.

- [Option 1: Restore the Onboard Key Manager configuration](#)
- [Option 2: Restore the External Key Manager configuration](#)

Option 1: Restore the Onboard Key Manager configuration

Restore the Onboard Key Manager (OKM) configuration from the ONTAP boot menu.

Before you begin

- Make sure you have following information while restoring the OKM configuration:
 - Cluster-wide passphrase entered [while enabling onboard key management](#).
 - [Backup information for the Onboard Key Manager](#).
- Perform the [How to verify onboard key management backup and cluster-wide passphrase](#) procedure before proceeding.

Steps

1. Connect the console cable to the target controller.
2. From the ONTAP boot menu select the appropriate option from the boot menu.

ONTAP version	Select this option
ONTAP 9.8 or later	<p data-bbox="621 153 829 191">Select option 10.</p> <p data-bbox="621 222 948 254">Show example boot menu</p> <div data-bbox="654 296 1455 1079"> <p data-bbox="683 331 1292 363">Please choose one of the following:</p> <ul data-bbox="683 411 1365 1003" style="list-style-type: none"> <li data-bbox="683 411 971 443">(1) Normal Boot. <li data-bbox="683 453 1133 485">(2) Boot without /etc/rc. <li data-bbox="683 495 1045 527">(3) Change password. <li data-bbox="683 537 1365 600">(4) Clean configuration and initialize all disks. <li data-bbox="683 611 1149 642">(5) Maintenance mode boot. <li data-bbox="683 653 1328 684">(6) Update flash from backup config. <li data-bbox="683 695 1240 726">(7) Install new software first. <li data-bbox="683 737 971 768">(8) Reboot node. <li data-bbox="683 779 1192 842">(9) Configure Advanced Drive Partitioning. <li data-bbox="683 852 1333 915">(10) Set Onboard Key Manager recovery secrets. <li data-bbox="683 926 1317 1003">(11) Configure node for external key management. <p data-bbox="683 1014 1032 1045">Selection (1-11)? 10</p> </div>

ONTAP version	Select this option
ONTAP 9.7 and earlier	<p>Select the hidden option <code>recover_onboard_keymanager</code></p> <p>Show example boot menu</p> <div> <p>Please choose one of the following:</p> <ul style="list-style-type: none"> (1) Normal Boot. (2) Boot without <code>/etc/rc</code>. (3) Change password. (4) Clean configuration and initialize all disks. (5) Maintenance mode boot. (6) Update flash from backup config. (7) Install new software first. (8) Reboot node. (9) Configure Advanced Drive Partitioning. <p>Selection (1-19)?</p> <p><code>recover_onboard_keymanager</code></p> </div>

3. Confirm that you want to continue the recovery process.

Show example prompt

```
This option must be used only in disaster recovery procedures. Are you
sure? (y or n):
```

4. Enter the cluster-wide passphrase twice.

While entering the passphrase the console will not show any input.

Show example prompt

```
Enter the passphrase for onboard key management:

Enter the passphrase again to confirm:
```

5. Enter the backup information.

a. Paste the entire content from the BEGIN BACKUP line through the END BACKUP line.

Show example prompt

Enter the backup data:

```
-----BEGIN BACKUP-----
0123456789012345678901234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123456789012345678901234
2345678901234567890123456789012345678901234567890123456789012345
3456789012345678901234567890123456789012345678901234567890123456
4567890123456789012345678901234567890123456789012345678901234567
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
0123456789012345678901234567890123456789012345678901234567890123
1234567890123456789012345678901234567890123456789012345678901234
2345678901234567890123456789012345678901234567890123456789012345
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
-----END BACKUP-----
```

b. Press the enter key twice at the end of the input.

The recovery process completes.

Show example prompt

```
Trying to recover keymanager secrets....
Setting recovery material for the onboard key manager
Recovery secrets set successfully
Trying to delete any existing km_onboard.wkeydb file.

Successfully recovered keymanager secrets.

*****
*****
* Select option "(1) Normal Boot." to complete recovery process.
*
* Run the "security key-manager onboard sync" command to
synchronize the key database after the node reboots.
*****
*****
```



Do not proceed if the displayed output is anything other than Successfully recovered keymanager secrets. Perform troubleshooting to correct the error.

6. Select option 1 from the boot menu to continue booting into ONTAP.

Show example prompt

```
*****
*****
* Select option "(1) Normal Boot." to complete the recovery process.
*
*****
*****

(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
(9) Configure Advanced Drive Partitioning.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 1
```

7. Confirm that the controller's console displays the following message.

```
Waiting for giveback...(Press Ctrl-C to abort wait)
```

8. From the partner node, giveback the partner controller by entering the following command.

```
storage failover giveback -fromnode local -only-cfo-aggregates true.
```

9. After booting with only the CFO aggregate, run the following command.

```
security key-manager onboard sync
```

10. Enter the cluster-wide passphrase for the Onboard Key Manager.

Show example prompt

Enter the cluster-wide passphrase for the Onboard Key Manager:

All offline encrypted volumes will be brought online and the corresponding volume encryption keys (VEKs) will be restored automatically within 10 minutes. If any offline encrypted volumes are not brought online automatically, they can be brought online manually using the "volume online -vserver <vserver> -volume <volume_name>" command.



If the sync is successful the cluster prompt is returned with no additional messages. If the sync fails an error message appears before returning to the cluster prompt. Do not continue until the error is corrected and the sync runs successfully.

11. Ensure that all keys are synced by entering the following command.

```
security key-manager key query -restored false.
```

There are no entries matching your query.



No results should appear when filtering for false in the restored parameter.

12. Giveback the node from the partner by entering the following command.

```
storage failover giveback -fromnode local
```

13. Restore automatic giveback, if you disabled it, by entering the following command.

```
storage failover modify -node local -auto-giveback true
```

14. If AutoSupport is enabled, restore automatic case creation by entering the following command.

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Option 2: Restore the External Key Manager configuration

Restore the External Key Manager configuration from the ONTAP boot menu.

Before you begin

You need the following information for restoring the External Key Manager (EKM) configuration.

- A copy of the /cfcard/kmip/servers.cfg file from another cluster node or the following information:
 - The KMIP server address.
 - The KMIP port.
- A copy of the /cfcard/kmip/certs/client.crt file from another cluster node or the client certificate.

- A copy of the `/cfcard/kmip/certs/client.key` file from another cluster node or the client key.
- A copy of the `/cfcard/kmip/certs/CA.pem` file from another cluster node or the KMIP server CA(s).

Steps

1. Connect the console cable to the target controller.
2. Select option 11 from the ONTAP boot menu.

Show example boot menu

```
(1)  Normal Boot.
(2)  Boot without /etc/rc.
(3)  Change password.
(4)  Clean configuration and initialize all disks.
(5)  Maintenance mode boot.
(6)  Update flash from backup config.
(7)  Install new software first.
(8)  Reboot node.
(9)  Configure Advanced Drive Partitioning.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 11
```

3. When prompted, confirm you have gathered the required information.

Show example prompt

```
Do you have a copy of the /cfcard/kmip/certs/client.crt file? {y/n}
Do you have a copy of the /cfcard/kmip/certs/client.key file? {y/n}
Do you have a copy of the /cfcard/kmip/certs/CA.pem file? {y/n}
Do you have a copy of the /cfcard/kmip/servers.cfg file? {y/n}
```

4. When prompted, enter the client and server information.

Show prompt

```
Enter the client certificate (client.crt) file contents:
Enter the client key (client.key) file contents:
Enter the KMIP server CA(s) (CA.pem) file contents:
Enter the server configuration (servers.cfg) file contents:
```

Show example

```
Enter the client certificate (client.crt) file contents:
-----BEGIN CERTIFICATE-----
<certificate_value>
-----END CERTIFICATE-----

Enter the client key (client.key) file contents:
-----BEGIN RSA PRIVATE KEY-----
<key_value>
-----END RSA PRIVATE KEY-----

Enter the KMIP server CA(s) (CA.pem) file contents:
-----BEGIN CERTIFICATE-----
<certificate_value>
-----END CERTIFICATE-----

Enter the IP address for the KMIP server: 10.10.10.10
Enter the port for the KMIP server [5696]:

System is ready to utilize external key manager(s).
Trying to recover keys from key servers....
kmip_init: configuring ports
Running command '/sbin/ifconfig e0M'
..
..
kmip_init: cmd: ReleaseExtraBSDPort e0M
```

After you enter the client and server information, the recovery process completes.

Show example

```
System is ready to utilize external key manager(s).
Trying to recover keys from key servers....
Performing initialization of OpenSSL
Successfully recovered keymanager secrets.
```

5. Select option 1 from the boot menu to continue booting into ONTAP.

Show example prompt

```
*****
*****
* Select option "(1) Normal Boot." to complete the recovery process.
*
*****
*****

(1) Normal Boot.
(2) Boot without /etc/rc.
(3) Change password.
(4) Clean configuration and initialize all disks.
(5) Maintenance mode boot.
(6) Update flash from backup config.
(7) Install new software first.
(8) Reboot node.
(9) Configure Advanced Drive Partitioning.
(10) Set Onboard Key Manager recovery secrets.
(11) Configure node for external key management.
Selection (1-11)? 1
```

6. Restore automatic giveback if you disabled it.

```
storage failover modify -node local -auto-giveback true
```

7. If AutoSupport is enabled, restore automatic case creation by entering the following command.

```
system node autosupport invoke -node * -type all -message MAINT=END
```

Return the failed part to NetApp - AFF fas8300 and FAS8700

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace the caching module - FAS8300 and FAS8700

You must replace the caching module in the controller module when your system registers a single AutoSupport (ASUP) message that the module has gone offline; failure to do so results in performance degradation.



The Ver2 controller module has only one caching module socket in the FAS8300. FAS8700 does not have a VER2 controller module. The caching module functionality is not impacted by the socket removal.

- You must replace the failed component with a replacement FRU component you received from your provider.

Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most configurations

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this tasks

If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller.

Synchronize a node with the cluster

You might want to erase the contents of your caching module before replacing it.

Steps

1. Although data on the caching module is encrypted, you might want to erase any data from the impaired caching module and verify that the caching module has no data:
 - a. Erase the data on the caching module: `system controller flash-cache secure-erase run -node node_name localhost -device-id device_number`



Run the `system controller flash-cache show` command if you don't know the Flash Cache device ID.

- b. Verify that the data has been erased from the caching module: `system controller flash-cache secure-erase show`
2. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:
`system node autosupport invoke -node * -type all -message MAINT=_number_of_hours_down_h`

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message MAINT=2h
```

3. Disable automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback false`
4. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> .
System prompt or password prompt (enter system password)	Take over or halt the impaired controller: <code>storage failover takeover -ofnode impaired_node_name</code> When the impaired controller shows Waiting for giveback..., press Ctrl-C, and then respond <code>y</code> .

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

1. Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
2. Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

3. Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1:> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1:> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A::> metrocluster operation show
Operation: heal-root-aggregates
State: successful
Start Time: 7/29/2016 20:54:41
End Time: 7/29/2016 20:54:42
Errors: -
```

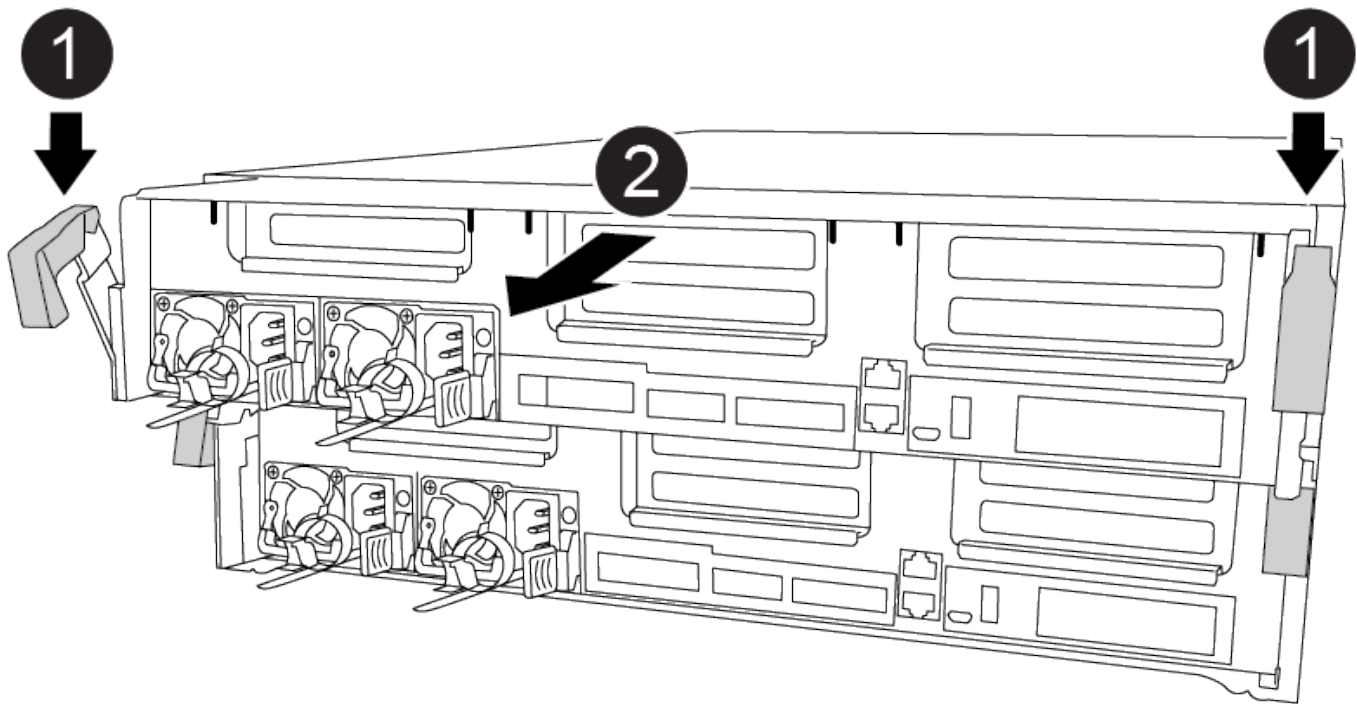
8. On the impaired controller module, disconnect the power supplies.

Step 2: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Place the controller module on a stable, flat surface.

Step 3: Replace a caching module

To replace a caching module, referred to as the Flash Cache on the label on your controller, locate the slot inside the controller and follow the specific sequence of steps. See the FRU map on the controller module for the location of the Flash Cache.



Slot 6 is only available in FAS8300 VER2 Controller.

Your storage system must meet certain criteria depending on your situation:

- It must have the appropriate operating system for the caching module you are installing.
- It must support the caching capacity.
- Although the contents of the caching module is encrypted, it is a best practice to erase the contents of the module before replacing it. For more information, see the [Statement of Volatility](#) for your system on the NetApp Support Site.

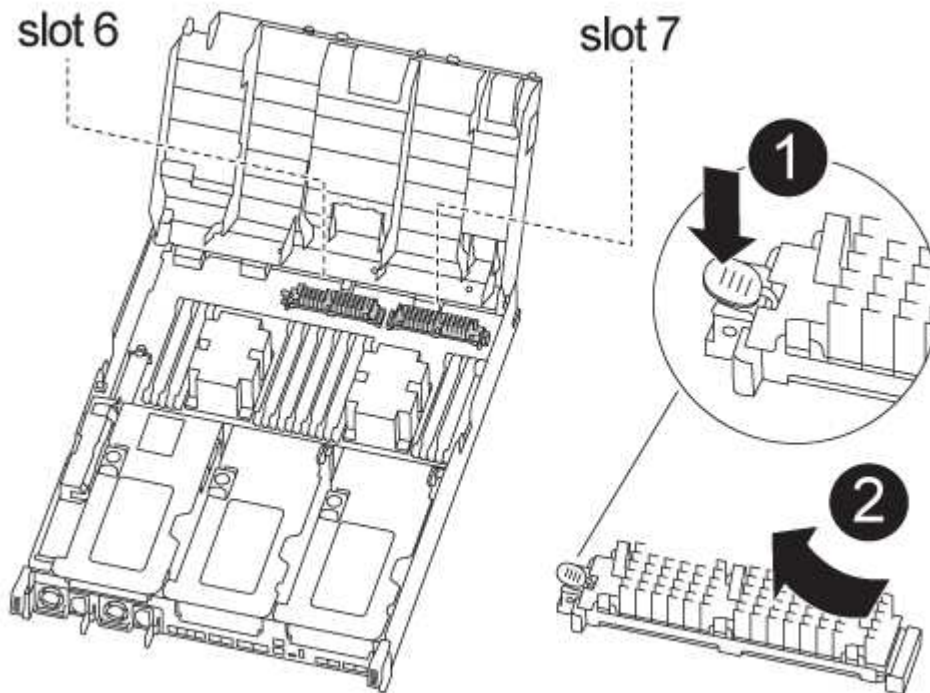


You must log into the NetApp Support Site to display the *Statement of Volatility* for your system.

- All other components in the storage system must be functioning properly; if not, you must contact technical support.

You can use the following animation, illustration, or the written steps to replace a caching module.

[Animation - Replace the caching module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Open the air duct:
 - a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
 - b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.
3. Using the FRU map on the controller module, locate the failed caching module and remove it:

Depending on your configuration, there may be zero, one, or two caching modules in the controller module. Use the FRU map inside the controller module to help locate the caching module.

- a. Press the blue release tab.

The caching module end rises clear of the release tab.

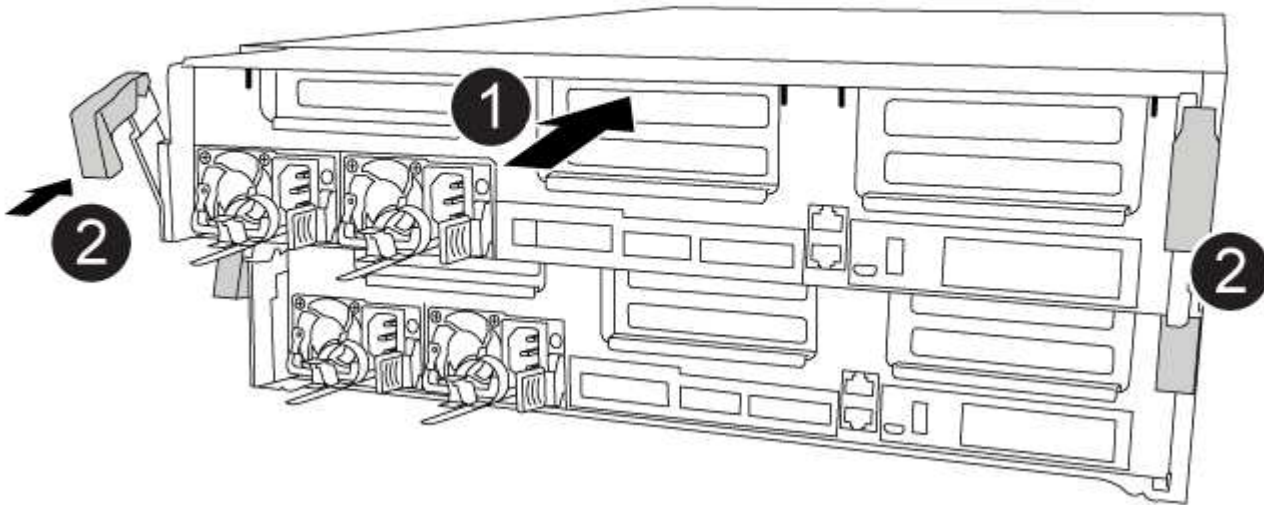
- b. Rotate the caching module up and slide it out of the socket.
4. Install the replacement caching module:
 - a. Align the edges of the replacement caching module with the socket and gently insert it into the socket.
 - b. Rotate the caching module downward toward the motherboard.
 - c. Placing your finger at the end of the caching module by the blue button, firmly push down on the caching module end, and then lift the locking button to lock the caching module in place.
5. Close the air duct:
 - a. Rotate the air duct down to the controller module.
 - b. Slide the air duct toward the risers to lock it in place.

Step 4: Install the controller module

After you have replaced the component in the controller module, you must reinstall the controller module into the chassis.

You can use the following animation, illustration, or the written steps to install the controller module in the chassis.

[Animation - Install the controller module](#)



Steps

1. If you have not already done so, close the air duct.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

3. Cable the management and console ports only, so that you can access the system to perform the tasks in the following sections.



You will connect the rest of the cables to the controller module later in this procedure.

4. Complete the installation of the controller module:

- a. Using the locking latches, firmly push the controller module into the chassis until the locking latches begin to rise.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components.

Step 5: Restore the controller module to operation

You must recable the system, give back the controller module, and then reenabling automatic giveback.

Steps

1. Recable the system, as needed.

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

2. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode impaired_node_name`

3. If automatic giveback was disabled, reenabling it: `storage failover modify -node local -auto-giveback true`

Step 7: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show

DR                               Configuration  DR
Group Cluster Node              State          Mirroring Mode
-----
1      cluster_A
      controller_A_1 configured      enabled    heal roots
completed
      cluster_B
      controller_B_1 configured      enabled    waiting for
switchback recovery
2 entries were displayed.
```

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the **waiting-for-switchback** state:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      switchover
Remote: cluster_A configured      waiting-for-switchback
```

The switchback operation is complete when the clusters are in the **normal** state.:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      normal
Remote: cluster_A configured      normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 8: Complete the replacement process

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Chassis

Overview of chassis replacement - FAS8300 and FAS8700

All other components in the system must be functioning properly; if not, you must contact technical support.

- You can use this procedure with all versions of ONTAP supported by your system.
- This procedure is disruptive. For a two-controller cluster, you will have a complete service outage and a partial outage in a multi-node cluster.

Shut down the controllers - FAS8300 and FAS8700

Option 1: Most configurations

This procedure is for systems with two node configurations. For more information about graceful shutdown when servicing a cluster, see [Gracefully shutdown and power up your storage system Resolution Guide - NetApp Knowledge Base](#).

Before you begin

- Make sure you have the necessary permissions and credentials:
 - Local administrator credentials for ONTAP.
 - BMC accessibility for each controller.
- Make sure you have the necessary tools and equipment for the replacement.
- As a best practice before shutdown, you should:
 - Perform additional [system health checks](#).
 - Upgrade ONTAP to a recommended release for the system.
 - Resolve any [Active IQ Wellness Alerts and Risks](#). Make note of any faults presently on the system, such as LEDs on the system components.

Steps

1. Log into the cluster through SSH or log in from any node in the cluster using a local console cable and a laptop/console.
2. Stop all clients/host from accessing data on the NetApp system.
3. Suspend external backup jobs.
4. If AutoSupport is enabled, suppress case creation and indicate how long you expect the system to be offline:

```
system node autosupport invoke -node * -type all -message "MAINT=2h Replace chassis"
```

5. Identify the SP/BMC address of all cluster nodes:


```
system service-processor show -node * -fields address
```

6. Exit the cluster shell:

```
exit
```

7. Log into SP/BMC over SSH using the IP address of any of the nodes listed in the output from the previous step to monitor progress.

If you are using a console/laptop, log into the controller using the same cluster administrator credentials.

8. Halt the two nodes located in the impaired chassis:

```
system node halt -node <node1>,<node2> -skip-lif-migration-before-shutdown  
true -ignore-quorum-warnings true -inhibit-takeover true
```



For clusters using SnapMirror synchronous operating in StrictSync mode: `system node halt -node <node1>,<node2> -skip-lif-migration-before-shutdown true -ignore-quorum-warnings true -inhibit-takeover true -ignore-strict-sync-warnings true`

9. Enter **y** for each controller in the cluster when you see:

```
Warning: Are you sure you want to halt node <node_name>? {y|n}:
```

10. Wait for each controller to halt and display the LOADER prompt.

Option 2: Controller is in a two-node MetroCluster configuration

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

1. Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
2. Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>

If the impaired controller...	Then...
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

3. Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State    #Vols  Nodes      RAID
Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mccl1A::> metrocluster operation show
  Operation: heal-root-aggregates
    State: successful
  Start Time: 7/29/2016 20:54:41
    End Time: 7/29/2016 20:54:42
    Errors: -
```

8. On the impaired controller module, disconnect the power supplies.

Move and replace hardware - FAS8300 and FAS8700

Move the fans, hard drives, and controller module or modules from the impaired chassis to the new chassis, and swap out the impaired chassis from the equipment rack or system cabinet with the new chassis of the same model as the impaired chassis.

Step 1: Remove the controller modules

To replace the chassis, you must remove the controller modules from the old chassis.

Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove and set aside the cable management devices from the left and right sides of the controller module.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Set the controller module aside in a safe place, and repeat these steps for the other controller module in the chassis.

Step 2: Move the fans

To move the fan modules to the replacement chassis when replacing the chassis, you must perform a specific sequence of tasks.

Steps

1. If you are not already grounded, properly ground yourself.
2. Remove the bezel (if necessary) with two hands, by grasping the openings on each side of the bezel, and then pulling it toward you until the bezel releases from the ball studs on the chassis frame.
3. Press down the release latch on the fan module cam handle, and then rotate the cam handle downward.

The fan module moves a little bit away from the chassis.

4. Pull the fan module straight out from the chassis, making sure that you support it with your free hand so that it does not swing out of the chassis.



The fan modules are short. Always support the bottom of the fan module with your free hand so that it does not suddenly drop free from the chassis and injure you.

5. Set the fan module aside.
6. Repeat the preceding steps for any remaining fan modules.
7. Insert the fan module into the replacement chassis by aligning it with the opening, and then sliding it into the chassis.
8. Push firmly on the fan module cam handle so that it is seated all the way into the chassis.

The cam handle raises slightly when the fan module is completely seated.

9. Swing the cam handle up to its closed position, making sure that the cam handle release latch clicks into the locked position.
10. Repeat these steps for the remaining fan modules.

Step 3: Replace a chassis from within the equipment rack or system cabinet

You must remove the existing chassis from the equipment rack or system cabinet before you can install the replacement chassis.

Steps

1. Remove the screws from the chassis mount points.
2. With two people, slide the old chassis off the rack rails in a system cabinet or equipment rack, and then set it aside.
3. If you are not already grounded, properly ground yourself.
4. Using two people, install the replacement chassis into the equipment rack or system cabinet by guiding the chassis onto the rack rails in a system cabinet or equipment rack.
5. Slide the chassis all the way into the equipment rack or system cabinet.
6. Secure the front of the chassis to the equipment rack or system cabinet, using the screws you removed from the old chassis.
7. If you have not already done so, install the bezel.

Step 4: Install the controller modules

After you install the controller modules into the new chassis, you need to boot it.

For HA pairs with two controller modules in the same chassis, the sequence in which you install the controller module is especially important because it attempts to reboot as soon as you completely seat it in the chassis.

Steps

1. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

2. Recable the console to the controller module, and then reconnect the management port.
3. Complete the installation of the controller module:
 - a. Using the locking latches, firmly push the controller module into the chassis until the locking latches begin to rise.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components.
- g. Interrupt the boot process and boot to the LOADER prompt by pressing `Ctrl-C`.

If your system stops at the boot menu, select the option to boot to LOADER.

4. Repeat the preceding steps to install the second controller into the new chassis.

Complete the restoration and replacement process - FAS8300 and FAS8700

You must verify the HA state of the chassis and return the failed part to NetApp, as described in the RMA instructions shipped with the kit.

Step 1: Verify and set the HA state of the chassis

You must verify the HA state of the chassis, and, if necessary, update the state to match your system configuration.

Steps

1. In Maintenance mode, from either controller module, display the HA state of the local controller module and chassis: `ha-config show`

The HA state should be the same for all components.

2. If the displayed system state for the chassis does not match your system configuration:
 - a. Set the HA state for the chassis: `ha-config modify chassis HA-state`

The value for HA-state can be one of the following:

- `ha`
- `mcc`
- `mcc-2n`
- `mccip`
- `non-ha`

- b. Confirm that the setting has changed: `ha-config show`

3. If you have not already done so, recable the rest of your system.

Step 2: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show
```

DR	Configuration	DR
Group Cluster Node	State	Mirroring Mode
1	cluster_A	
	controller_A_1 configured	enabled heal roots
completed		
	cluster_B	
	controller_B_1 configured	enabled waiting for
	switchback recovery	
2 entries were displayed.		

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the **waiting-for-switchback** state:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured	switchover	
Remote: cluster_A	configured	waiting-for-switchback	

The switchback operation is complete when the clusters are in the **normal** state.:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured	normal	
Remote: cluster_A	configured	normal	

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 3: Complete the replacement process

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Controller

Overview of controller module replacement - FAS8300 and FAS8700

You must review the prerequisites for the replacement procedure and select the correct one for your version of the ONTAP operating system.

- All drive shelves must be working properly.
- If your system is in a MetroCluster configuration, you must review the section [Choosing the correct recovery procedure](#) to determine whether you should use this procedure.

If this is the procedure you should use, note that the controller replacement procedure for a controller in a four or eight node MetroCluster configuration is the same as that in an HA pair. No MetroCluster-specific steps are required because the failure is restricted to an HA pair and storage failover commands can be used to provide nondisruptive operation during the replacement.

- You must replace the failed component with a replacement FRU component you received from your provider.
- You must be replacing a controller module with a controller module of the same model type. You cannot upgrade your system by just replacing the controller module.
- You cannot change any drives or drive shelves as part of this procedure.
- In this procedure, the boot device is moved from the impaired controller to the *replacement* controller so that the *replacement* controller will boot up in the same version of ONTAP as the old controller module.
- It is important that you apply the commands in these steps on the correct systems:
 - The *impaired* controller is the controller that is being replaced.
 - The *replacement node* is the new controller that is replacing the impaired controller.
 - The *healthy* controller is the surviving controller.
- You must always capture the controller's console output to a text file.

This provides you a record of the procedure so that you can troubleshoot any issues that you might encounter during the replacement process.

Shut down the impaired controller - FAS8300 and FAS8700

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most systems

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=<# of hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1:> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1:> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A:> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A:> metrocluster operation show
Operation: heal-root-aggregates
State: successful
Start Time: 7/29/2016 20:54:41
End Time: 7/29/2016 20:54:42
Errors: -
```

8. On the impaired controller module, disconnect the power supplies.

Replace the controller module hardware - FAS8300 and FAS8700

To replace the controller module hardware, you must remove the impaired controller, move FRU components to the replacement controller module, install the replacement controller module in the chassis, and then boot the system to Maintenance mode.



The Ver2 controller module has only one caching module socket (Slot 6) in the FAS8300. FAS8700 does not have a VER2 controller module. The caching module functionality is not impacted by the socket removal.

Step 1: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

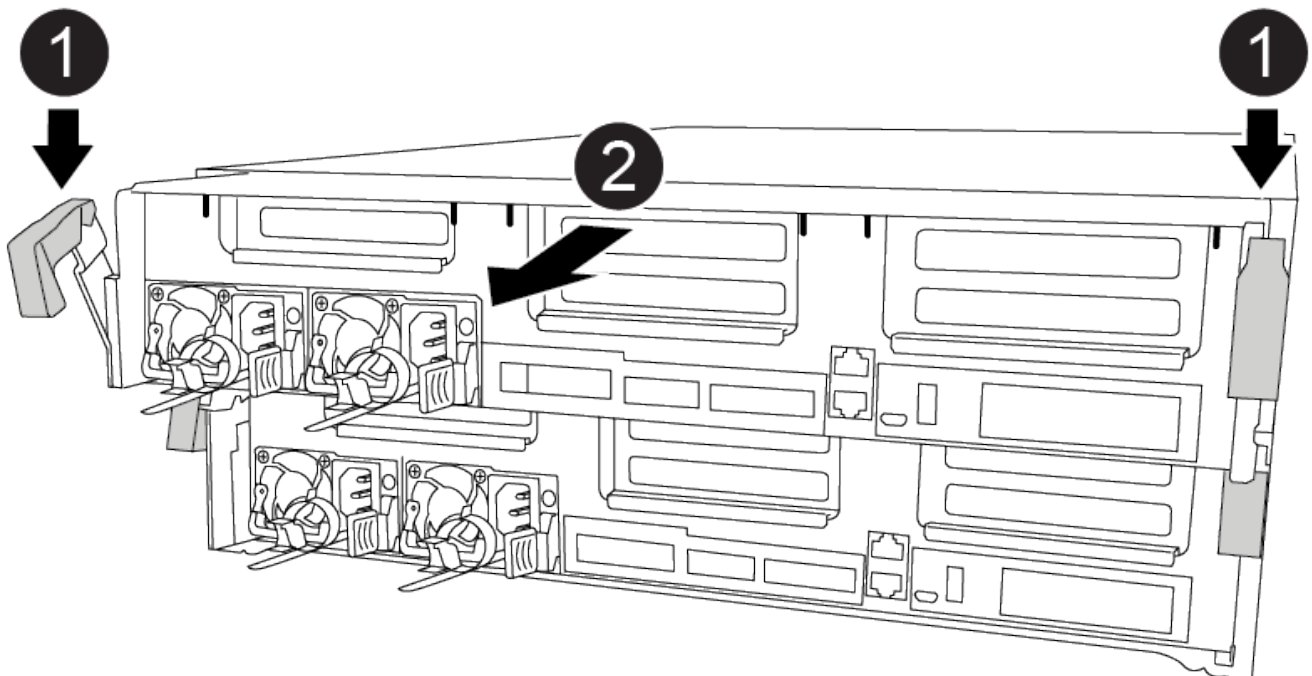
You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.



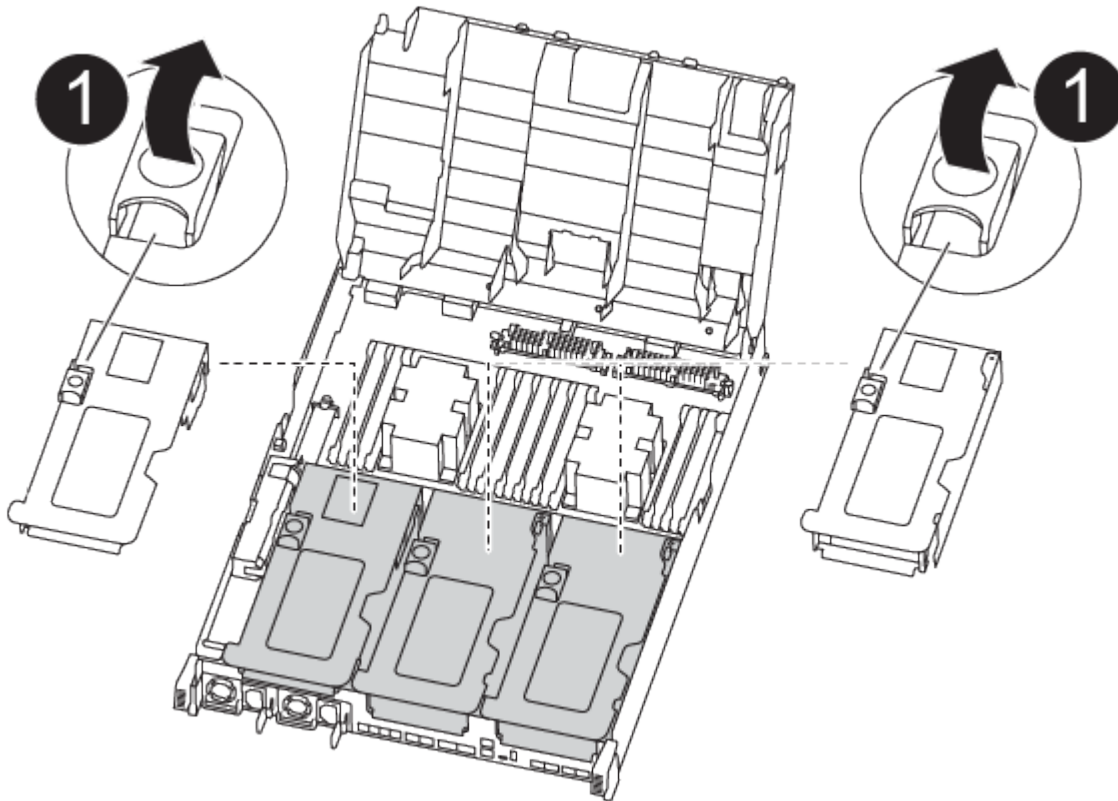
The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Place the controller module on a stable, flat surface.
8. On the replacement controller module, open the air duct and remove the empty risers from the controller module using the animation, illustration, or the written steps:

Removing the empty risers from the replacement controller module

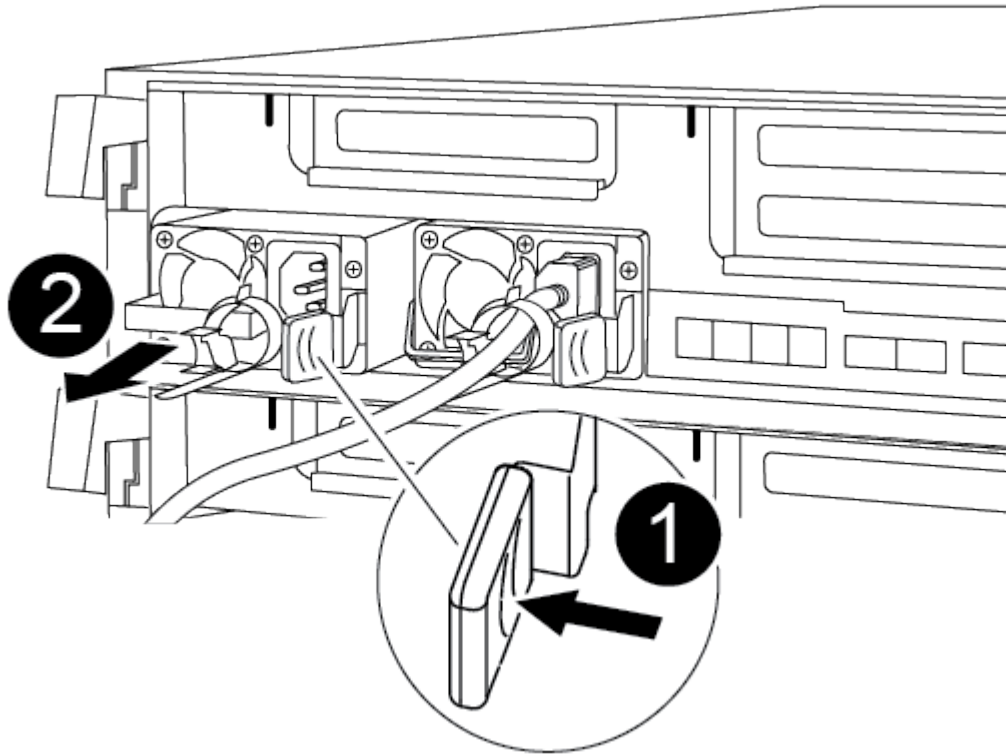


- a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
- b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.
- c. Rotate the riser locking latch on the left side of riser 1 up and toward air duct, lift the riser up, and then set it aside.
- d. Repeat the previous step for the remaining risers.

Step 2: Move the power supplies

You must move the power supply from the impaired controller module to the replacement controller module when you replace a controller module.

You can use the following animation, illustration, or the written steps to move the power supplies to the replacement controller module.



1. Remove the power supply:
 - a. Rotate the cam handle so that it can be used to pull the power supply out of the chassis.
 - b. Press the blue locking tab to release the power supply from the chassis.
 - c. Using both hands, pull the power supply out of the chassis, and then set it aside.
2. Move the power supply to the new controller module, and then install it.
3. Using both hands, support and align the edges of the power supply with the opening in the controller module, and then gently push the power supply into the controller module until the locking tab clicks into place.

The power supplies will only properly engage with the internal connector and lock in place one way.



To avoid damaging the internal connector, do not use excessive force when sliding the power supply into the system.

4. Repeat the preceding steps for any remaining power supplies.

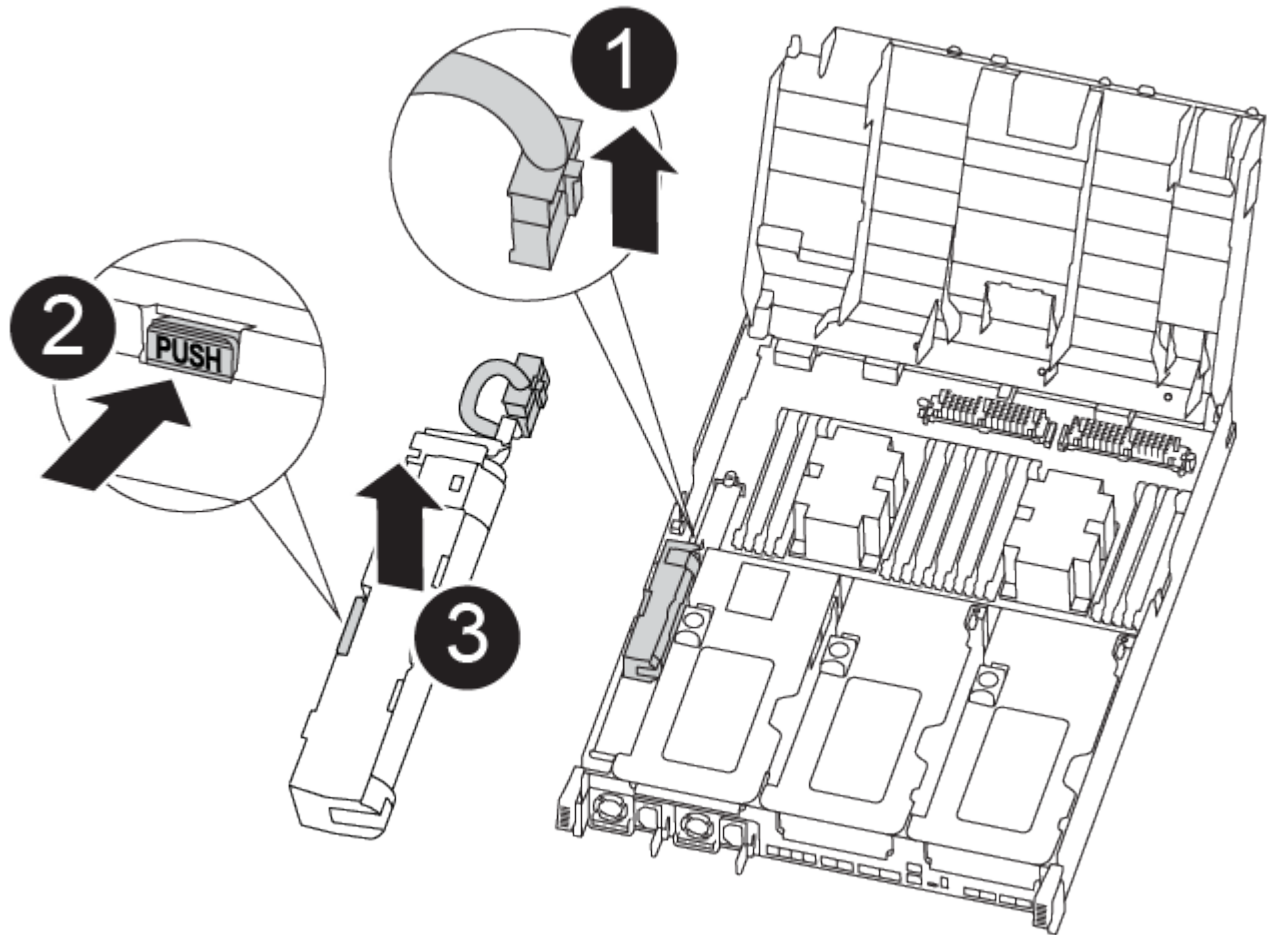
Step 3: Move the NVDIMM battery

To move the NVDIMM battery from the impaired controller module to the replacement controller module, you must perform a specific sequence of steps.

You can use the following animation, illustration, or the written steps to move the NVDIMM battery from the impaired controller module to the replacement controller module.

[Animation - Move the NVDIMM battery](#)

1. Open the air duct:
 - a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
 - b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.
2. Locate the NVDIMM battery in the controller module.



1. Locate the battery plug and squeeze the clip on the face of the battery plug to release the plug from the socket, and then unplug the battery cable from the socket.
2. Grasp the battery and press the blue locking tab marked PUSH, and then lift the battery out of the holder and controller module.
3. Move the battery to the replacement controller module.
4. Align the battery module with the opening for the battery, and then gently push the battery into slot until it locks into place.



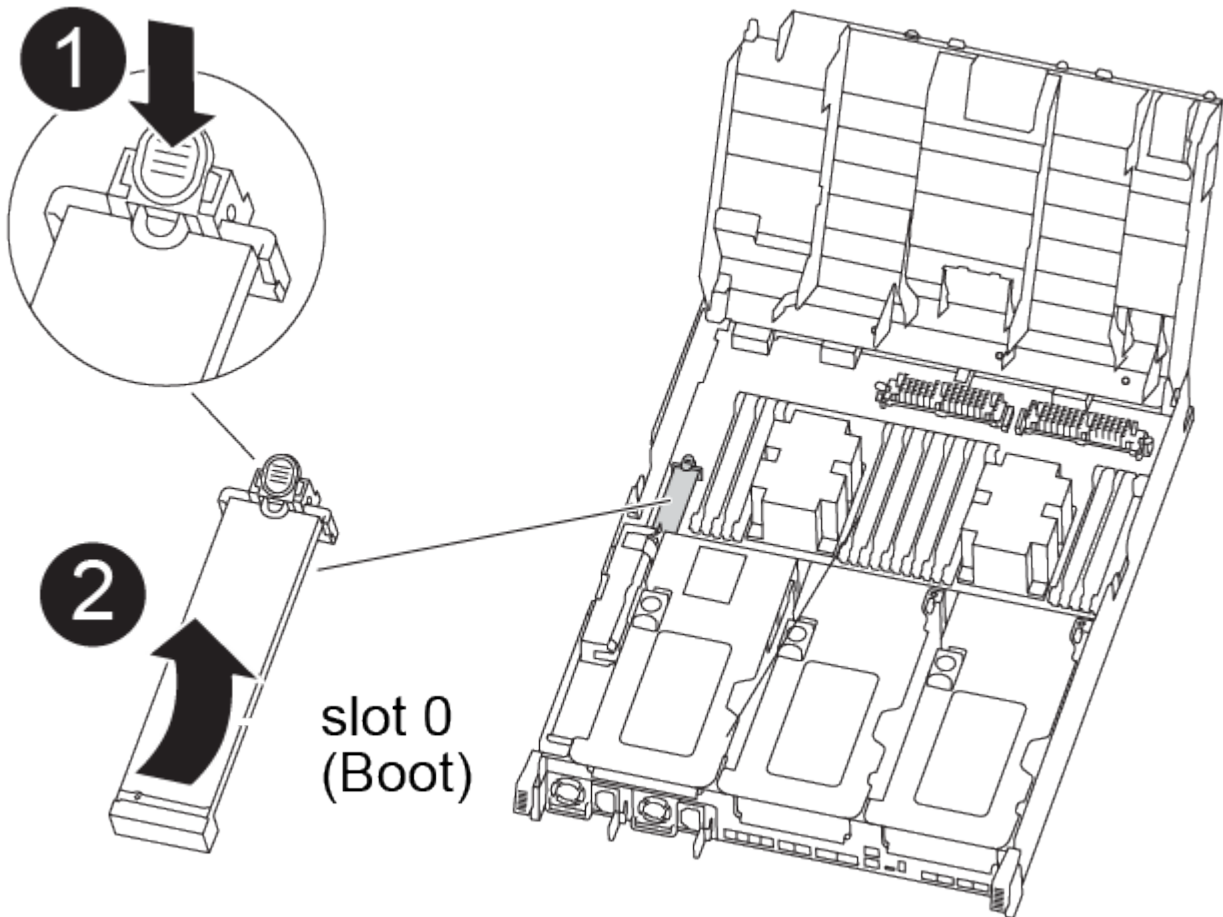
Do not plug the battery cable back into the motherboard until instructed to do so.

Step 4: Move the boot media

You must locate the boot media, and then follow the directions to remove it from the impaired controller module and insert it into the replacement controller module.

You can use the following animation, illustration, or the written steps to move the boot media from the impaired controller module to the replacement controller module.

Animation - Move the boot media



1. Locate and remove the boot media from the controller module:
 - a. Press the blue button at the end of the boot media until the lip on the boot media clears the blue button.
 - b. Rotate the boot media up and gently pull the boot media out of the socket.
2. Move the boot media to the new controller module, align the edges of the boot media with the socket housing, and then gently push it into the socket.
3. Check the boot media to make sure that it is seated squarely and completely in the socket.

If necessary, remove the boot media and reseal it into the socket.
4. Lock the boot media in place:
 - a. Rotate the boot media down toward the motherboard.
 - b. Press the blue locking button so that it is in the open position.
 - c. Placing your fingers at the end of the boot media by the blue button, firmly push down on the boot media end to engage the blue locking button.

Step 5: Move the PCIe risers and mezzanine card

As part of the controller replacement process, you must move the PCIe risers and mezzanine card from the impaired controller module to the replacement controller module.

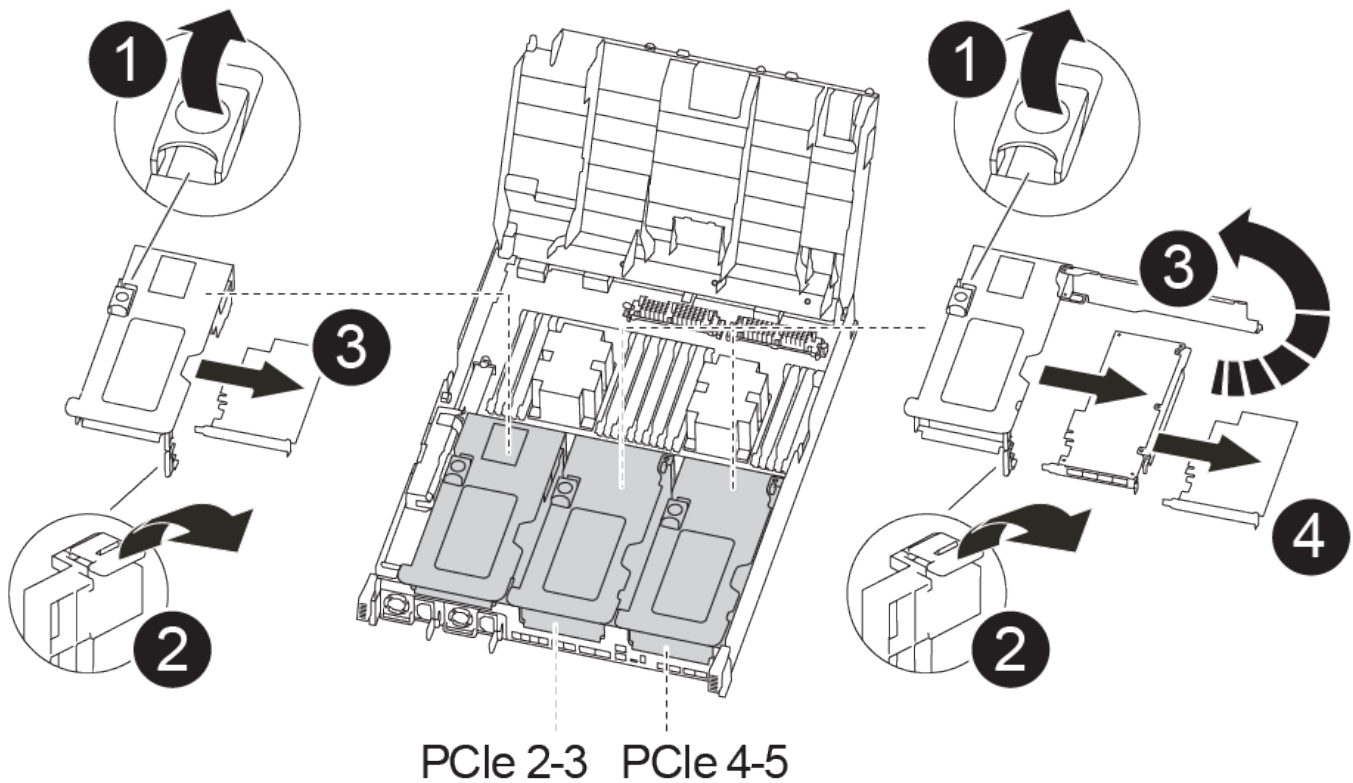
You can use the following animations, illustrations, the FUR map on the system, or the written steps to move the PCIe risers and mezzanine card from the impaired controller module to the replacement controller module.



You do not have to remove the PCIe cards from the risers. Transfer the risers, with the PCIe cards still installed, to the replacement controller module.

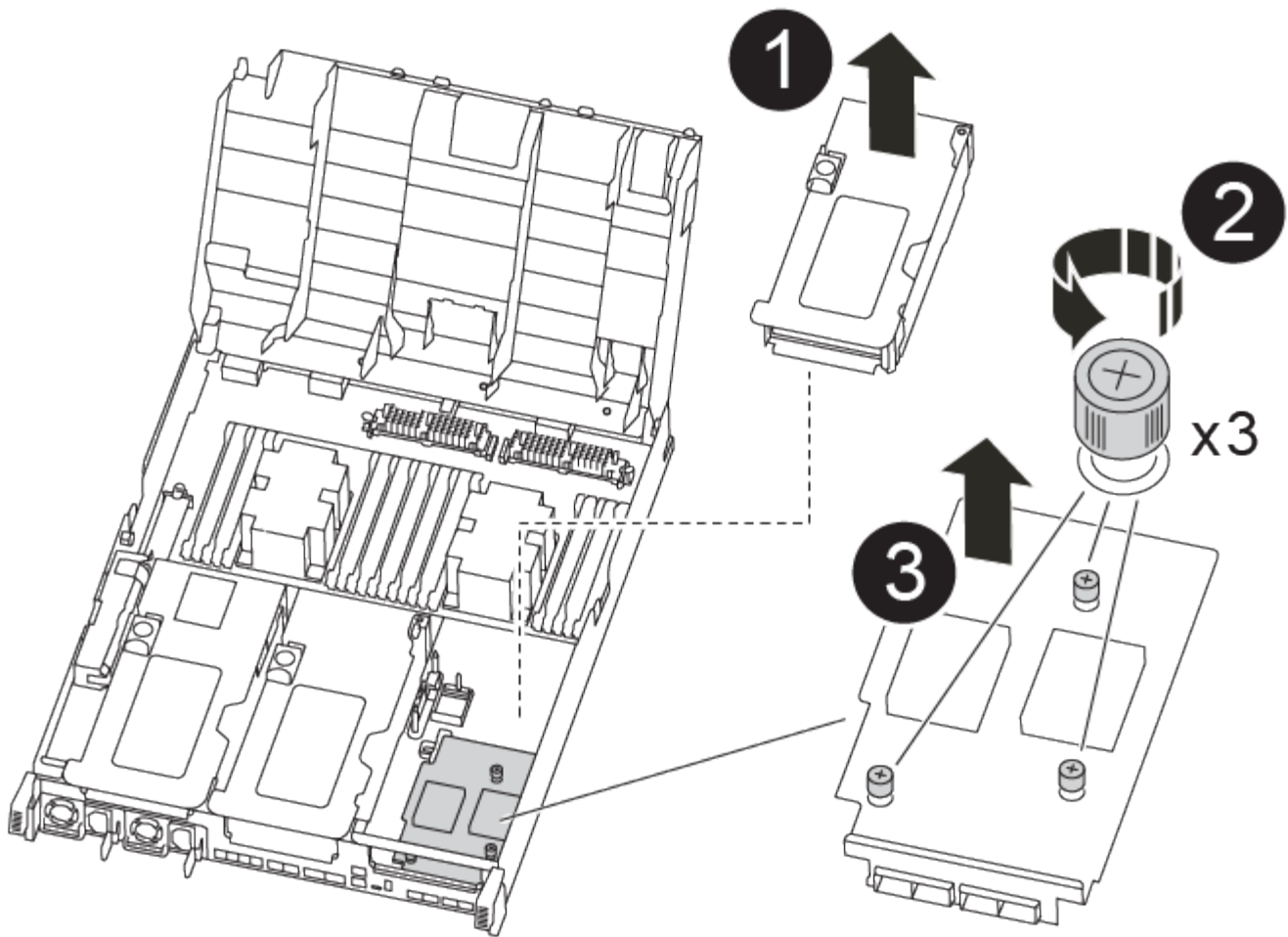
Moving PCIe riser 1 and 2 (left and middle risers):

[Animation - Move PCI risers 1 and 2](#)



Moving the mezzanine card and riser 3 (right riser):

[Animation - Move the mezzanine card and riser 3](#)



1. Move PCIe risers one and two from the impaired controller module to the replacement controller module:
 - a. Remove any SFP or QSFP modules that might be in the PCIe cards.
 - b. Rotate the riser locking latch on the left side of the riser up and toward air duct.

The riser raises up slightly from the controller module.

- c. Lift the riser up, and then move it to the replacement controller module.
 - d. Align the riser with the pins to the side of the riser socket, lower the riser down on the pins, push the riser squarely into the socket on the motherboard, and then rotate the latch down flush with the sheet metal on the riser.
 - e. Repeat this step for riser number 2.

2. Remove riser number 3, remove the mezzanine card, and install both into the replacement controller module:

- a. Remove any SFP or QSFP modules that might be in the PCIe cards.
 - b. Rotate the riser locking latch on the left side of the riser up and toward air duct.

The riser raises up slightly from the controller module.

- c. Lift the riser up, and then set it aside on a stable, flat surface.
 - d. Loosen the thumbscrews on the mezzanine card, and gently lift the card directly out of the socket, and then move it to the replacement controller module.

- e. Install the mezzanine in the replacement controller and secure it with the thumbscrews.
- f. Install the third riser in the replacement controller module.

Step 6: Move caching modules

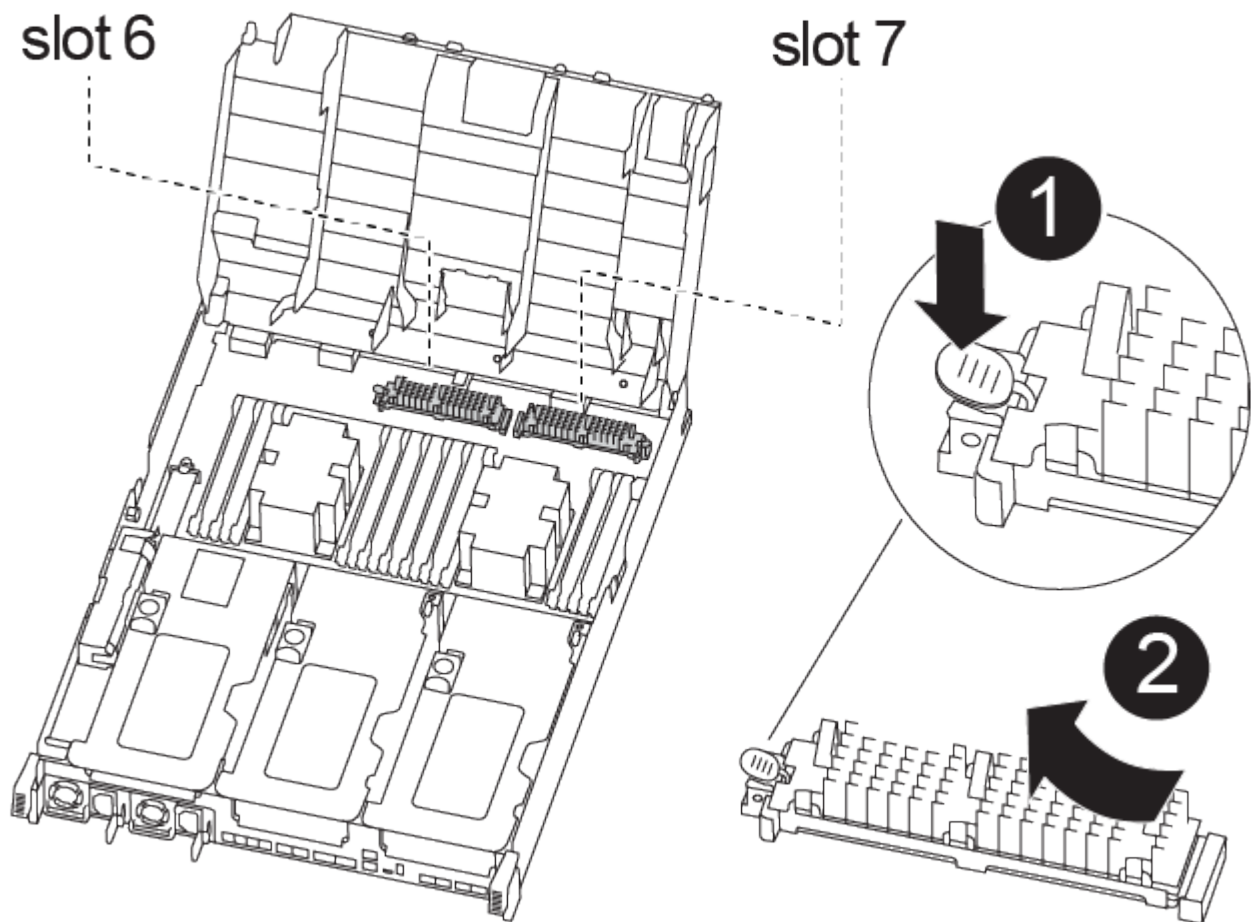
You must move the caching modules from the impaired controller modules to the replacement controller module when replacing a controller module.



The Ver2 controller module has only one caching module socket in the FAS8300. FAS8700 does not have a VER2 controller module. The caching module functionality is not impacted by the socket removal.

You can use the following animation, illustration, or the written steps to move caching modules to the new controller module.

[Animation - Move the caching modules](#)



1. If you are not already grounded, properly ground yourself.
2. Move the caching modules from the impaired controller module to the replacement controller module:
 - a. Press the blue release tab at the end of the caching module, rotate the module up, and then remove the module from the socket.
 - b. Move the caching module to the same socket on the replacement controller module.

- c. Align the edges of the caching module with the socket and gently insert the module as far into the socket as it will go.
- d. Rotate the caching module downward toward the motherboard.
- e. Placing your finger at the end of the caching module by the blue button, firmly push down on the caching module end, and then lift the locking button to lock the caching module in place.

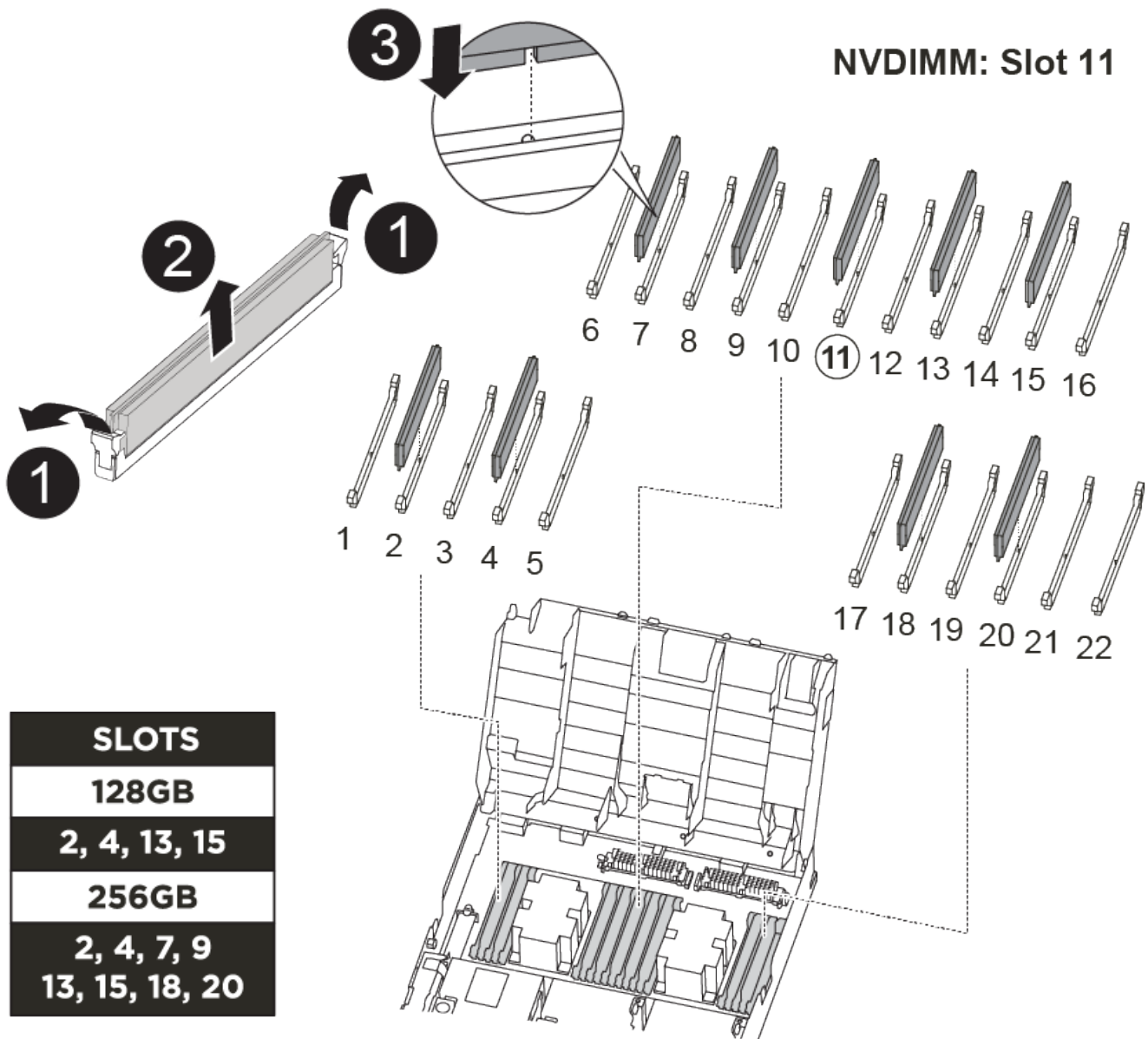
Step 7: Move the DIMMs

You need to locate the DIMMs, and then move them from the impaired controller module to the replacement controller module.

You must have the new controller module ready so that you can move the DIMMs directly from the impaired controller module to the corresponding slots in the replacement controller module.

You can use the following animation, illustration, or the written steps to move the DIMMs from the impaired controller module to the replacement controller module.

[Animation - Move the DIMMs](#)



1. Locate the DIMMs on your controller module.
2. Note the orientation of the DIMM in the socket so that you can insert the DIMM in the replacement controller module in the proper orientation.
3. Verify that the NVDIMM battery is not plugged into the new controller module.
4. Move the DIMMs from the impaired controller module to the replacement controller module:



Make sure that you install the each DIMM into the same slot it occupied in the impaired controller module.

- a. Eject the DIMM from its slot by slowly pushing apart the DIMM ejector tabs on either side of the DIMM, and then slide the DIMM out of the slot.



Carefully hold the DIMM by the edges to avoid pressure on the components on the DIMM circuit board.

- b. Locate the corresponding DIMM slot on the replacement controller module.
- c. Make sure that the DIMM ejector tabs on the DIMM socket are in the open position, and then insert the DIMM squarely into the socket.

The DIMMs fit tightly in the socket, but should go in easily. If not, realign the DIMM with the socket and reinsert it.

- d. Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the socket.
 - e. Repeat these substeps for the remaining DIMMs.
5. Plug the NVDIMM battery into the motherboard.

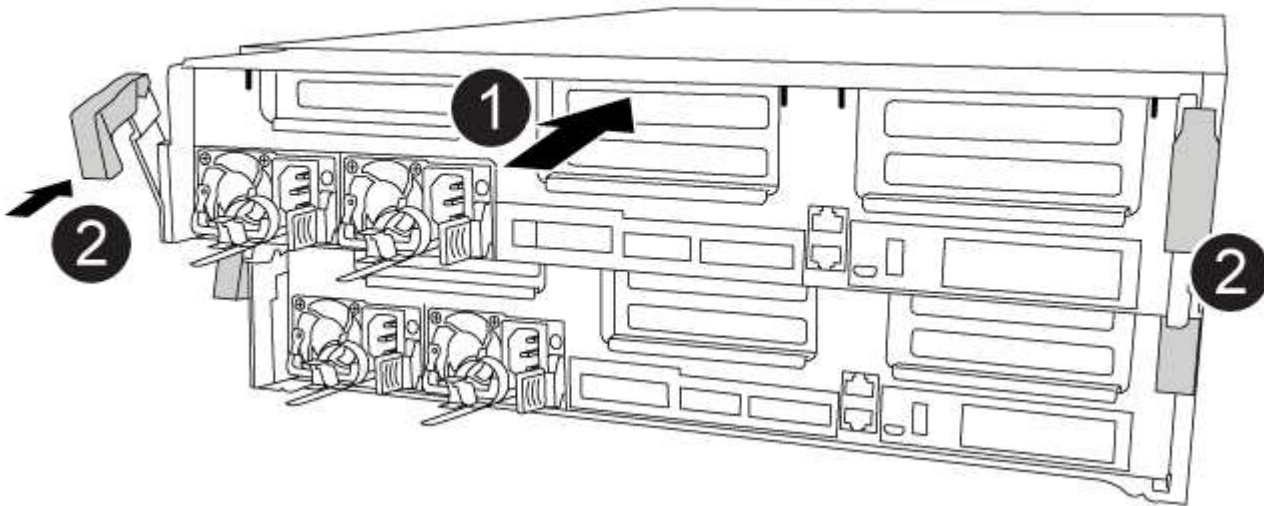
Make sure that the plug locks down onto the controller module.

Step 8: Install the controller module

After all of the components have been moved from the impaired controller module to the replacement controller module, you must install the replacement controller module into the chassis, and then boot it to Maintenance mode.

You can use the following animation, illustration, or the written steps to install the replacement controller module in the chassis.

[Animation - Install the controller module](#)



1. If you have not already done so, close the air duct.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

3. Cable the management and console ports only, so that you can access the system to perform the tasks in the following sections.



You will connect the rest of the cables to the controller module later in this procedure.

4. Complete the installation of the controller module:

- a. Using the locking latches, firmly push the controller module into the chassis until the locking latches begin to rise.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components.
- g. Interrupt the boot process and boot to the LOADER prompt by pressing `Ctrl-C`.

If your system stops at the boot menu, select the option to boot to LOADER.

Restore and verify the system configuration - FAS8300 and FAS8700

After completing the hardware replacement and booting to Maintenance mode, you verify the low-level system configuration of the replacement controller and reconfigure system settings as necessary.

Step 1: Set and verify system time after replacing the controller

You should check the time and date on the replacement controller module against the healthy controller module in an HA pair, or against a reliable time server in a stand-alone configuration. If the time and date do not match, you must reset them on the replacement controller module to prevent possible outages on clients due to time differences.

About this task

It is important that you apply the commands in the steps on the correct systems:

- The *replacement* node is the new node that replaced the impaired node as part of this procedure.
- The *healthy* node is the HA partner of the *replacement* node.

Steps

1. If the *replacement* node is not at the LOADER prompt, halt the system to the LOADER prompt.
2. On the *healthy* node, check the system time: `cluster date show`

The date and time are based on the configured timezone.

3. At the LOADER prompt, check the date and time on the *replacement* node: `show date`

The date and time are given in GMT.

4. If necessary, set the date in GMT on the replacement node: `set date mm/dd/yyyy`
5. If necessary, set the time in GMT on the replacement node: `set time hh:mm:ss`
6. At the LOADER prompt, confirm the date and time on the *replacement* node: `show date`

The date and time are given in GMT.

Step 2: Verify and set the HA state of the controller module

You must verify the HA state of the controller module and, if necessary, update the state to match your system configuration.

1. In Maintenance mode from the new controller module, verify that all components display the same HA state: `ha-config show`

The HA state should be the same for all components.

2. If the displayed system state of the controller module does not match your system configuration, set the HA state for the controller module: `ha-config modify controller ha-state`

The value for HA-state can be one of the following:

- `ha`
- `mcc`
- `mcc-2n`
- `mccip`
- `non-ha`

3. If the displayed system state of the controller module does not match your system configuration, set the HA state for the controller module: `ha-config modify controller ha-state`
4. Confirm that the setting has changed: `ha-config show`

Recable the system and reassign disks - FAS8300 and FAS8700

You must complete a series of tasks before restoring your system to full operation.

Step 1: Recable the system

Verify the controller module's storage and network connections.

Steps

1. Verify that the cabling is correct by using [Active IQ Config Advisor](#).
 - a. Download and install Config Advisor.
 - b. Enter the information for the target system, and then click Collect Data.
 - c. Click the Cabling tab, and then examine the output. Make sure that all disk shelves are displayed and all disks appear in the output, correcting any cabling issues you find.
 - d. Check other cabling by clicking the appropriate tab, and then examining the output from Config Advisor.

Step 2: Reassign disks

If the storage system is in an HA pair, the system ID of the new controller module is automatically assigned to the disks when the giveback occurs at the end of the procedure. In a stand-alone system, you must manually reassign the ID to the disks.

You must use the correct procedure for your configuration:

Controller redundancy	Then use this procedure...
HA pair	Option 1: Verify the system ID change on an HA system]
Two-node MetroCluster configuration	Option 2: Manually reassign the system ID on systems in a two-node MetroCluster configuration

Option 1: Verify the system ID change on an HA system

You must confirm the system ID change when you boot the *replacement* controller and then verify that the change was implemented.

This procedure applies only to systems running ONTAP in an HA pair.

1. If the *replacement* controller is in Maintenance mode (showing the `*>` prompt, exit Maintenance mode and go to the LOADER prompt: `halt`
2. From the LOADER prompt on the *replacement* controller, boot the controller, entering `y` if you are prompted to override the system ID due to a system ID mismatch:
3. Wait until the `Waiting for giveback...` message is displayed on the *replacement* controller console and then, from the healthy controller, verify that the new partner system ID has been automatically assigned:
`storage failover show`

In the command output, you should see a message that the system ID has changed on the impaired controller, showing the correct old and new IDs. In the following example, node2 has undergone replacement and has a new system ID of 151759706.

```
node1> `storage failover show`
```

Node	Partner	Takeover Possible	State Description
-----	-----	-----	

node1	node2	false	System ID changed on partner (Old:
			151759706), In takeover
			151759755, New:
node2	node1	-	Waiting for giveback (HA mailboxes)

4. From the healthy controller, verify that any coredumps are saved:

- a. Change to the advanced privilege level: `set -privilege advanced`

You can respond `y` when prompted to continue into advanced mode. The advanced mode prompt appears (`*>`).

- b. Save any coredumps: `system node run -node local-node-name partner savecore`

- c. Wait for the `savecore` command to complete before issuing the giveback.

You can enter the following command to monitor the progress of the `savecore` command: `system node run -node local-node-name partner savecore -s`

- d. Return to the admin privilege level: `set -privilege admin`

5. If your storage system has Storage or Volume Encryption configured, you must restore Storage or Volume Encryption functionality by using one of the following procedures, depending on whether you are using onboard or external key management:

- [Restore onboard key management encryption keys](#)
- [Restore external key management encryption keys](#)

6. Give back the controller:

- a. From the healthy controller, give back the replaced controller's storage: `storage failover giveback -ofnode replacement_node_name`

The *replacement* controller takes back its storage and completes booting.

If you are prompted to override the system ID due to a system ID mismatch, you should enter `y`.



If the giveback is vetoed, you can consider overriding the vetoes.

[Find the High-Availability Configuration Guide for your version of ONTAP 9](#)

- b. After the giveback has been completed, confirm that the HA pair is healthy and that takeover is possible: `storage failover show`

The output from the `storage failover show` command should not include the System ID changed

on partner message.

7. Verify that the disks were assigned correctly: `storage disk show -ownership`

The disks belonging to the *replacement* controller should show the new system ID. In the following example, the disks owned by node1 now show the new system ID, 1873775277:

```
node1> `storage disk show -ownership`

Disk   Aggregate Home   Owner   DR Home   Home ID   Owner ID   DR Home ID
Reserver Pool
-----
1.0.0   aggr0_1   node1   node1   -         1873775277 1873775277 -
1873775277 Pool0
1.0.1   aggr0_1   node1   node1         1873775277 1873775277 -
1873775277 Pool0
.
.
.
```

Option 2: Manually reassign the system ID on systems in a two-node MetroCluster configuration

In a two-node MetroCluster configuration running ONTAP, you must manually reassign disks to the new controller's system ID before you return the system to normal operating condition.

About this task

This procedure applies only to systems in a two-node MetroCluster configuration running ONTAP.

You must be sure to issue the commands in this procedure on the correct node:

- The *impaired* node is the node on which you are performing maintenance.
- The *replacement* node is the new node that replaced the impaired node as part of this procedure.
- The *healthy* node is the DR partner of the impaired node.

Steps

1. If you have not already done so, reboot the *replacement* node, interrupt the boot process by entering `Ctrl-C`, and then select the option to boot to Maintenance mode from the displayed menu.

You must enter `Y` when prompted to override the system ID due to a system ID mismatch.

2. View the old system IDs from the healthy node: ``metrocluster node show -fields node-systemid,dr-partner-systemid``

In this example, the `Node_B_1` is the old node, with the old system ID of 118073209:

```

dr-group-id cluster          node          node-systemid dr-
partner-systemid
-----
1            Cluster_A      Node_A_1      536872914
118073209
1            Cluster_B      Node_B_1      118073209
536872914
2 entries were displayed.

```

3. View the new system ID at the Maintenance mode prompt on the impaired node: `disk show`

In this example, the new system ID is 118065481:

```

Local System ID: 118065481
...
...

```

4. Reassign disk ownership (for FAS systems), by using the system ID information obtained from the `disk show` command: `disk reassign -s old system ID`

In the case of the preceding example, the command is: `disk reassign -s 118073209`

You can respond `Y` when prompted to continue.

5. Verify that the disks were assigned correctly: `disk show -a`

Verify that the disks belonging to the *replacement* node show the new system ID for the *replacement* node. In the following example, the disks owned by system-1 now show the new system ID, 118065481:

```

*> disk show -a
Local System ID: 118065481

  DISK          OWNER          POOL  SERIAL NUMBER  HOME
-----
disk_name      system-1 (118065481) Pool0  J8Y0TDZC      system-1
(118065481)
disk_name      system-1 (118065481) Pool0  J8Y09DXC      system-1
(118065481)
.
.
.

```

6. From the healthy node, verify that any coredumps are saved:

- a. Change to the advanced privilege level: `set -privilege advanced`

You can respond `Y` when prompted to continue into advanced mode. The advanced mode prompt appears (`*>`).

- b. Verify that the coredumps are saved: `system node run -node local-node-name partner savecore`

If the command output indicates that `savecore` is in progress, wait for `savecore` to complete before issuing the giveback. You can monitor the progress of the `savecore` using the `system node run -node local-node-name partner savecore -s` command.

- c. Return to the admin privilege level: `set -privilege admin`

7. If the *replacement* node is in Maintenance mode (showing the `*>` prompt), exit Maintenance mode and go to the LOADER prompt: `halt`
8. Boot the *replacement* node: `boot_ontap`
9. After the *replacement* node has fully booted, perform a switchback: `metrocluster switchback`
10. Verify the MetroCluster configuration: `metrocluster node show - fields configuration-state`

```
node1_siteA::> metrocluster node show -fields configuration-state
```

dr-group-id	cluster node	configuration-state
-----	-----	-----
1 node1_siteA	node1mcc-001	configured
1 node1_siteA	node1mcc-002	configured
1 node1_siteB	node1mcc-003	configured
1 node1_siteB	node1mcc-004	configured

4 entries were displayed.

11. Verify the operation of the MetroCluster configuration in Data ONTAP:
 - a. Check for any health alerts on both clusters: `system health alert show`
 - b. Confirm that the MetroCluster is configured and in normal mode: `metrocluster show`
 - c. Perform a MetroCluster check: `metrocluster check run`

- d. Display the results of the MetroCluster check: `metrocluster check show`
- e. Run Config Advisor. Go to the Config Advisor page on the NetApp Support Site at support.netapp.com/NOW/download/tools/config_advisor/.

After running Config Advisor, review the tool's output and follow the recommendations in the output to address any issues discovered.

12. Simulate a switchover operation:
 - a. From any node's prompt, change to the advanced privilege level: `set -privilege advanced`

You need to respond with `y` when prompted to continue into advanced mode and see the advanced mode prompt (`*>`).

- b. Perform the switchback operation with the `-simulate` parameter: `metrocluster switchover -simulate`
- c. Return to the admin privilege level: `set -privilege admin`

Complete system restoration - FAS8300 and FAS8700

To restore your system to full operation, you must restore the NetApp Storage Encryption configuration (if necessary), and install licenses for the new controller, and return the failed part to NetApp, as described in the RMA instructions shipped with the kit.

Step 1: Install licenses for the replacement controller in ONTAP

You must install new licenses for the *replacement* node if the impaired node was using ONTAP features that require a standard (node-locked) license. For features with standard licenses, each node in the cluster should have its own key for the feature.

About this task

Until you install license keys, features requiring standard licenses continue to be available to the *replacement* node. However, if the impaired node was the only node in the cluster with a license for the feature, no configuration changes to the feature are allowed.

Also, using unlicensed features on the node might put you out of compliance with your license agreement, so you should install the replacement license key or keys on the *replacement* node as soon as possible.

Before you begin

The licenses keys must be in the 28-character format.

You have a 90-day grace period in which to install the license keys. After the grace period, all old licenses are invalidated. After a valid license key is installed, you have 24 hours to install all of the keys before the grace period ends.



If your system was initially running ONTAP 9.10.1 or later, use the procedure documented in [Post Motherboard Replacement Process to update Licensing on a AFF/FAS system](#). If you are unsure of the initial ONTAP release for your system, see [NetApp Hardware Universe](#) for more information.

Steps

1. If you need new license keys, obtain replacement license keys on the [NetApp Support Site](#) in the My Support section under Software licenses.



The new license keys that you require are automatically generated and sent to the email address on file. If you fail to receive the email with the license keys within 30 days, you should contact technical support.

2. Install each license key: `system license add -license-code license-key, license-key...`
3. Remove the old licenses, if desired:
 - a. Check for unused licenses: `license clean-up -unused -simulate`

- b. If the list looks correct, remove the unused licenses: `license clean-up -unused`

Step 2: Verify LIFs and registering the serial number

Before returning the *replacement* node to service, you should verify that the LIFs are on their home ports, and register the serial number of the *replacement* node if AutoSupport is enabled, and reset automatic giveback.

Steps

1. Verify that the logical interfaces are reporting to their home server and ports: `network interface show -is-home false`

If any LIFs are listed as false, revert them to their home ports: `network interface revert -vserver * -lif *`

2. Register the system serial number with NetApp Support.
 - If AutoSupport is enabled, send an AutoSupport message to register the serial number.
 - If AutoSupport is not enabled, call [NetApp Support](#) to register the serial number.
3. Check the health of your cluster. See the [How to perform a cluster health check with a script in ONTAP KB](#) article for more information.
4. If an AutoSupport maintenance window was triggered, end it by using the `system node autosupport invoke -node * -type all -message MAINT=END` command.
5. If automatic giveback was disabled, reenable it: `storage failover modify -node local -auto-giveback true`

Step 3: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show
```

DR		Configuration	DR
Group	Cluster Node	State	Mirroring Mode
1	cluster_A		
	controller_A_1	configured	enabled
completed	cluster_B		
	controller_B_1	configured	enabled
	switchback recovery		waiting for

2 entries were displayed.

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the `waiting-for-switchback` state:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured	switchover	
Remote: cluster_A	configured	waiting-for-switchback	

The switchback operation is complete when the clusters are in the `normal` state.:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured	normal	
Remote: cluster_A	configured	normal	

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 4: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace a DIMM - FAS8300 and FAS8700

You must replace a DIMM in the controller when your storage system encounters errors such as, excessive CECC (Correctable Error Correction Codes) errors that are based on Health Monitor alerts or uncorrectable ECC errors, typically caused by a single DIMM failure preventing the storage system from booting ONTAP.

All other components in the system must be functioning properly; if not, you must contact technical support.

You must replace the failed component with a replacement FRU component you received from your provider.

Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most configurations

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=<# of
hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message
MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1:> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1:> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A:> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A:> metrocluster operation show
Operation: heal-root-aggregates
State: successful
Start Time: 7/29/2016 20:54:41
End Time: 7/29/2016 20:54:42
Errors: -
```

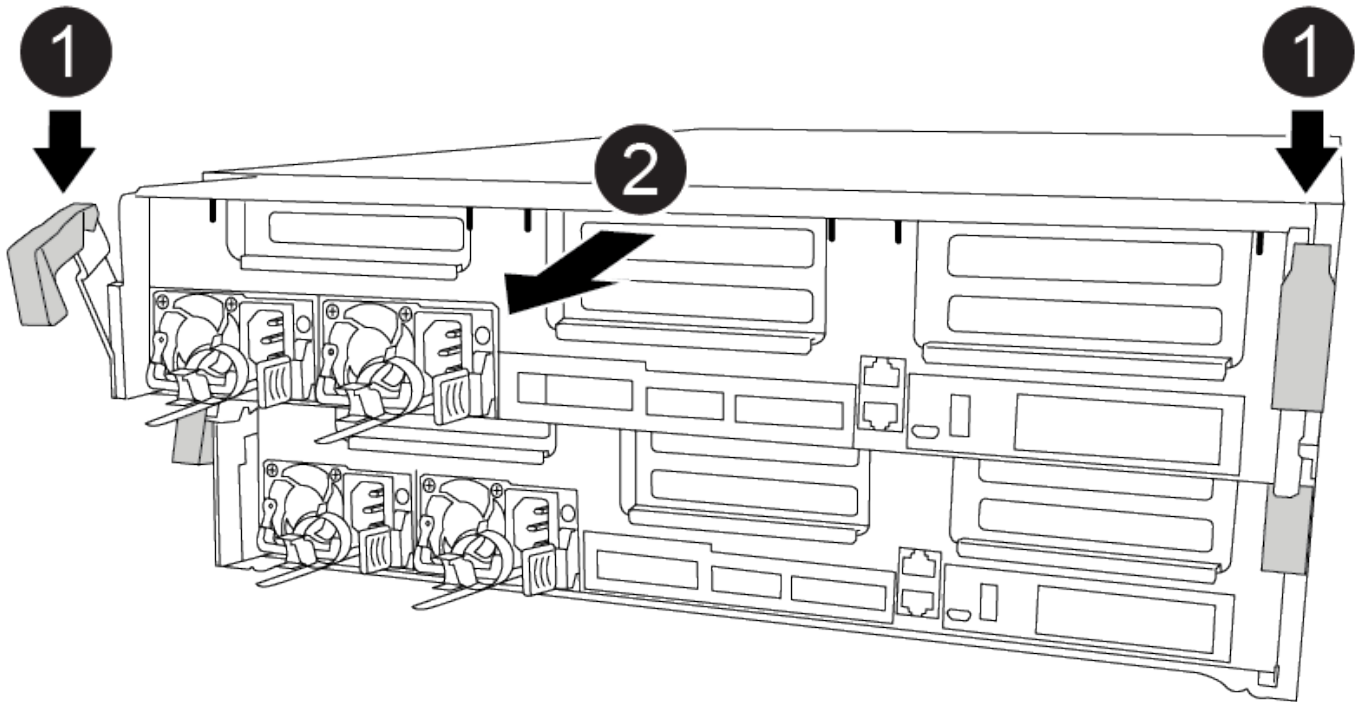
8. On the impaired controller module, disconnect the power supplies.

Step 2: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Place the controller module on a stable, flat surface.

Step 3: Replace system DIMMs

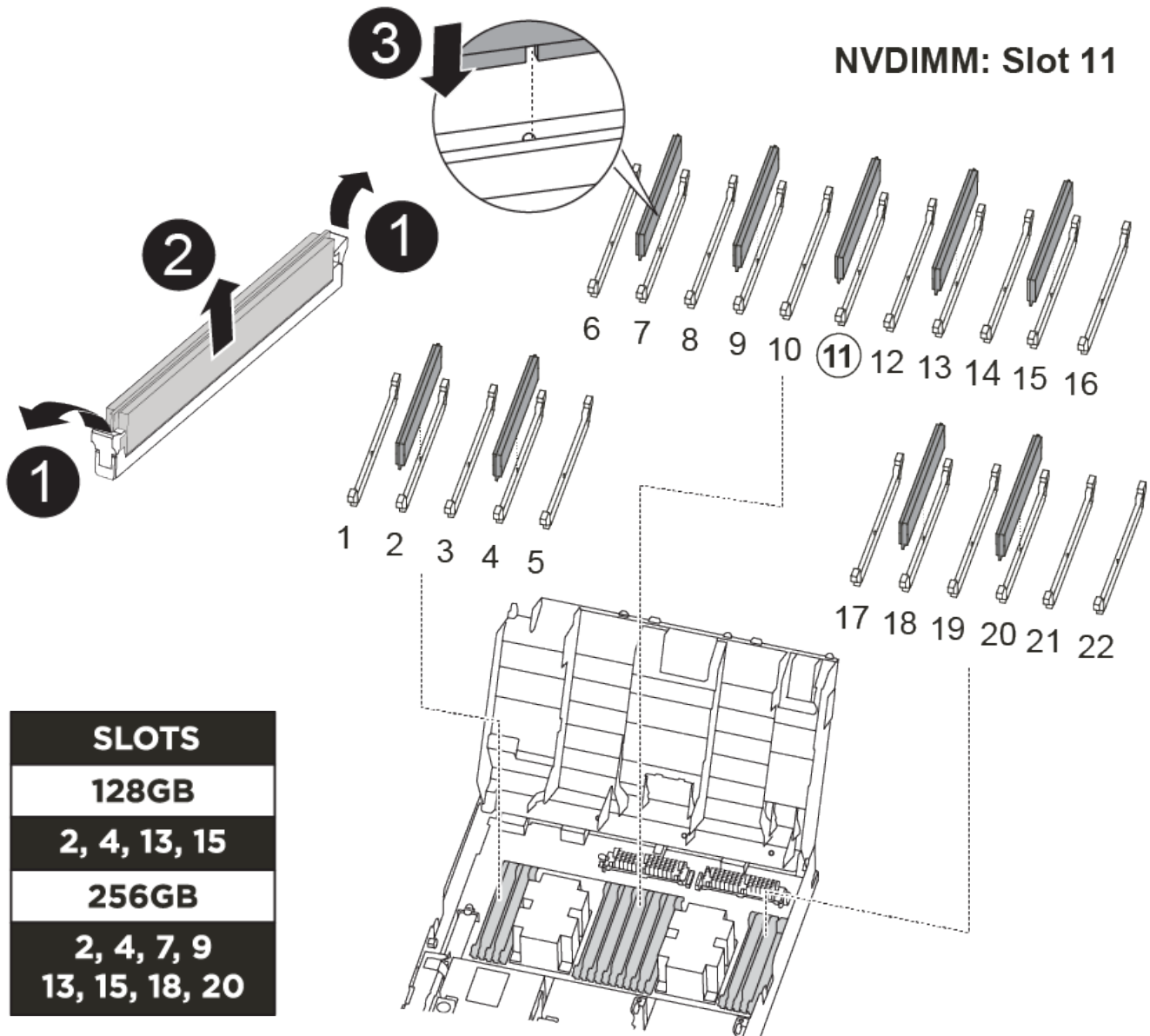
Replacing a system DIMM involves identifying the target DIMM through the associated error message, locating the target DIMM using the FRU map on the air duct, and then replacing the DIMM.

You can use the following animation, illustration, or the written steps to replace a system DIMM.



The animation and illustration shows empty slots for sockets without DIMMs. These empty sockets are populated with blanks.

Animation - Replace a system DIMM



The number and location of DIMMS in your system depends on the model of your system. Refer to FRU map on the air duct for more information.

- If you have a FAS8300 system, the system DIMMs are located in sockets 2, 4, 13, and 15.

- If you have a FAS8700 system, the system DIMMs are located in slots 2, 4, 7, 9, 13, 15, 18, and 20.
- The NVDIMM is located in slot 11.

Steps

1. Open the air duct:
 - a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
 - b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.
2. Locate the DIMMs on your controller module.
3. Note the orientation of the DIMM in the socket so that you can insert the replacement DIMM in the proper orientation.
4. Eject the DIMM from its socket by slowly pushing apart the two DIMM ejector tabs on either side of the DIMM, and then slide the DIMM out of the socket.



Carefully hold the DIMM by the edges to avoid pressure on the components on the DIMM circuit board.

5. Remove the replacement DIMM from the antistatic shipping bag, hold the DIMM by the corners, and align it to the slot.

The notch among the pins on the DIMM should line up with the tab in the socket.

6. Make sure that the DIMM ejector tabs on the connector are in the open position, and then insert the DIMM squarely into the slot.

The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and reinsert it.



Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot.

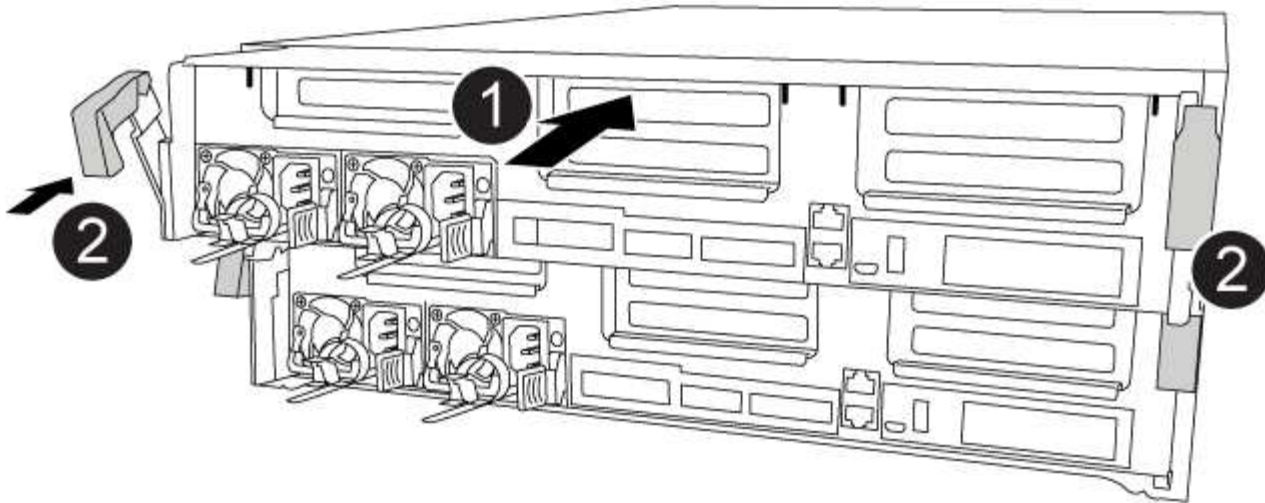
7. Push carefully, but firmly, on the top edge of the DIMM until the ejector tabs snap into place over the notches at the ends of the DIMM.
8. Close the air duct.

Step 4: Install the controller module

After you have replaced the component in the controller module, you must reinstall the controller module into the chassis.

You can use the following animation, drawing, or the written steps to install the controller module in the chassis.

[Animation - Install the controller module](#)



Steps

1. If you have not already done so, close the air duct.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

3. Cable the management and console ports only, so that you can access the system to perform the tasks in the following sections.



You will connect the rest of the cables to the controller module later in this procedure.

4. Complete the installation of the controller module:

- a. Using the locking latches, firmly push the controller module into the chassis until the locking latches begin to rise.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components.

Step 5: Restore the controller module to operation

You must recable the system, give back the controller module, and then reenabling automatic giveback.

Steps

1. Recable the system, as needed.

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

2. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode impaired_node_name`
3. If automatic giveback was disabled, reenabling it: `storage failover modify -node local -auto-giveback true`

Step 6: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show

DR                               Configuration  DR
Group Cluster Node              State          Mirroring Mode
-----
1      cluster_A
      controller_A_1 configured    enabled    heal roots
completed
      cluster_B
      controller_B_1 configured    enabled    waiting for
switchback recovery
2 entries were displayed.
```

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed

successfully: metrocluster check lif show

4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the `waiting-for-switchback` state:

```
cluster_B::> metrocluster show
Cluster              Configuration State      Mode
-----
Local: cluster_B configured          switchover
Remote: cluster_A configured          waiting-for-switchback
```

The switchback operation is complete when the clusters are in the `normal` state.:

```
cluster_B::> metrocluster show
Cluster              Configuration State      Mode
-----
Local: cluster_B configured          normal
Remote: cluster_A configured          normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 7: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Hot-swap a fan module - FAS8300 and FAS8700

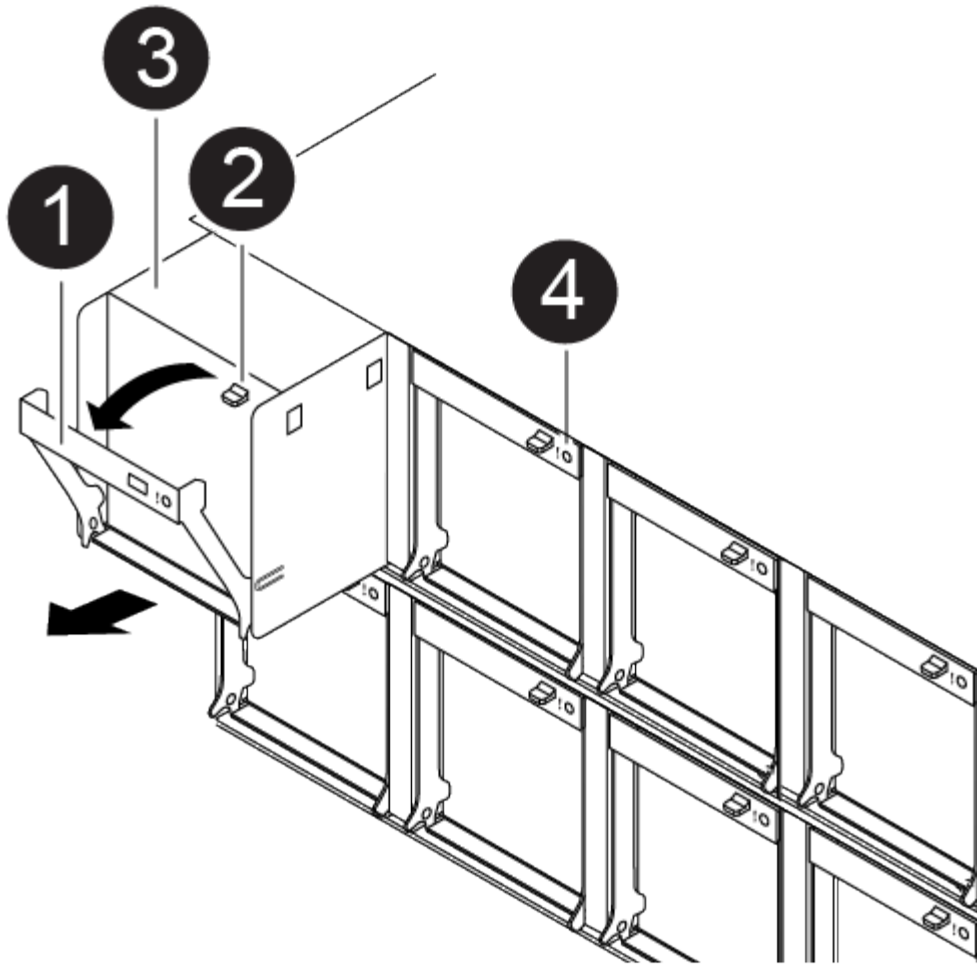
To swap out a fan module without interrupting service, you must perform a specific sequence of tasks.



You must replace the fan module within two minutes of removing it from the chassis. System airflow is disrupted and the controller module or modules shut down after two minutes to avoid overheating.

You can use the following animation, illustration, or the written steps to hot-swap a fan module.

[Animation - Replace a fan](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Remove the bezel (if necessary) with two hands, by grasping the openings on each side of the bezel, and then pulling it toward you until the bezel releases from the ball studs on the chassis frame.
3. Identify the fan module that you must replace by checking the console error messages and looking at the Attention LED on each fan module.
4. Press down the release latch on the fan module cam handle, and then rotate the cam handle downward.

The fan module moves a little bit away from the chassis.

5. Pull the fan module straight out from the chassis, making sure that you support it with your free hand so that it does not swing out of the chassis.



The fan modules are short. Always support the bottom of the fan module with your free hand so that it does not suddenly drop free from the chassis and injure you.

6. Set the fan module aside.
7. Insert the replacement fan module into the chassis by aligning it with the opening, and then sliding it into the chassis.
8. Push firmly on the fan module cam handle so that it is seated all the way into the chassis.

The cam handle raises slightly when the fan module is completely seated.

9. Swing the cam handle up to its closed position, making sure that the cam handle release latch clicks into the locked position.

The Attention LED should not be lit after the fan is seated and has spun up to operational speed.

10. Align the bezel with the ball studs, and then gently push the bezel onto the ball studs.
11. Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace an NVDIMM - FAS8300 and FAS8700

You must replace the NVDIMM in the controller module when your system registers that the flash lifetime is almost at an end or that the identified NVDIMM is not healthy in general; failure to do so causes a system panic.

All other components in the system must be functioning properly; if not, you must contact technical support.

You must replace the failed component with a replacement FRU component you received from your provider.

Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most configurations

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=<# of hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
  Operation: heal-aggregates
    State: successful
Start Time: 7/25/2016 18:45:55
  End Time: 7/25/2016 18:45:56
    Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2       227.1GB   227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A::> metrocluster operation show
  Operation: heal-root-aggregates
    State: successful
Start Time: 7/29/2016 20:54:41
  End Time: 7/29/2016 20:54:42
    Errors: -
```

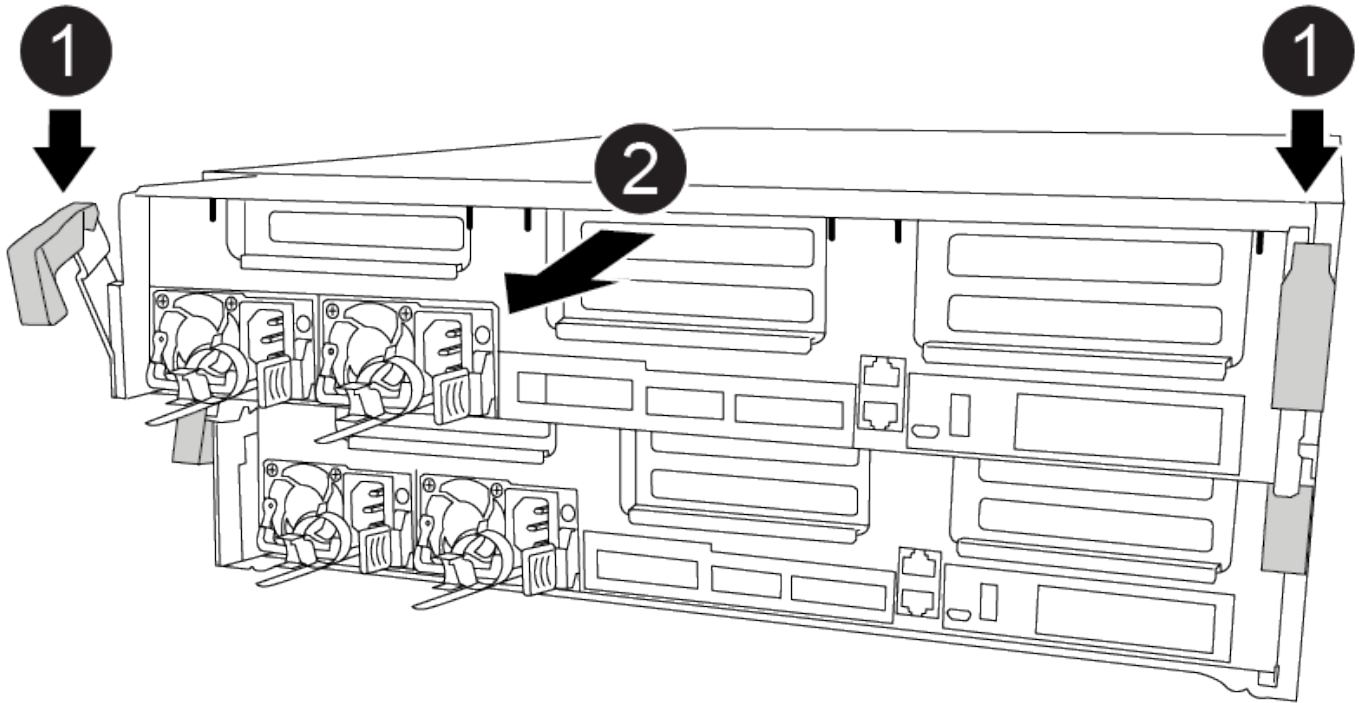
8. On the impaired controller module, disconnect the power supplies.

Step 2: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following , illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Place the controller module on a stable, flat surface.

Step 3: Replace the NVDIMM

To replace the NVDIMM, you must locate it in the controller module using the FRU map on top of the air duct the FRU Map on the top of the slot 1 riser.

- The NVDIMM LED blinks while destaging contents when you halt the system. After the destage is complete, the LED turns off.
- Although the contents of the NVDIMM is encrypted, it is a best practice to erase the contents of the NVDIMM before replacing it. For more information, see the [Statement of Volatility](#) on the NetApp Support Site.



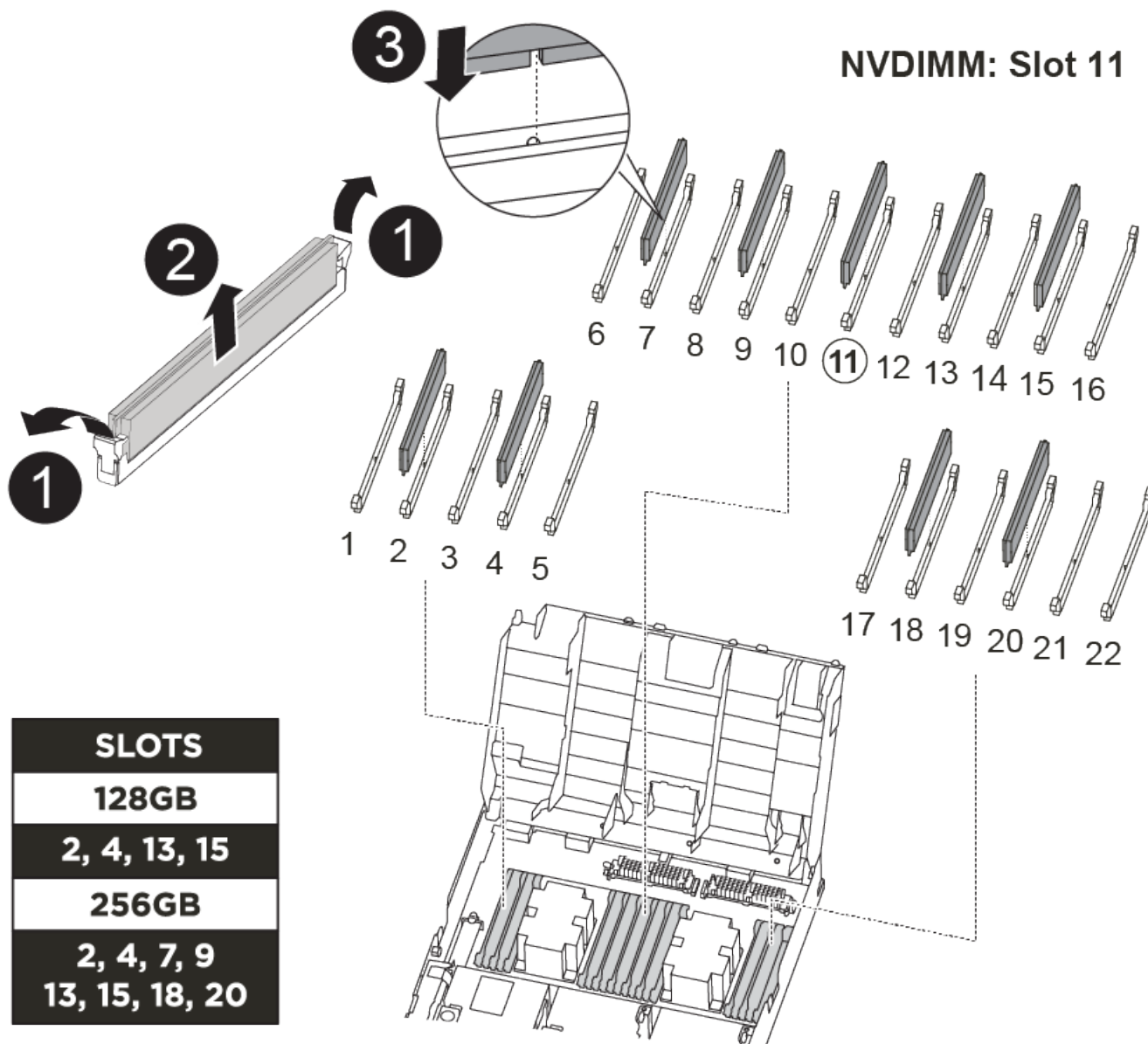
You must log into the NetApp Support Site to display the *Statement of Volatility* for your system.

You can use the following animation, illustration, or the written steps to replace the NVDIMM.



The animation and illustration show empty slots for sockets without DIMMs. These empty sockets are populated with blanks.

[Animation - Replace the NVDIMM](#)



Steps

1. Open the air duct and then locate the NVDIMM in slot 11 on your controller module.



The NVDIMM looks significantly different than system DIMMs.

2. Eject the NVDIMM from its slot by slowly pushing apart the two NVDIMM ejector tabs on either side of the NVDIMM, and then slide the NVDIMM out of the socket and set it aside.



Carefully hold the NVDIMM by the edges to avoid pressure on the components on the NVDIMM circuit board.

3. Remove the replacement NVDIMM from the antistatic shipping bag, hold the NVDIMM by the corners, and then align it to the slot.

The notch among the pins on the NVDIMM should line up with the tab in the socket.

4. Locate the slot where you are installing the NVDIMM.
5. Insert the NVDIMM squarely into the slot.

The NVDIMM fits tightly in the slot, but should go in easily. If not, realign the NVDIMM with the slot and reinsert it.



Visually inspect the NVDIMM to verify that it is evenly aligned and fully inserted into the slot.

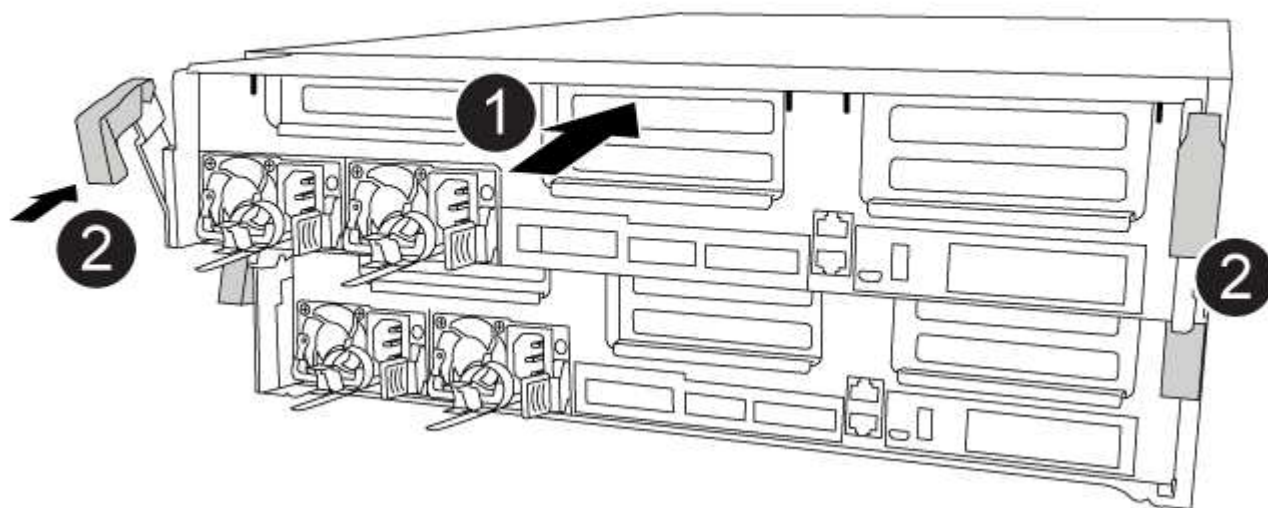
6. Push carefully, but firmly, on the top edge of the NVDIMM until the ejector tabs snap into place over the notches at the ends of the NVDIMM.
7. Close the air duct.

Step 4: Install the controller module

After you have replaced the component in the controller module, you must reinstall the controller module into the chassis, and then boot it.

You can use the following animation, illustration, or the written steps to install the controller module in the chassis.

[Animation - Install the controller module](#)



Steps

1. If you have not already done so, close the air duct.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

3. Cable the management and console ports only, so that you can access the system to perform the tasks in the following sections.



You will connect the rest of the cables to the controller module later in this procedure.

4. Complete the installation of the controller module:

- a. Using the locking latches, firmly push the controller module into the chassis until the locking latches begin to rise.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components.

Step 5: Restore the controller module to operation

You must recable the system, give back the controller module, and then reenabling automatic giveback.

Steps

1. Recable the system, as needed.

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

2. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode `impaired_node_name``
3. If automatic giveback was disabled, reenabling it: `storage failover modify -node local -auto-giveback true`

Step 6: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show

DR                               Configuration  DR
Group Cluster Node              State          Mirroring Mode
-----
1      cluster_A
      controller_A_1 configured      enabled    heal roots
completed
      cluster_B
      controller_B_1 configured      enabled    waiting for
switchback recovery
2 entries were displayed.
```

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the **waiting-for-switchback** state:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      switchover
Remote: cluster_A configured      waiting-for-switchback
```

The switchback operation is complete when the clusters are in the **normal** state.:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      normal
Remote: cluster_A configured      normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 7: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace the NVDIMM battery - FAS8300 and FAS8700

To replace the NVDIMM battery, you must remove the controller module, remove the battery, replace the battery, and then reinstall the controller module.

All other components in the system must be functioning properly; if not, you must contact technical support.

Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most configurations

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=<# of
hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message
MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
  Operation: heal-aggregates
    State: successful
Start Time: 7/25/2016 18:45:55
  End Time: 7/25/2016 18:45:56
    Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A::> metrocluster operation show
  Operation: heal-root-aggregates
    State: successful
Start Time: 7/29/2016 20:54:41
  End Time: 7/29/2016 20:54:42
    Errors: -
```

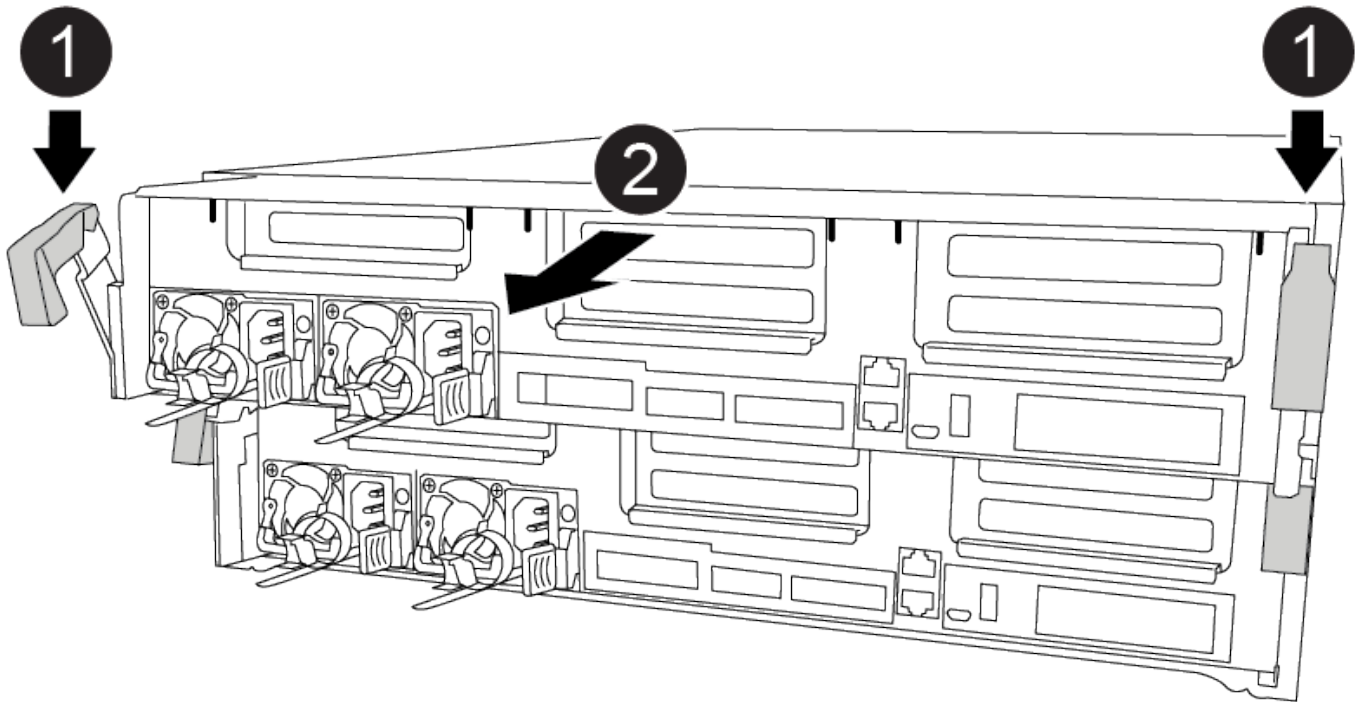
8. On the impaired controller module, disconnect the power supplies.

Step 2: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

7. Place the controller module on a stable, flat surface.

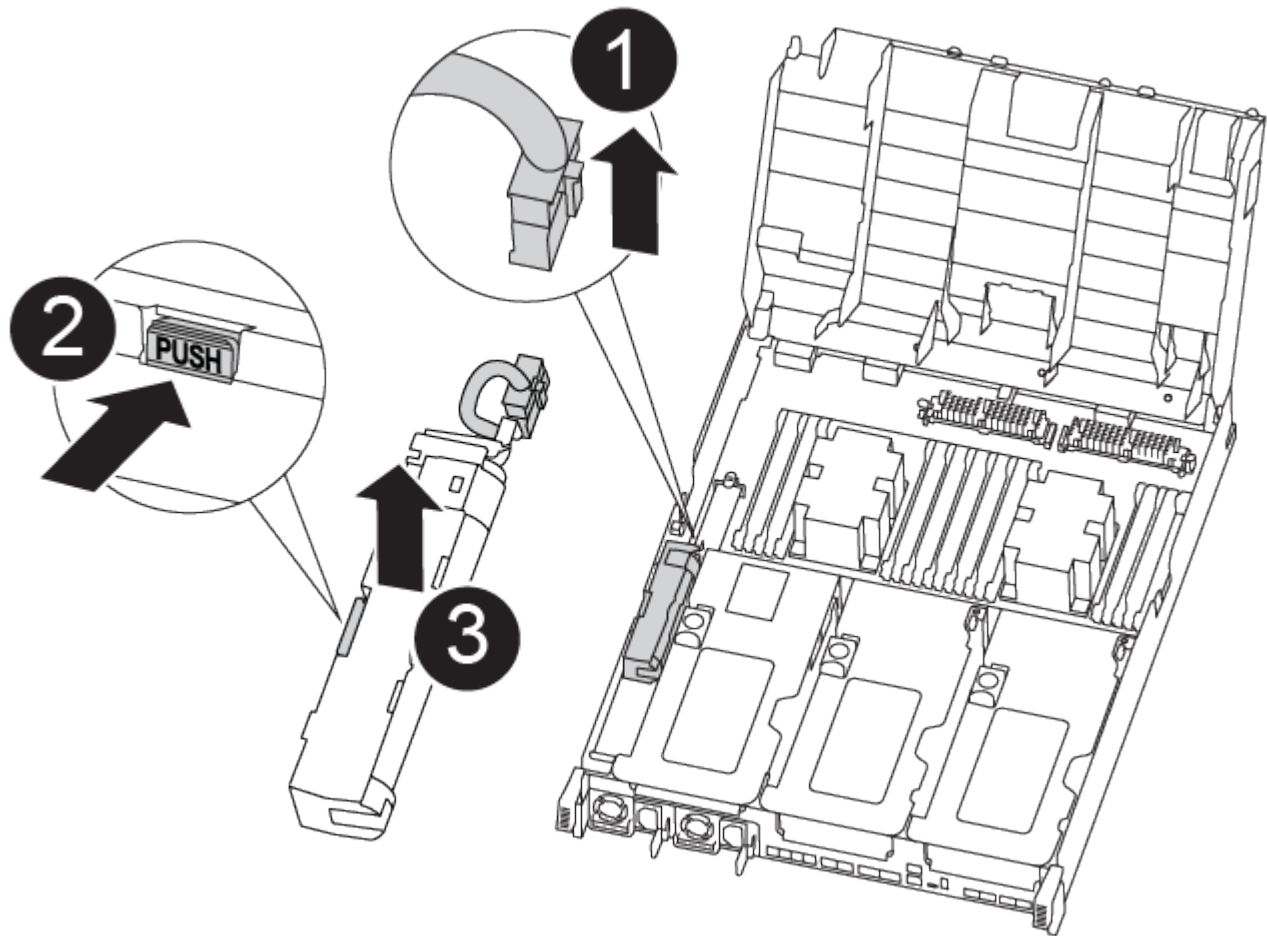
Step 3: Replace the NVDIMM battery

To replace the NVDIMM battery, you must remove the failed battery from the controller module and install the replacement battery into the controller module. See the FRU map inside the controller module to locate the NVDIMM battery.

The NVDIMM LED blinks while destaging contents when you halt the system. After the destage is complete, the LED turns off.

You can use the following animation, illustration, or the written steps to replace the NVDIMM battery.

[Animation - Replace the NVDIMM battery](#)



Steps

1. Open the air duct:
 - a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
 - b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.
2. Locate the NVDIMM battery in the controller module.
3. Locate the battery plug and squeeze the clip on the face of the battery plug to release the plug from the socket, and then unplug the battery cable from the socket.
4. Grasp the battery and press the blue locking tab marked PUSH, and then lift the battery out of the holder

and controller module.

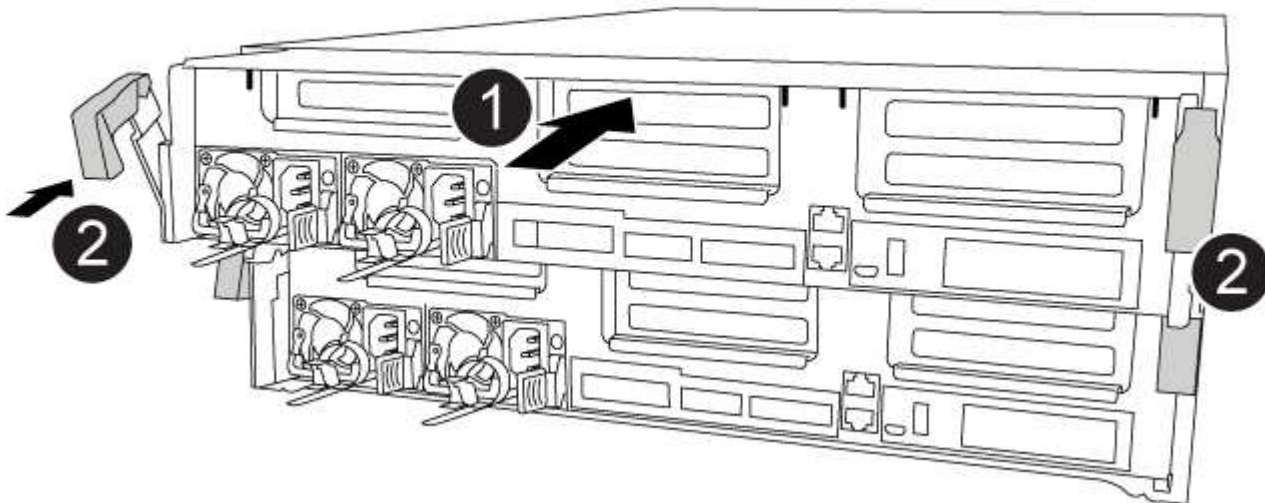
5. Remove the replacement battery from its package.
6. Align the battery module with the opening for the battery, and then gently push the battery into slot until it locks into place.
7. Plug the battery plug back into the controller module, and then close the air duct.

Step 4: Install the controller module

After you have replaced the component in the controller module, you must reinstall the controller module into the chassis, and then boot it to Maintenance mode.

You can use the following animation, illustration, or the written steps to install the controller module in the chassis.

[Animation - Install the controller module](#)



Steps

1. If you have not already done so, close the air duct.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.

Do not completely insert the controller module in the chassis until instructed to do so.
3. Cable the management and console ports only, so that you can access the system to perform the tasks in the following sections.

You will connect the rest of the cables to the controller module later in this procedure.
4. Complete the installation of the controller module:
 - a. Using the locking latches, firmly push the controller module into the chassis until the locking latches begin to rise.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components.

Step 5: Restore the controller module to operation

You must recable the system, give back the controller module, and then reenabling automatic giveback.

Steps

1. Recable the system, as needed.

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

2. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode impaired_node_name`
3. If automatic giveback was disabled, reenabling it: `storage failover modify -node local -auto-giveback true`

Step 6: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show
```

DR	Configuration	DR
Group Cluster Node	State	Mirroring Mode
1 cluster_A	controller_A_1 configured	enabled heal roots
completed cluster_B	controller_B_1 configured	enabled waiting for switchback recovery

2 entries were displayed.

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the **waiting-for-switchback** state:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured	switchover	
Remote: cluster_A	configured	waiting-for-switchback	

The switchback operation is complete when the clusters are in the **normal** state.:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
Local: cluster_B	configured	normal	
Remote: cluster_A	configured	normal	

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 7: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace a PCIe or mezzanine card - FAS8300 and FAS8700

To replace a PCIe or mezzanine card, you must disconnect the cables and any SFP and QSFP modules from the cards, replace the failed PCIe or mezzanine card, and then recable the cards.

- You can use this procedure with all versions of ONTAP supported by your system
- All other components in the system must be functioning properly; if not, you must contact technical support.

Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most configurations

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=<# of
hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message
MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1:> metrocluster operation show
Operation: heal-aggregates
State: successful
Start Time: 7/25/2016 18:45:55
End Time: 7/25/2016 18:45:56
Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1:> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A:> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A:> metrocluster operation show
Operation: heal-root-aggregates
State: successful
Start Time: 7/29/2016 20:54:41
End Time: 7/29/2016 20:54:42
Errors: -
```

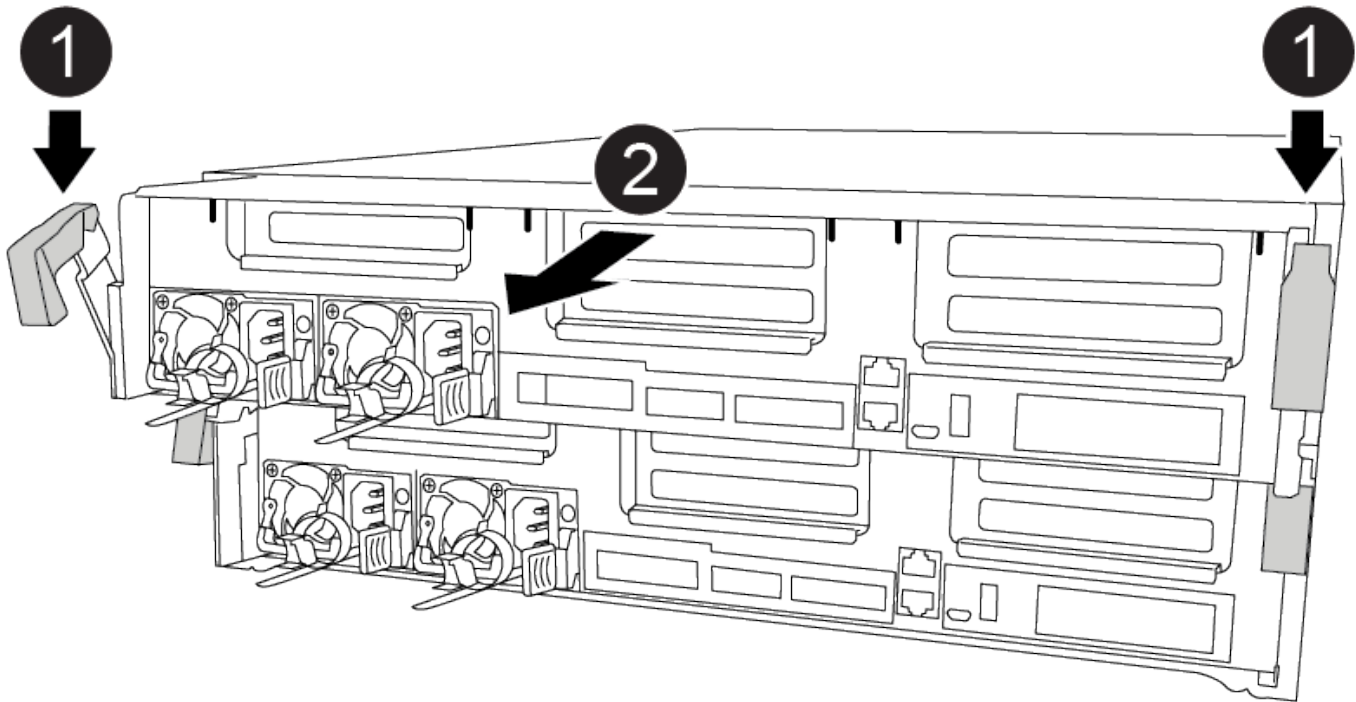
8. On the impaired controller module, disconnect the power supplies.

Step 2: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

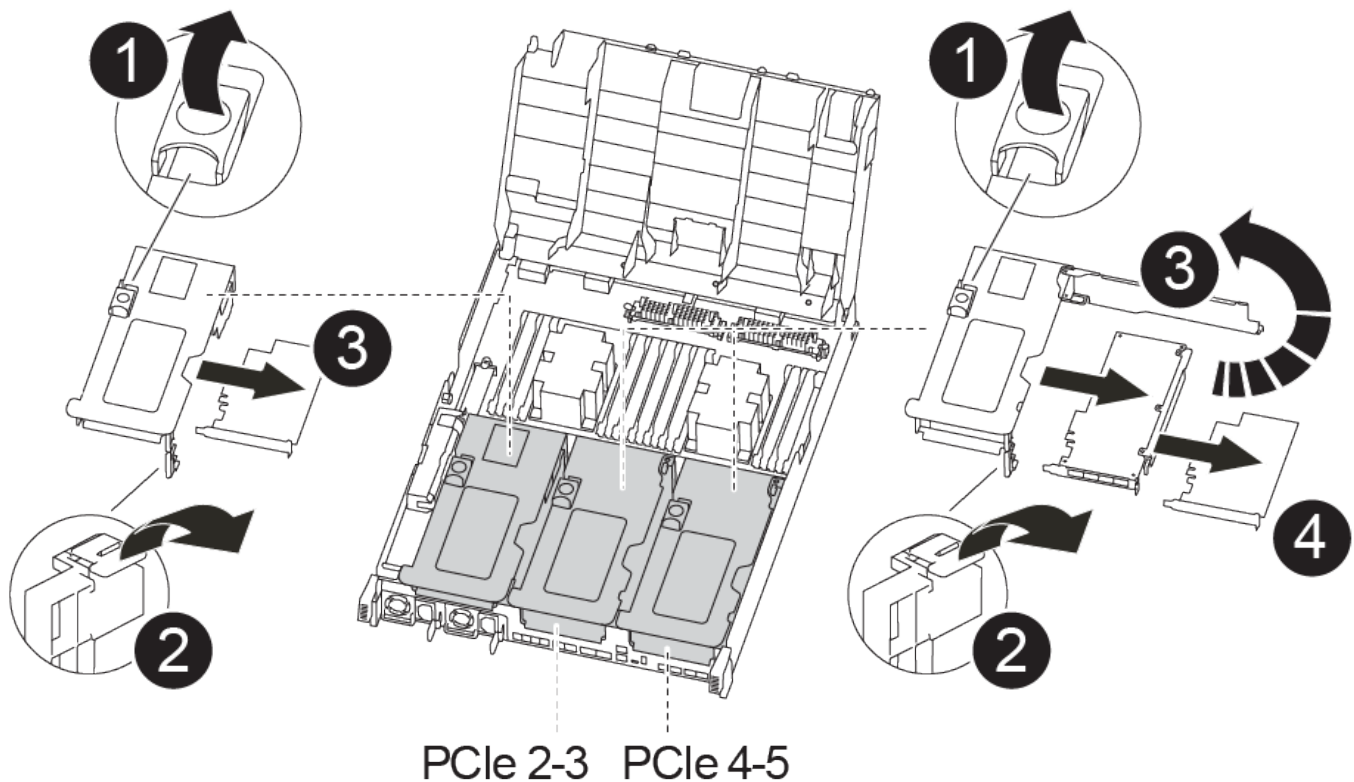
7. Place the controller module on a stable, flat surface.

Step 3: Replace a PCIe card

To replace a PCIe card, you must locate the failed PCIe card, remove the riser that contains the card from the controller module, replace the card, and then reinstall the PCIe riser in the controller module.

You can use the following animation, illustration, or the written steps to replace a PCIe card.

[Animation - Replace a PCIe card](#)



Steps

1. Remove the riser containing the card to be replaced:
 - a. Open the air duct by pressing the locking tabs on the sides of the air duct, slide it toward the back of the controller module, and then rotate it to its completely open position.
 - b. Remove any SFP or QSFP modules that might be in the PCIe cards.
 - c. Rotate the riser locking latch on the left side of the riser up and toward air duct.

The riser raises up slightly from the controller module.

- d. Lift the riser up straight up and set it aside on a stable flat surface,
2. Remove the PCIe card from the riser:
 - a. Turn the riser so that you can access the PCIe card.
 - b. Press the locking bracket on the side of the PCIe riser, and then rotate it to the open position.
 - c. For risers 2 and 3 only, swing the side panel up.
 - d. Remove the PCIe card from the riser by gently pushing up on the bracket and lift the card straight out of the socket.

3. Install the replacement PCIe card in the riser by aligning the card with the socket, press the card into the socket and then close the side panel on the riser, if present.

Be sure that you properly align the card in the slot and exert even pressure on the card when seating it in the socket. The PCIe card must be fully and evenly seated in the slot.



If you are installing a card in the bottom slot and cannot see the card socket well, remove the top card so that you can see the card socket, install the card, and then reinstall the card you removed from the top slot.

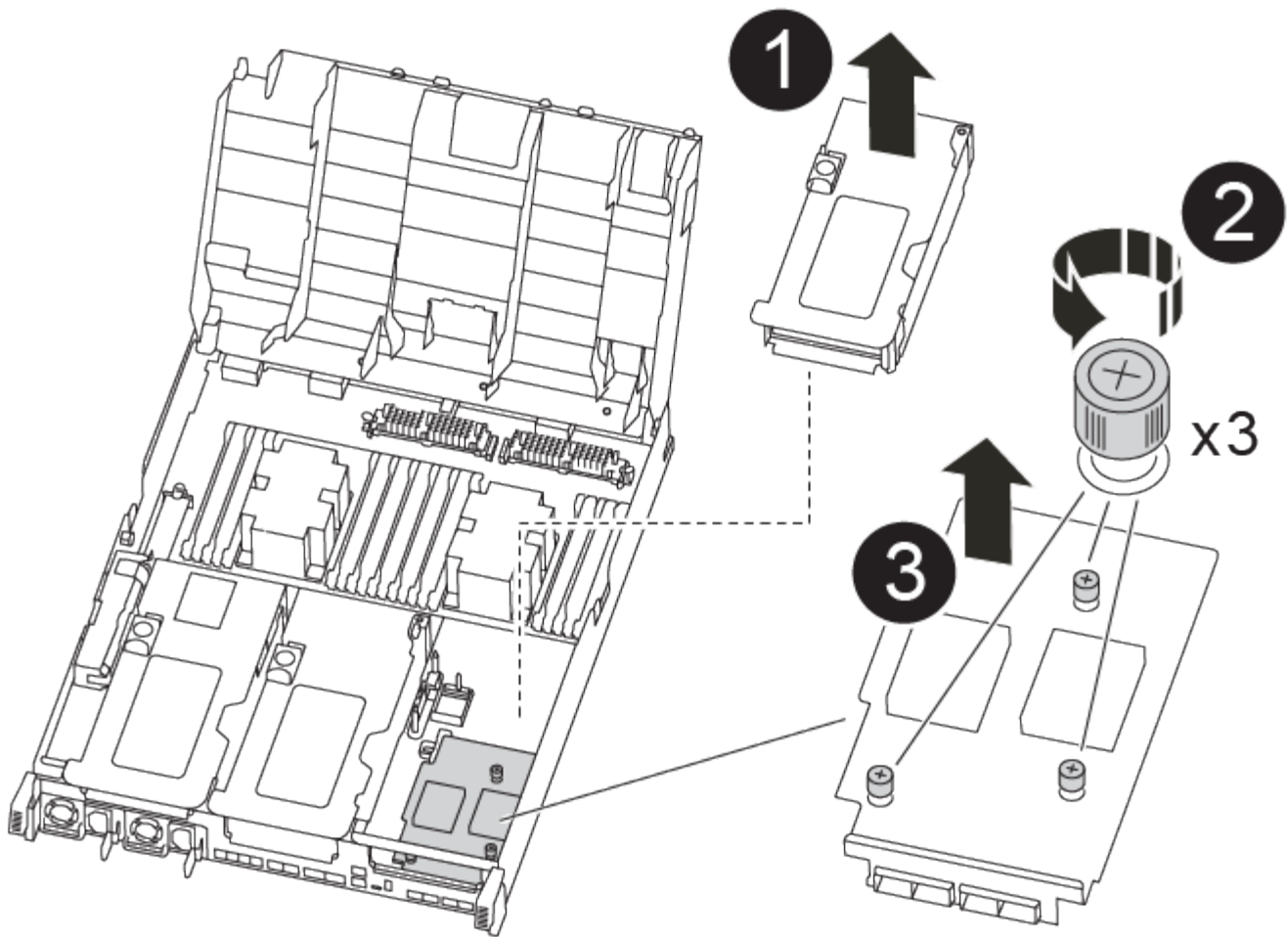
4. Reinstall the riser:
 - a. Align the riser with the pins to the side of the riser socket, lower the riser down on the pins.
 - b. Push the riser squarely into the socket on the motherboard.
 - c. Rotate the latch down flush with the sheet metal on the riser.

Step 4: Replace the mezzanine card

The mezzanine card is located under riser number 3 (slots 4 and 5). You must remove that riser to access the mezzanine card, replace the mezzanine card, and then reinstall riser number 3. See the FRU map on the controller module for more information.

You can use the following animation, illustration, or the written steps to replace the mezzanine card.

[Animation - Replace the mezzanine card](#)



Steps

1. Remove riser number 3 (slots 4 and 5):

- Open the air duct by pressing the locking tabs on the sides of the air duct, slide it toward the back of the controller module, and then rotate it to its completely open position.
- Remove any SFP or QSFP modules that might be in the PCIe cards.
- Rotate the riser locking latch on the left side of the riser up and toward air duct.

The riser raises up slightly from the controller module.

- Lift the riser up, and then set it aside on a stable, flat surface.

2. Replace the mezzanine card:

- Remove any QSFP or SFP modules from the card.
- Loosen the thumbscrews on the mezzanine card, and gently lift the card directly out of the socket and set it aside.
- Align the replacement mezzanine card over the socket and the guide pins and gently push the card into the socket.
- Tighten the thumbscrews on the mezzanine card.

3. Reinstall the riser:

- Align the riser with the pins to the side of the riser socket, lower the riser down on the pins.

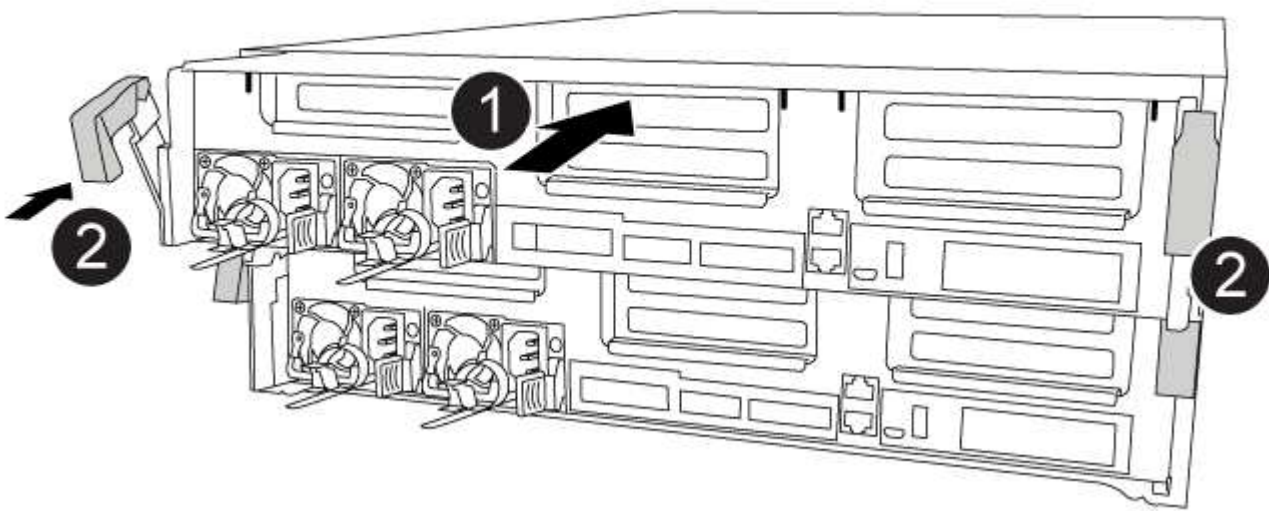
- b. Push the riser squarely into the socket on the motherboard.
- c. Rotate the latch down flush with the sheet metal on the riser.

Step 5: Install the controller module

After you have replaced the component in the controller module, you must reinstall the controller module into the chassis, and then boot it to Maintenance mode.

You can use the following animation, illustration, or the written steps to install the controller module in the chassis.

[Animation - Install the controller module](#)



Steps

1. If you have not already done so, close the air duct.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

3. Recable the system, as needed.

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

4. Complete the installation of the controller module:
 - a. Using the locking latches, firmly push the controller module into the chassis until it meets the midplane and is fully seated.

The locking latches rise when the controller module is fully seated.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- c. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

- f. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components and let the controller reboot.
5. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode impaired_node_name`
 6. If automatic giveback was disabled, reenable it: `storage failover modify -node local -auto-giveback true`

Step 6: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`


```
cluster_B::> metrocluster node show
```

DR		Configuration	DR
Group	Cluster	Node	Mirroring Mode
-----	-----	-----	-----
1	cluster_A	controller_A_1 configured	enabled heal roots
completed	cluster_B	controller_B_1 configured	enabled waiting for
		switchback recovery	

2 entries were displayed.

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the **waiting-for-switchback** state:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
-----	-----	-----	-----
Local: cluster_B	configured	switchover	
Remote: cluster_A	configured	waiting-for-switchback	

The switchback operation is complete when the clusters are in the **normal** state.:

```
cluster_B::> metrocluster show
```

Cluster	Configuration	State	Mode
-----	-----	-----	-----
Local: cluster_B	configured	normal	
Remote: cluster_A	configured	normal	

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 7: Restore the controller module to operation

You must recable the system, give back the controller module, and then reenabling automatic giveback.

Steps

1. Recable the system, as needed.

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

2. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode impaired_node_name`
3. If automatic giveback was disabled, reenabling it: `storage failover modify -node local -auto-giveback true`

Step 8: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace a power supply - FAS8300 and FAS8700

Replacing a power supply (PSU) involves disconnecting the target PSU from the power source, unplugging the power cable, removing the old PSU and installing the replacement PSU, and then reconnecting the replacement PSU to the power source.

- The power supplies are redundant and hot-swappable.
- This procedure is written for replacing one power supply at a time.



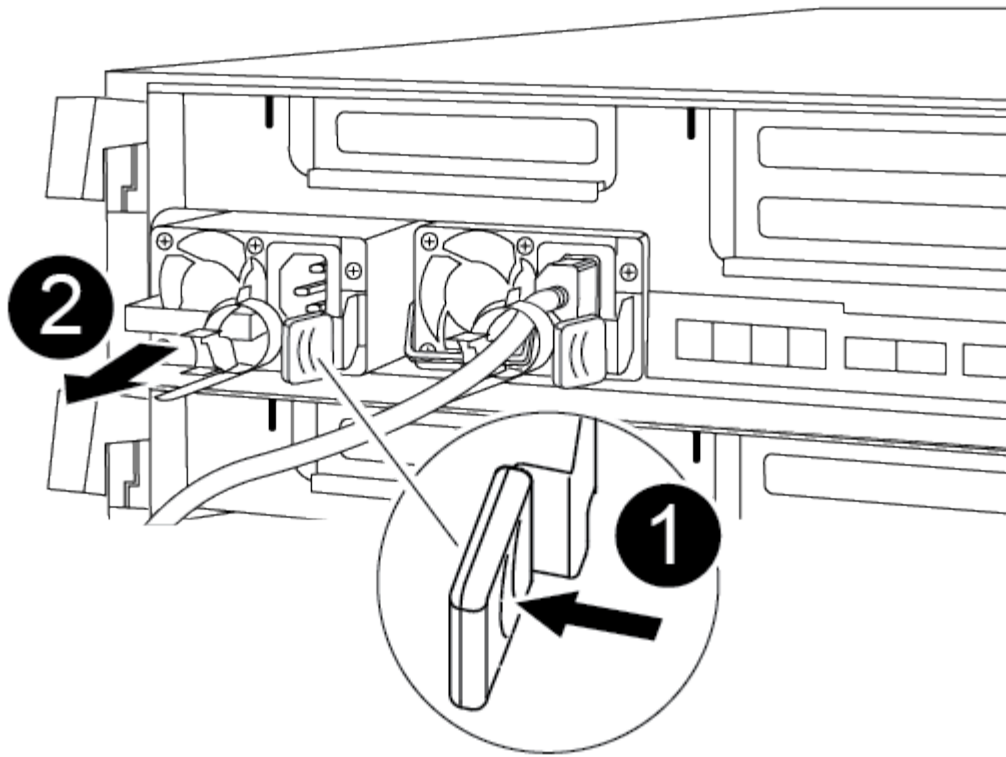
It is a best practice to replace the power supply within two minutes of removing it from the chassis. The system continues to function, but ONTAP sends messages to the console about the degraded power supply until the power supply is replaced.



Do not mix PSUs with different efficiency ratings. Always replace like for like.

You can use the following animation, illustration, or the written steps to replace the power supply.

[Animation - Replace a power supply](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Identify the power supply you want to replace, based on console error messages or through the LEDs on the power supplies.
3. Disconnect the power supply:
 - a. Open the power cable retainer, and then unplug the power cable from the power supply.
 - b. Unplug the power cable from the power source.
4. Remove the power supply:
 - a. Rotate the cam handle so that it can be used to pull the power supply out of the chassis.
 - b. Press the blue locking tab to release the power supply from the chassis.
 - c. Using both hands, pull the power supply out of the chassis, and then set it aside.
5. Using both hands, support and align the edges of the power supply with the opening in the controller module, and then gently push the power supply into the controller module until the locking tab clicks into place.

The power supplies will only properly engage with the internal connector and lock in place one way.



To avoid damaging the internal connector, do not use excessive force when sliding the power supply into the system.

6. Rotate the cam handle so that it is flush against the power supply.
7. Reconnect the power supply cabling:
 - a. Reconnect the power cable to the power supply and the power source.

b. Secure the power cable to the power supply using the power cable retainer.

Once power is restored to the power supply, the status LED should be green.

8. Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Replace the real-time clock battery - FAS8300 and FAS8700

You replace the real-time clock (RTC) battery in the controller module so that your system's services and applications that depend on accurate time synchronization continue to function.

- You can use this procedure with all versions of ONTAP supported by your system
- All other components in the system must be functioning properly; if not, you must contact technical support.

Step 1: Shut down the impaired controller

You can shut down or take over the impaired controller using different procedures, depending on the storage system hardware configuration.

Option 1: Most configurations

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, it must be in quorum. If the cluster is not in quorum or a healthy controller shows false for eligibility and health, you must correct the issue before shutting down the impaired controller; see [Synchronize a node with the cluster](#).

Steps

1. If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message MAINT=<# of
hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message
MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.

If the impaired controller is displaying...	Then...
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Option 2: Controller is in a two-node MetroCluster

To shut down the impaired controller, you must determine the status of the controller and, if necessary, switch over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- You must leave the power supplies turned on at the end of this procedure to provide power to the healthy controller.

Steps

- Check the MetroCluster status to determine whether the impaired controller has automatically switched over to the healthy controller: `metrocluster show`
- Depending on whether an automatic switchover has occurred, proceed according to the following table:

If the impaired controller...	Then...
Has automatically switched over	Proceed to the next step.
Has not automatically switched over	Perform a planned switchover operation from the healthy controller: <code>metrocluster switchover</code>
Has not automatically switched over, you attempted switchover with the <code>metrocluster switchover</code> command, and the switchover was vetoed	Review the veto messages and, if possible, resolve the issue and try again. If you are unable to resolve the issue, contact technical support.

- Resynchronize the data aggregates by running the `metrocluster heal -phase aggregates` command from the surviving cluster.

```
controller_A_1::> metrocluster heal -phase aggregates
[Job 130] Job succeeded: Heal Aggregates is successful.
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

4. Verify that the operation has been completed by using the `metrocluster operation show` command.

```
controller_A_1::> metrocluster operation show
  Operation: heal-aggregates
    State: successful
Start Time: 7/25/2016 18:45:55
  End Time: 7/25/2016 18:45:56
    Errors: -
```

5. Check the state of the aggregates by using the `storage aggregate show` command.

```
controller_A_1::> storage aggregate show
Aggregate      Size Available Used% State   #Vols  Nodes
RAID Status
-----
...
aggr_b2        227.1GB    227.1GB    0% online      0 mcc1-a2
raid_dp, mirrored, normal...
```

6. Heal the root aggregates by using the `metrocluster heal -phase root-aggregates` command.

```
mcc1A::> metrocluster heal -phase root-aggregates
[Job 137] Job succeeded: Heal Root Aggregates is successful
```

If the healing is vetoed, you have the option of reissuing the `metrocluster heal` command with the `-override-vetoes` parameter. If you use this optional parameter, the system overrides any soft vetoes that prevent the healing operation.

7. Verify that the heal operation is complete by using the `metrocluster operation show` command on the destination cluster:

```
mcc1A::> metrocluster operation show
  Operation: heal-root-aggregates
    State: successful
Start Time: 7/29/2016 20:54:41
  End Time: 7/29/2016 20:54:42
    Errors: -
```

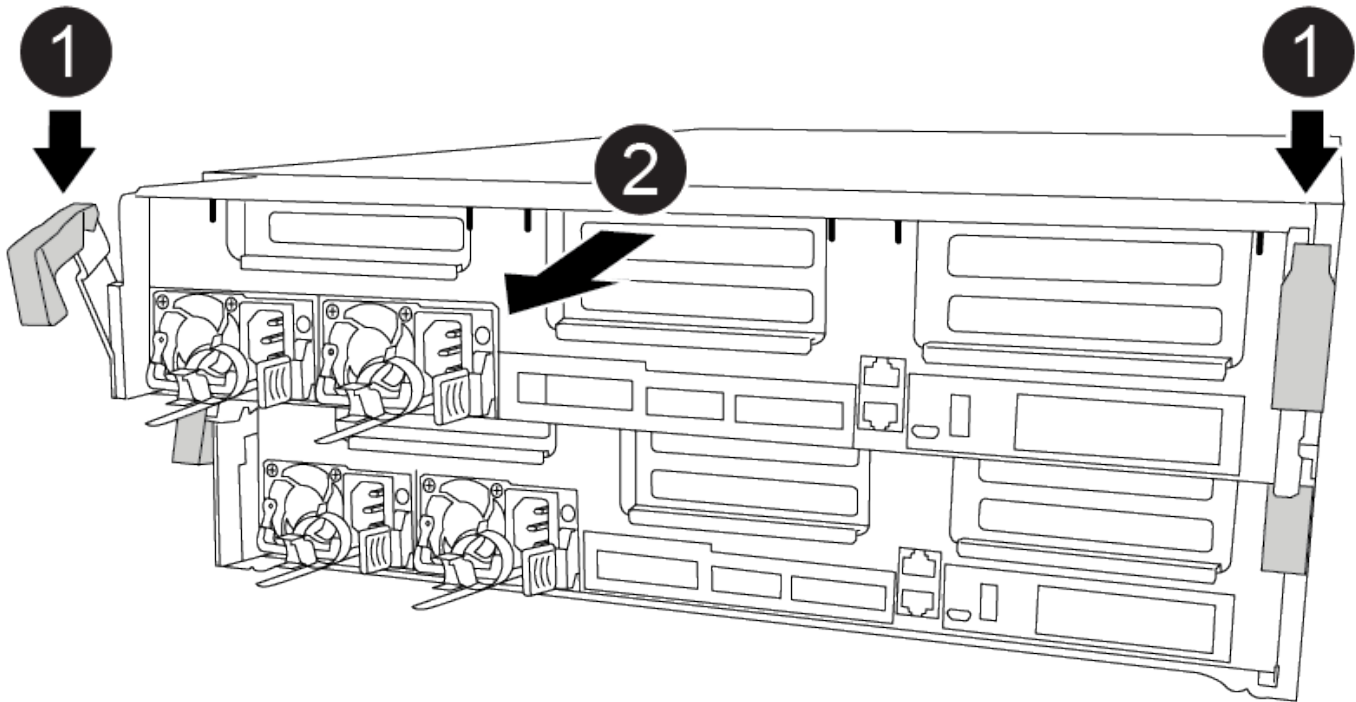
8. On the impaired controller module, disconnect the power supplies.

Step 2: Remove the controller module

To access components inside the controller module, you must remove the controller module from the chassis.

You can use the following animation, illustration, or the written steps to remove the controller module from the chassis.

[Animation - Remove the controller module](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Release the power cable retainers, and then unplug the cables from the power supplies.
3. 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 module, 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.

4. Remove the cable management device from the controller module and set it aside.
5. Press down on both of the locking latches, and then rotate both latches downward at the same time.

The controller module moves slightly out of the chassis.

6. Slide the controller module out of the chassis.

Make sure that you support the bottom of the controller module as you slide it out of the chassis.

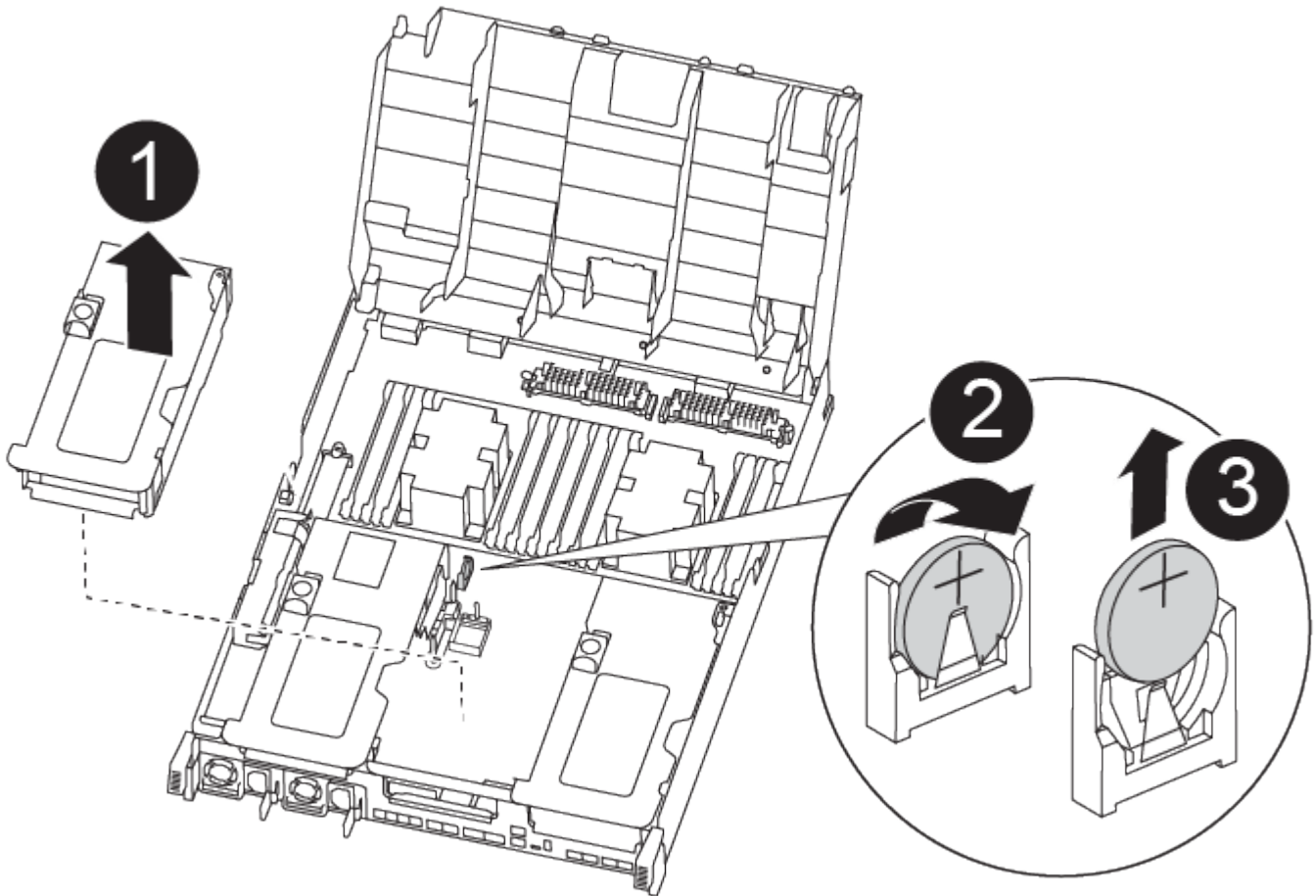
7. Place the controller module on a stable, flat surface.

Step 3: Replace the RTC battery

You need to locate the RTC battery inside the controller module, and then follow the specific sequence of steps. See the FRU map inside the controller module for the location of the RTC battery.

You can use the following animation, illustration, or the written steps to replace the RTC battery.

[Animation - Replace the RTC battery](#)



Steps

1. If you are not already grounded, properly ground yourself.
2. Open the air duct:
 - a. Press the locking tabs on the sides of the air duct in toward the middle of the controller module.
 - b. Slide the air duct toward the back of the controller module, and then rotate it upward to its completely open position.
3. Locate, remove, and then replace the RTC battery:
 - a. Using the FRU map, locate the RTC battery on the controller module.
 - b. Gently push the battery away from the holder, rotate it away from the holder, and then lift it out of the holder.



Note the polarity of the battery as you remove it from the holder. The battery is marked with a plus sign and must be positioned in the holder correctly. A plus sign near the holder tells you how the battery should be positioned.

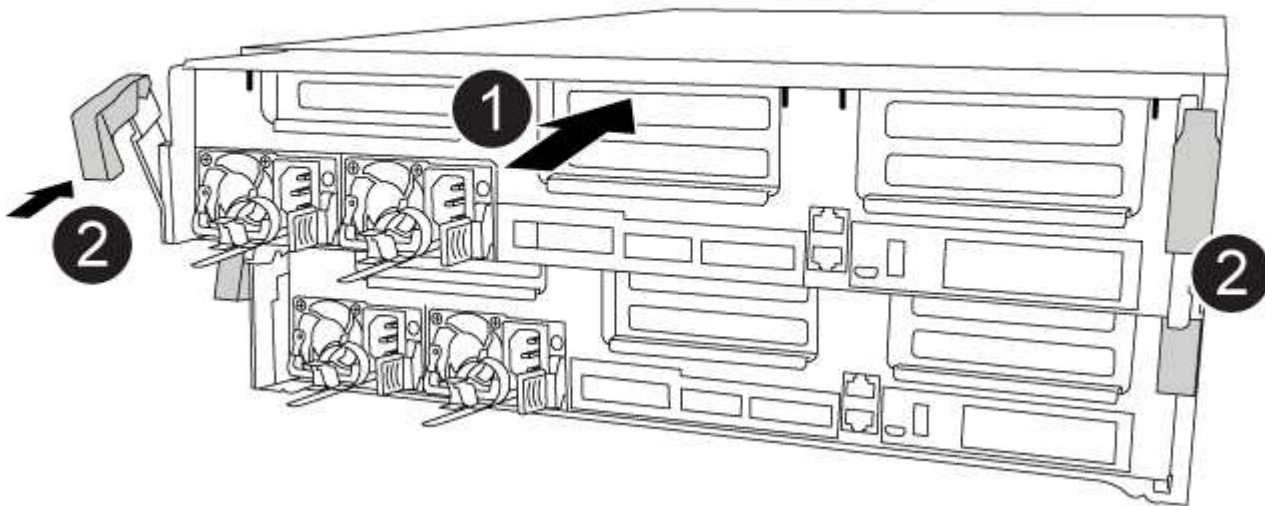
- c. Remove the replacement battery from the antistatic shipping bag.
 - d. Note the polarity of the RTC battery, and then insert it into the holder by tilting the battery at an angle and pushing down.
4. Visually inspect the battery to make sure that it is completely installed into the holder and that the polarity is correct.
 5. Close the air duct.

Step 4: Reinstall the controller module and sett time/date after RTC battery replacement

After you replace a component within the controller module, you must reinstall the controller module in the system chassis, reset the time and date on the controller, and then boot it.

You can use the following animation, illustration, or the written steps to install the controller module in the chassis.

[Animation - Install the controller module](#)



Steps

1. If you have not already done so, close the air duct or controller module cover.
2. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.

Do not completely insert the controller module in the chassis until instructed to do so.

3. Recable the system, as needed.

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

optic cables.

4. Complete the installation of the controller module:

- a. Using the locking latches, firmly push the controller module into the chassis until it meets the midplane and is fully seated.

The locking latches rise when the controller module is fully seated.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. Fully seat the controller module in the chassis by rotating the locking latches upward, tilting them so that they clear the locking pins, gently push the controller all the way in, and then lower the locking latches into the locked position.
- c. Plug the power cords into the power supplies, reinstall the power cable locking collar, and then connect the power supplies to the power source.

The controller module begins to boot as soon as power is restored. Be prepared to interrupt the boot process.

- d. If you have not already done so, reinstall the cable management device.
- e. Interrupt the normal boot process and boot to LOADER by pressing `Ctrl-C`.



If your system stops at the boot menu, select the option to boot to LOADER.

5. Reset the time and date on the controller:

- a. Check the date and time on the healthy controller with the `show date` command.
- b. At the LOADER prompt on the target controller, check the time and date.
- c. If necessary, modify the date with the `set date mm/dd/yyyy` command.
- d. If necessary, set the time, in GMT, using the `set time hh:mm:ss` command.
- e. Confirm the date and time on the target controller.

6. At the LOADER prompt, enter `bye` to reinitialize the PCIe cards and other components and let the controller reboot.

7. Return the controller to normal operation by giving back its storage: `storage failover giveback -ofnode impaired_node_name`

8. If automatic giveback was disabled, reenable it: `storage failover modify -node local -auto-giveback true`

Step 5: Switch back aggregates in a two-node MetroCluster configuration

After you have completed the FRU replacement in a two-node MetroCluster configuration, you can perform the MetroCluster switchback operation. This returns the configuration to its normal operating state, with the sync-source storage virtual machines (SVMs) on the formerly impaired site now active and serving data from the local disk pools.

This task only applies to two-node MetroCluster configurations.

Steps

1. Verify that all nodes are in the enabled state: `metrocluster node show`

```
cluster_B::> metrocluster node show

DR                               Configuration  DR
Group Cluster Node              State          Mirroring Mode
-----
1      cluster_A
      controller_A_1 configured      enabled    heal roots
completed
      cluster_B
      controller_B_1 configured      enabled    waiting for
switchback recovery
2 entries were displayed.
```

2. Verify that resynchronization is complete on all SVMs: `metrocluster vserver show`
3. Verify that any automatic LIF migrations being performed by the healing operations were completed successfully: `metrocluster check lif show`
4. Perform the switchback by using the `metrocluster switchback` command from any node in the surviving cluster.
5. Verify that the switchback operation has completed: `metrocluster show`

The switchback operation is still running when a cluster is in the `waiting-for-switchback` state:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      switchover
Remote: cluster_A configured      waiting-for-switchback
```

The switchback operation is complete when the clusters are in the `normal` state.:

```
cluster_B::> metrocluster show

Cluster              Configuration State      Mode
-----
Local: cluster_B configured      normal
Remote: cluster_A configured      normal
```

If a switchback is taking a long time to finish, you can check on the status of in-progress baselines by using the `metrocluster config-replication resync-status show` command.

6. Reestablish any SnapMirror or SnapVault configurations.

Step 6: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return and Replacements](#) page for further information.

Copyright information

Copyright © 2025 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.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.