



Boot media - manual recovery

Install and maintain

NetApp

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Boot media - manual recovery

Boot media manual recovery workflow - AFF C30 and AFF C60

The manual recovery of the boot image involves using a USB drive to reinstall ONTAP onto the AFF C30 or AFF C60 storage system's replacement boot media. You must download the appropriate ONTAP recovery image from the NetApp Support Site and copy it to a USB drive. This prepared USB drive is then used to perform the recovery and restore the system to operational status.

If your system is running in ONTAP 9.17.1 and later, use the [automatic boot recovery procedure](#).

To get started, review the recovery requirements, shut down the controller, replace the boot media, use the USB drive to restore the image, and reapply encryption settings if necessary.

1

Review the boot media requirements

Review the requirements for replacing the boot media.

2

Check onboard encryption keys

Determine whether the system has security key manager enabled or encrypted disks.

3

Shut down the impaired controller

Shut down the controller when you need to replace the boot media.

4

Replace the boot media

Remove the failed boot media from the impaired controller and install the replacement boot media, and then transfer an ONTAP image using a USB flash drive.

5

Boot the recovery image

Boot the ONTAP image from the USB drive, restore the file system, and verify the environmental variables.

6

Restore encryption

Restore the onboard key manager configuration or the external key manager from the ONTAP boot menu.

7

Return the failed part to NetApp

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

Requirements for manual boot media recovery - AFF C30 and AFF C60

Before replacing the boot media in your AFF C30 or AFF C60 storage system, ensure you meet the necessary requirements for a successful replacement. This includes making sure you have a USB flash drive with the appropriate amount of storage and verifying that you have the correct replacement boot device.

USB flash drive

- Ensure you have a USB flash drive formatted to FAT32.
- The USB must have sufficient storage capacity to hold the `image_xxx.tgz` file.

File preparation

Copy the `image_xxx.tgz` file to the USB flash drive. This file will be used when you transfer the ONTAP image using the USB flash drive.

Component replacement

Replace the failed component with the replacement component provided by NetApp.

Controller identification

It is critical to apply the commands to the correct controller when you are replacing the impaired boot media:

- The *impaired controller* is the controller on which you are performing maintenance.
- The *healthy controller* is the HA partner of the impaired controller.

What's next?

After you've reviewed the requirements to replace the boot media, you need to [check encryption key support and status on the boot media](#).

Check encryption support for manual boot media recovery - AFF C30 and AFF C60

To ensure data security on your AFF C30 or AFF C60 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 NVE support and download the correct ONTAP image

Determine whether your ONTAP version supports NetApp Volume Encryption (NVE) so you can download the correct ONTAP image for the boot media replacement.

Steps

1. Check if your ONTAP version supports encryption:

```
version -v
```

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

2. Download the appropriate ONTAP image based on NVE support:
 - 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



Download the ONTAP image from the NetApp Support Site to your HTTP or FTP server or a local folder. You will need this image file during the boot media replacement procedure.

Step 2: Verify key manager status and back up configuration

Before shutting down the impaired controller, verify the key manager configuration and back up the necessary information.

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, EKM is listed in the command output.• If OKM is enabled, OKM is listed in the command output.• If no key manager is enabled, No key manager keystores configured 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, external is listed in the command output.• If OKM is enabled, onboard is listed in the command output.• If no key manager is enabled, No key managers configured is listed in the command output.

2. Depending on whether a key manager is configured on your system, do one of the following:

If no key manager is configured:

You can safely shut down the impaired controller and proceed to the shutdown procedure.

If a key manager is configured (EKM or OKM):

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

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

- b. Review the output and check the value in the `Restored` column. This column indicates whether the authentication keys for your key manager (either EKM or OKM) have been successfully restored.

3. Complete the appropriate procedure based on your key manager type:

External Key Manager (EKM)

Complete these steps based on the value in the `Restored` column.

If all keys show `true` in the `Restored` column:

You can safely shut down the impaired controller and proceed to the shutdown procedure.

If any keys show a value other than `true` in the `Restored` column:

- a. Restore the external key management authentication keys to all nodes in the cluster:

```
security key-manager external restore
```

If the command fails, contact NetApp Support.

- b. Verify that all authentication keys are restored:

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

Confirm that the `Restored` column displays `true` for all authentication keys.

- c. If all keys are restored, you can safely shut down the impaired controller and proceed to the shutdown procedure.

Onboard Key Manager (OKM)

Complete these steps based on the value in the `Restored` column.

If all keys show `true` in the `Restored` column:

- a. Back up the OKM information:

- i. Switch to advanced privilege mode:

```
set -priv advanced
```

Enter `y` when prompted to continue.

- ii. Display the key management backup information:

```
security key-manager onboard show-backup
```

- iii. Copy the backup information to a separate file or your log file.

You will need this backup information if you need to manually recover OKM during the replacement procedure.

- iv. Return to admin mode:

```
set -priv admin
```

- b. You can safely shut down the impaired controller and proceed to the shutdown procedure.

If any keys show a value other than `true` in the `Restored` column:

a. Synchronize the onboard key manager:

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

Enter the 32-character alphanumeric onboard key management passphrase when prompted.



This is the cluster-wide passphrase you created when you initially configured the Onboard Key Manager. If you do not have this passphrase, contact NetApp Support.

b. Verify all authentication keys are restored:

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

Confirm that the `Restored` column displays `true` for all authentication keys and the `Key Manager type` shows `onboard`.

c. Back up the OKM information:

i. Switch to advanced privilege mode:

```
set -priv advanced
```

Enter `y` when prompted to continue.

ii. Display the key management backup information:

```
security key-manager onboard show-backup
```

iii. Copy the backup information to a separate file or your log file.

You will need this backup information if you need to manually recover OKM during the replacement procedure.

iv. Return to admin mode:

```
set -priv admin
```

d. You can safely shut down the impaired controller and proceed to the shutdown procedure.

What's next?

After checking the encryption key support and status on the boot media, you need to [shut down the controller](#).

Shut down the controller for manual boot media recovery - AFF C30 and AFF C60

Shut down the impaired controller in your AFF C30 or AFF C60 storage system to prevent data loss and maintain system stability during the manual boot media recovery process.

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 impaired_node_name -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 MetroCluster

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](#).
- 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:

- 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 section.
Waiting for giveback...	Press Ctrl-C, and then respond <i>y</i> 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 -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

What's next?

After shutting down the controller, you need to [replace the boot media](#).

Replace the boot media and prepare for manual boot recovery - AFF C30 and AFF C60

The boot media in your AFF C30 or AFF C60 storage system stores essential firmware and configuration data. The replacement process involves removing the controller module, removing the impaired boot media, installing the replacement boot media, and then manually transferring the ONTAP image to the replacement boot media using a USB flash drive.

About this task

If needed, you can turn on the platform chassis location (blue) LEDs to aid in physically locating the affected platform. Log into the BMC using SSH and enter the `system location-led on` command.

A platform chassis has three location LEDs: one on the operator display panel and one on each controller. Location LEDs remain illuminated for 30 minutes.

You can turn them off by entering the `system location-led off` command. If you are unsure if the LEDs are on or off, you can check their state by entering the `system location-led show` command.

Step 1: Remove the controller

You must remove the controller from the chassis when you replace the controller or replace a component inside the controller.

Before you begin

Make sure all other components in the storage system are functioning properly; if not, you must contact [NetApp Support](#) before continuing with this procedure.

Steps

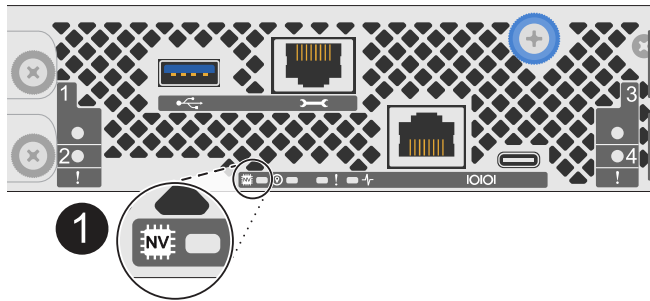
1. On the impaired controller, make sure the NV LED is off.

When the NV LED is off, destaging is complete and it is safe to remove the impaired controller.



If the NV LED is flashing (green), destage is in progress. You must wait for the NV LED to turn off. However, if the flashing continues for longer than five minutes, contact [NetApp Support](#) before continuing with this procedure.

The NV LED is located next to the NV icon on the controller.



1

NV icon and LED on the controller

2. If you are not already grounded, properly ground yourself.
3. Disconnect the power on the impaired controller:



Power supplies (PSUs) do not have a power switch.

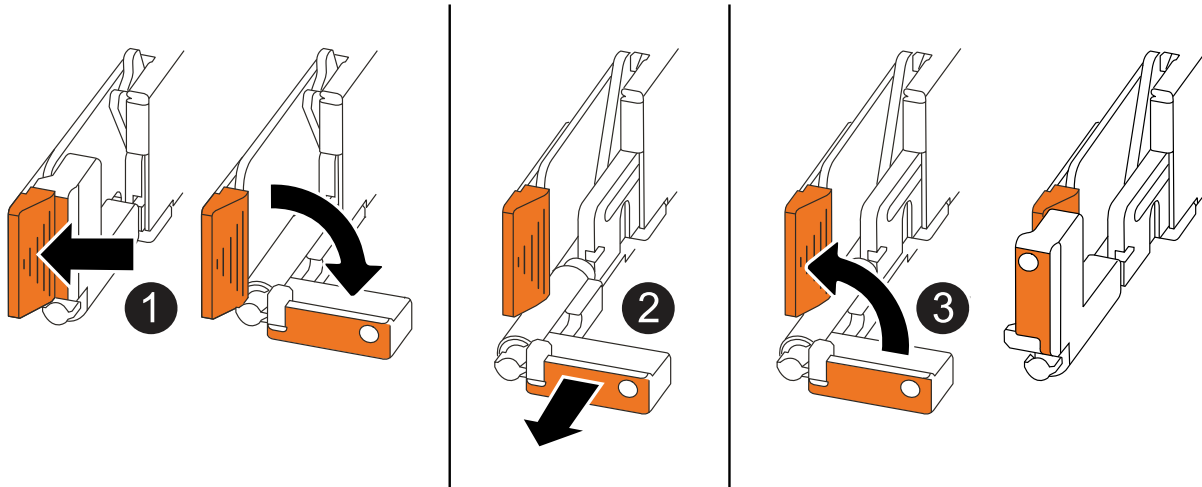
If you are disconnecting a...	Then...
AC PSU	<ol style="list-style-type: none">1. Open the power cord retainer.2. Unplug the power cord from the PSU and set it aside.
DC PSU	<ol style="list-style-type: none">1. Unscrew the two thumb screws on the D-SUB DC power cord connector.2. Unplug the power cord from the PSU and set it aside.

4. Unplug all cables from the impaired controller.

Keep track of where the cables were connected.

5. Remove the impaired controller:

The following illustration shows the operation of the controller handles (from the left side of the controller) when removing a controller:



1	On both ends of the controller, push the vertical locking tabs outward to release the handles.
2	<ul style="list-style-type: none"> • Pull the handles towards you to unseat the controller from the midplane. <p>As you pull, the handles extend out from the controller and then you feel some resistance, keep pulling.</p> <ul style="list-style-type: none"> • Slide the controller out of the chassis while supporting the bottom of the controller, and place it on a flat, stable surface.
3	If needed, rotate the handles upright (next to the tabs) to move them out of the way.

6. Place the controller on an anti-static mat.

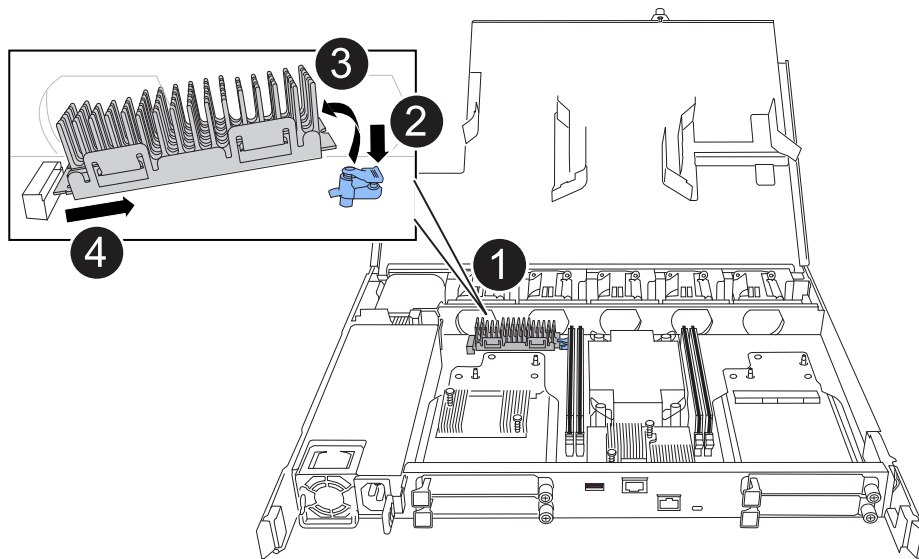
7. Open the controller cover by turning the thumbscrew counterclockwise to loosen, and then open the cover.

Step 2: Replace the boot media

To replace the boot media, locate it inside the controller and follow the specific sequence of steps.

1. If you are not already grounded, properly ground yourself.

2. Remove the boot media:



1	Boot media location
2	Press down on the blue tab to release the right end of the boot media.
3	Lift the right end of the boot media up at a slight angle to get a good grip along the sides of the boot media.
4	Gently pull the left end of the boot media out of its socket.

3. Install the replacement boot media:

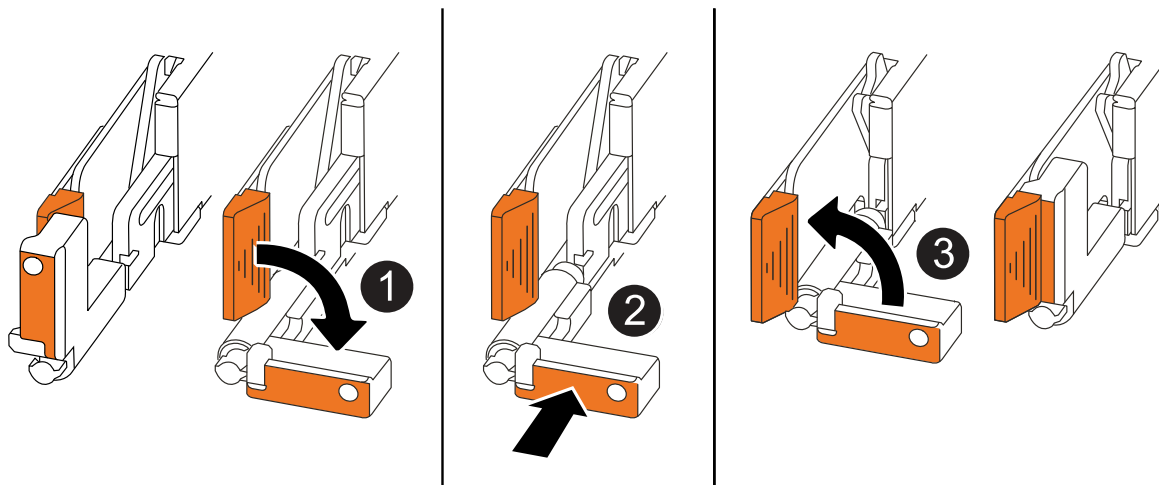
- a. Remove the boot media from its package.
- b. Slide the socket end of the boot media into its socket.
- c. At the opposite end of the boot media, press down and hold the blue tab (in the open position), gently push down on that end of the boot media until it stops, and then release the tab to lock the boot media into place.

Step 3: Reinstall the controller

Reinstall the controller into the chassis, but do not reboot it.

About this task

The following illustration shows the operation of the controller handles (from the left side of a controller) when reinstalling the controller, and can be used as a reference for the rest of the controller reinstallation steps.



1	If you rotated the controller handles upright (next to the tabs) to move them out of the way while you serviced the controller, rotate them down to the horizontal position.
2	Push the handles to reinsert the controller into the chassis halfway and then, when instructed, push until the controller is fully seated.
3	Rotate the handles to the upright position and lock in place with the locking tabs.

Steps

1. Close the controller cover and turn the thumbscrew clockwise until tightened.
2. Insert the controller halfway into the chassis.

Align the rear of the controller with the opening in the chassis, and then gently push the controller using the handles.



Do not completely insert the controller in the chassis until instructed to do so later in this procedure.

3. Reconnect the cables to the controller; however, do not plug in the power cord to the power supply (PSU) at this time.



Make sure that the console cable is connected to the controller because you want to catch and log the boot sequence later in the boot media replacement procedure when you fully seat the controller in the chassis and it begins to boot.

Step 4: Transfer the boot image to the boot media

The replacement boot media that you installed is without an ONTAP image so you need to transfer an ONTAP image using a USB flash drive.

Before you begin

- You must have a USB flash drive, formatted to FAT32, with at least 4GB capacity.
- You must have 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 supported, download the image with NetApp Volume Encryption, as indicated in the download button.
- If NVE is not supported, download the image without NetApp Volume Encryption, as indicated in the download button.
- You must have a network connection between the node management ports of the controllers (typically the e0M interfaces).

Steps

1. Download and copy the appropriate service image from the [NetApp Support Site](#) to the USB flash drive.
 - a. Download the service image from the Downloads link on the page, 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.

The USB flash drive should have the appropriate ONTAP image of what the impaired controller is running.

- c. Remove the USB flash drive from your laptop.
2. Insert the USB flash drive into the USB-A port on the impaired controller.

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

3. Fully seat the impaired controller in the chassis:
 - a. Firmly push on the handles until the controller meets the midplane and is fully seated.



Do not use excessive force when sliding the controller into the chassis; it could damage the connectors.



The controller boots when fully seated in the chassis. It gets its power from the partner controller.

- b. Rotate the controller handles up and lock in place with the tabs.
4. 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.

5. Reconnect the power cord to the power supply (PSU) on the impaired controller.

Once power is restored to the PSU, the status LED should be green.

If you are reconnecting a...	Then...
AC PSU	<ol style="list-style-type: none">1. Plug the power cord into the PSU.2. Secure the power cord with the power cord retainer.

If you are reconnecting a...	Then...
DC PSU	<ol style="list-style-type: none"> 1. Plug the D-SUB DC power cord connector into the PSU. 2. Tighten the two thumb screws to secure the D-SUB DC power cord connector to the PSU.

What's next?

After replacing the boot media, you need to [boot the recovery image](#).

Manual boot media recovery from a USB drive - AFF C30 and AFF C60

After installing the new boot media device in your AFF C30 or AFF C60 storage system, you can boot the recovery image manually from a USB drive to restore the configuration from the partner node.

Before you begin

- Ensure your console is connected to the impaired controller.
- Verify you have a USB flash drive with the recovery image.
- Determine if your system uses encryption. You will need to select the appropriate option in step 3 based on whether encryption is enabled.

Steps

1. From the LOADER prompt on the impaired controller, boot the recovery image from the USB flash drive:

```
boot_recovery
```

The recovery image is downloaded from the USB flash drive.

2. When prompted, enter the name of the image or press **Enter** to accept the default image displayed in brackets.
3. Restore the var file system using the procedure for your ONTAP version:

ONTAP 9.16.0 or earlier

Complete the following steps on the impaired controller and partner controller:

- a. **On the impaired controller:** Press `Y` when you see `Do you want to restore the backup configuration now?`
- b. **On the impaired controller:** If prompted, press `Y` to overwrite `/etc/ssh/ssh_host_ecdsa_key`.
- c. **On the partner controller:** Set the impaired controller to advanced privilege level:

```
set -privilege advanced
```

- d. **On the partner controller:** Run the restore backup command:

```
system node restore-backup -node local -target-address  
impaired_node_IP_address
```



If you see any message other than a successful restore, contact NetApp Support.

- e. **On the partner controller:** Return 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, then press `Ctrl-C` when you see the Boot Menu.
- i. **On the impaired controller:** Do one of the following:
 - If the system does not use encryption, select *Option 1 Normal Boot* from the Boot Menu.
 - If the system uses encryption, go to [Restore encryption](#).

ONTAP 9.16.1 or later

Complete the following steps on the impaired controller:

- a. Press `Y` when prompted to restore the backup configuration.

After the restore procedure is successful, this message displays: `syncflash_partner:`
`Restore from partner complete`

- b. Press `Y` when prompted to confirm that the restore backup was successful.
- c. Press `Y` when prompted to use the restored configuration.
- d. Press `Y` when prompted to reboot the node.
- e. Press `Y` when prompted to reboot again, then press `Ctrl-C` when you see the Boot Menu.
- f. Do one of the following:
 - If the system does not use encryption, select *Option 1 Normal Boot* from the Boot Menu.

- If the system uses encryption, go to [Restore encryption](#).

4. Connect the console cable to the partner controller.
5. Return the controller to normal operation by giving back its storage:

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

6. If you disabled automatic giveback, reenable it:

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

7. If AutoSupport is enabled, restore automatic case creation:

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

What's next?

After booting the recovery image, you need to [restore encryption on the boot media](#).

Restore encryption keys after manual boot recovery - AFF C30 and AFF C60

Restore encryption on the replacement boot media in your AFF C30 or AFF C60 storage system to ensure continued data protection. The replacement process involves verifying key availability, reapplying encryption settings, and confirming secure access to your data.

Complete the appropriate steps to restore encryption on your system based on your key manager type. If you are unsure which key manager your system uses, check the settings you captured at the beginning of the boot media replacement procedure.

Onboard Key Manager (OKM)

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

Before you begin

Ensure you have the following information available:

- Cluster-wide passphrase entered while [enabling onboard key management](#)
- [Backup information for the Onboard Key Manager](#)
- Verification that you have the correct passphrase and backup data using the [How to verify onboard key management backup and cluster-wide passphrase](#) procedure

Steps

On the impaired controller:

1. Connect the console cable to the impaired controller.
2. From the ONTAP boot menu, select the appropriate option:

ONTAP version	Select this option
ONTAP 9.8 or later	<p>Select option 10.</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 /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.<p>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> <pre> Please choose one of the following: (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. Selection (1-19)? recover_onboard_keymanager </pre> </div>

3. Confirm that you want to continue the recovery process when prompted:

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 does 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, including the dashes.

Show example prompt

Enter the backup data:

-----BEGIN

BACKUP-----

01234567890123456789012345678901234567890123456789012345678901
23

12345678901234567890123456789012345678901234567890123456789012
34

23456789012345678901234567890123456789012345678901234567890123
45

34567890123456789012345678901234567890123456789012345678901234
56

45678901234567890123456789012345678901234567890123456789012345
67

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AA
01234567890123456789012345678901234567890123456789012345678901
23
12345678901234567890123456789012345678901234567890123456789012
34
23456789012345678901234567890123456789012345678901234567890123
45
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AA

-----END
BACKUP-----
```

b. Press Enter twice at the end of the input.

The recovery process completes and displays the following message:

Successfully recovered keymanager secrets.

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)
```

On the partner controller:

8. Giveback the impaired controller:

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

On the impaired controller:

9. After booting with only the CFO aggregate, synchronize the key manager:

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

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

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. Verify that all keys are synced:

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

The command should return no results. If any results appear, repeat the sync command until no results are returned.

On the partner controller:

12. Giveback the impaired controller:

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

13. Restore automatic giveback if you disabled it:

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

14. If AutoSupport is enabled, restore automatic case creation:

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

External Key Manager (EKM)

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

Before you begin

Gather the following files from another cluster node or from your backup:

- /cfcard/knip/servers.cfg file or the KMIP server address and port
- /cfcard/knip/certs/client.crt file (client certificate)
- /cfcard/knip/certs/client.key file (client key)
- /cfcard/knip/certs/CA.pem file (KMIP server CA certificates)

Steps

On the impaired controller:

1. Connect the console cable to the impaired 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. Confirm you have gathered the required information when prompted:

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. Enter the client and server information when prompted:
 - a. Enter the client certificate (client.crt) file contents, including the BEGIN and END lines.
 - b. Enter the client key (client.key) file contents, including the BEGIN and END lines.
 - c. Enter the KMIP server CA(s) (CA.pem) file contents, including the BEGIN and END lines.
 - d. Enter the KMIP server IP address.
 - e. Enter the KMIP server port (press Enter to use the default port 5696).

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
```

The recovery process completes and displays the following message:

Successfully recovered keymanager secrets.

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:

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

What's next?

After restoring encryption on the boot media, you need to [return the failed part to NetApp](#).

Return the failed part to NetApp - AFF C30 and AFF C60

If a component in your AFF C30 or AFF C60 storage system fails, return the failed part to NetApp. See the [Part Return and Replacements](#) page for further information.

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