



# **Boot media**

## **ONTAP Systems**

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# Boot media

## Replace the boot media - AFF C190

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.

- 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 onboard encryption keys as needed - AFF C190

Prior to shutting down the impaired node and checking the status of the onboard encryption keys, you must check the status of the impaired node, disable automatic giveback, and check what version of ONTAP the system is running.

Prior to shutting down the impaired node and checking the status of the onboard encryption keys, you must check the status of the impaired node, disable automatic giveback, and check the version of ONTAP that is running.

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 node shows false for eligibility and health, you must correct the issue before shutting down the impaired node; see the [NetApp Encryption overview with the CLI](#).

### Steps

1. Check the status of the impaired node:
  - If the impaired node is at the login prompt, log in as `admin`.
  - If the impaired node is at the LOADER prompt and is part of HA configuration, log in as `admin` on the healthy node.
  - If the impaired node is in a standalone configuration and at LOADER prompt, contact [mysupport.netapp.com](https://mysupport.netapp.com).
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_downh
```

The following AutoSupport message suppresses automatic case creation for two hours: `cluster1:*> system node autosupport invoke -node * -type all -message MAINT=2h`

3. Check the version of ONTAP the system is running on the impaired node if up, or on the partner node if the impaired node is down, using the `version -v` command:
  - If `<Ino-DARE>` or `<1Ono-DARE>` is displayed in the command output, the system does not support NVE, proceed to shut down the controller.
  - If `<Ino-DARE>` is not displayed in the command output, and the system is running ONTAP 9.6 or later, go to the next section.
4. If the impaired node is part of an HA configuration, disable automatic giveback from the healthy node:

```
storage failover modify -node local -auto-giveback false or storage failover  
modify -node local -auto-giveback-after-panic false
```

## Check NVE or NSE on systems running ONTAP 9.6 and later

Before shutting down the impaired node, you need to verify whether the system has either NetApp Volume Encryption (NVE) or NetApp Storage Encryption (NSE) enabled. If so, you need to verify the configuration.

1. Verify whether NVE is in use for any volumes in the cluster: `volume show -is-encrypted true`

If any volumes are listed in the output, NVE is configured and you need to verify the NVE configuration. If no volumes are listed, check whether NSE is configured and in use.

2. Verify whether NSE is configured and in use: `storage encryption disk show`
  - If the command output lists the drive details with Mode & Key ID information, NSE is configured and you need to verify the NSE configuration and in use.
  - If no disks are shown, NSE is not configured.
  - If NVE and NSE are not configured, no drives are protected with NSE keys, it's safe to shut down the impaired node.

## Verify NVE configuration

1. Display the key IDs of the authentication keys that are stored on the key management servers: `security key-manager key-query`



After the ONTAP 9.6 release, you may have additional key manager types. The types are KMIP, AKV, and GCP. The process for confirming these types is the same as confirming external or onboard key manager types.

- If the Key Manager type displays `external` and the Restored column displays `yes`, it's safe to shut down the impaired node.
- If the Key Manager type displays `onboard` and the Restored column displays `yes`, you need to complete some additional steps.
- If the Key Manager type displays `external` and the Restored column displays anything other than `yes`, you need to complete some additional steps.
- If the Key Manager type displays `onboard` and the Restored column displays anything other than `yes`,

you need to complete some additional steps.

1. If the `Key Manager` type displays `onboard` and the `Restored` column displays `yes`, manually back up the OKM information:
  - a. Go to advanced privilege mode and enter `y` when prompted to continue: `set -priv advanced`
  - b. Enter the command to display the key management information: `security key-manager onboard show-backup`
  - c. 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.
  - d. Return to admin mode: `set -priv admin`
  - e. Shut down the impaired node.

2. If the `Key Manager` type displays `external` and the `Restored` column displays anything other than `yes`:

- 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.

[mysupport.netapp.com](https://mysupport.netapp.com)

- b. Verify that the `Restored` column equals `yes` for all authentication keys: `security key-manager key-query`
  - c. Shut down the impaired node.

3. If the `Key Manager` type displays `onboard` and the `Restored` column displays anything other than `yes`:

- a. Enter the onboard security key-manager sync command: `security key-manager onboard sync`



Enter the customer's onboard key management passphrase at the prompt. If the passphrase cannot be provided, contact NetApp Support. [mysupport.netapp.com](https://mysupport.netapp.com)

- b. Verify the `Restored` column shows `yes` for all authentication keys: `security key-manager key-query`
  - c. Verify that the `Key Manager` type shows `onboard`, and then manually back up the OKM information.
  - d. Go to advanced privilege mode and enter `y` when prompted to continue: `set -priv advanced`
  - e. Enter the command to display the key management backup information: `security key-manager onboard show-backup`
  - f. 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.
  - g. Return to admin mode: `set -priv admin`
  - h. You can safely shut down the node.

## Verify NSE configuration

1. Display the key IDs of the authentication keys that are stored on the key management servers: `security key-manager key-query -key-type NSE-AK`



After the ONTAP 9.6 release, you may have additional key manager types. The types are KMIP, AKV, and GCP. The process for confirming these types is the same as confirming external or onboard key manager types.

- If the Key Manager type displays `external` and the Restored column displays `yes`, it's safe to shut down the impaired node.
- If the Key Manager type displays `onboard` and the Restored column displays `yes`, you need to complete some additional steps.
- If the Key Manager type displays `external` and the Restored column displays anything other than `yes`, you need to complete some additional steps.
- If the Key Manager type displays `external` and the Restored column displays anything other than `yes`, you need to complete some additional steps.
  1. If the Key Manager type displays `onboard` and the Restored column displays `yes`, manually back up the OKM information:
    - a. Go to advanced privilege mode and enter `y` when prompted to continue: `set -priv advanced`
    - b. Enter the command to display the key management information: `security key-manager onboard show-backup`
    - c. 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.
    - d. Return to admin mode: `set -priv admin`
    - e. You can safely shut down the node.
  2. If the Key Manager type displays `external` and the Restored column displays anything other than `yes`:
    - a. Enter the onboard security key-manager sync command: `security key-manager external sync`  
  
If the command fails, contact NetApp Support.  
  
[mysupport.netapp.com](https://mysupport.netapp.com)
    - b. Verify that the Restored column equals `yes` for all authentication keys: `security key-manager key-query`
    - c. You can safely shut down the node.
  3. If the Key Manager type displays `onboard` and the Restored column displays anything other than `yes`:
    - a. Enter the onboard security key-manager sync command: `security key-manager onboard sync`  
  
Enter the customer's onboard key management passphrase at the prompt. If the passphrase cannot be provided, contact NetApp Support.

- b. Verify the Restored column shows yes for all authentication keys: `security key-manager key-query`
- c. Verify that the Key Manager type shows onboard, and then manually back up the OKM information.
- d. Go to advanced privilege mode and enter `y` when prompted to continue: `set -priv advanced`
- e. Enter the command to display the key management backup information: `security key-manager onboard show-backup`
- f. 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.
- g. Return to admin mode: `set -priv admin`
- h. You can safely shut down the node.

## Shut down the node - AFF C190

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

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

### Steps

1. If the impaired node isn't at the LOADER prompt:

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

2. 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.

## Remove the controller module, replace the boot media and transfer the boot image to the boot media - AFF C190

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

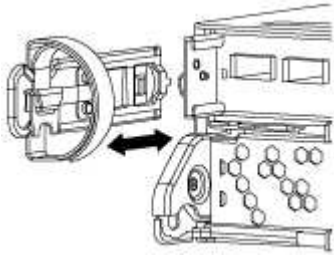
To access components inside the controller module, you must first remove the controller module from the system, and then remove the cover on the controller module.

### Steps

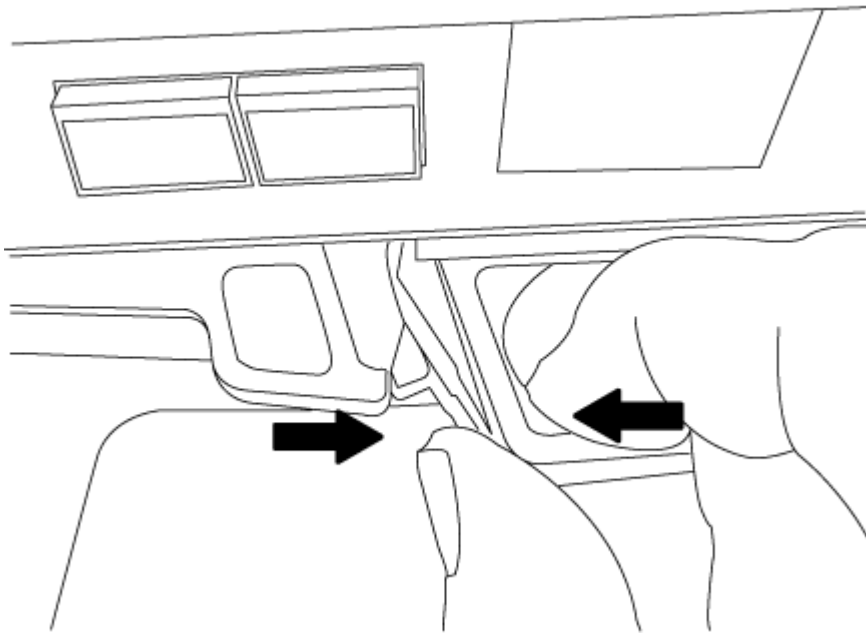
1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller module, keeping track of where the cables were connected.

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

3. Remove and set aside the cable management devices from the left and right sides of the controller module.



4. Squeeze the latch on the cam handle until it releases, open the cam handle fully to release the controller module from the midplane, and then, using two hands, pull the controller module out of the chassis.



5. Turn the controller module over and place it on a flat, stable surface.
6. Open the cover by sliding in the blue tabs to release the cover, and then swing the cover up and open.





## Step 2: Replace the boot media

You must locate the boot media in the controller module, and then follow the directions to replace it.

1. Locate the boot media using the following illustration or the FRU map on the controller module:
2. Press the blue button on the boot media housing to release the boot media from its housing, and then gently pull it straight out of the boot media socket.



Do not twist or pull the boot media straight up, because this could damage the socket or the boot media.

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. Push the boot media down to engage the locking button on the boot media housing.
6. Close the controller module cover.

## Step 3: Transfer the boot image to the boot media

You can install the system image to the replacement boot media using a USB flash drive with the image installed on it. However, you must restore the `var` file system during this procedure.

- You must have a USB flash drive, formatted to 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.

## 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.
2. Reinstall the cable management device and recable the system, as needed.

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

3. 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.

4. Push the controller module all the way into the system, making sure that the cam handle clears the USB flash drive, firmly push the cam handle to finish seating the controller module, push the cam handle to the closed position, and then tighten the thumbscrew.

The node begins to boot as soon as it is completely installed into the chassis.

5. Interrupt the boot process to stop at the LOADER prompt by pressing Ctrl-C when you see `Starting AUTOBOOT press Ctrl-C to abort...`.

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

6. Although the environment variables and bootargs are retained, you should check that all required boot environment variables and bootargs are properly set for your system type and configuration using the `printenv bootarg name` command and correct any errors using the `setenv variable-name <value>` command.

### a. Check the boot environment variables:

- `bootarg.init.boot_clustered`
- `partner-sysid`
- `bootarg.init.flash_optimized` for AFF C190
- `bootarg.init.switchless_cluster.enable`

### b. If External Key Manager is enabled, check the bootarg values, listed in the `kenv` ASUP output:

- `bootarg.storageencryption.support <value>`
- `bootarg.keymanager.support <value>`

- `kmip.init.interface <value>`
- `kmip.init.ipaddr <value>`
- `kmip.init.netmask <value>`
- `kmip.init.gateway <value>`

c. If Onboard Key Manager is enabled, check the bootarg values, listed in the `kenv` ASUP output:

- `bootarg.storageencryption.support <value>`
- `bootarg.keymanager.support <value>`
- `bootarg.onboard_keymanager <value>`

d. Save the environment variables you changed with the **`savenv`** command

e. Confirm your changes using the **`printenv variable-name`** command.

7. Boot the recovery image:

**`boot_recovery ontap_image_name.tgz`**



If the `image.tgz` file is named something other than `image.tgz`, such as `boot_recovery_9_4.tgz`, you need to include the different file name in the `boot_recovery` command.

The system boots to the boot menu and prompts you for the boot image name.

8. Enter the boot image name that is on the USB flash drive:

**`image_name.tgz`**

After `image_name.tgz` is installed, the system prompts you to restore the backup configuration (the `var` file system) from the healthy node.

9. Restore the `var` file system:

If your system has...	Then...
A network connection	<p>a. Press <b>y</b> when prompted to restore the backup configuration.</p> <p>b. Set the healthy node to advanced privilege level:</p> <pre>set -privilege advanced</pre> <p>c. Run the restore backup command:</p> <pre>system node restore-backup -node local -target -address <i>impaired_node_IP_address</i></pre> <p>d. Return the node to admin level:</p> <pre>set -privilege admin</pre> <p>e. Press <b>y</b> when prompted to use the restored configuration.</p> <p>f. Press <b>y</b> when prompted to reboot the node.</p>
No network connection	<p>a. Press <b>n</b> when prompted to restore the backup configuration.</p> <p>b. Reboot the system when prompted by the system.</p> <p>c. Select the <b>Update flash from backup config</b> (sync flash) option from the displayed menu.</p> <p>If you are prompted to continue with the update, press <b>y</b>.</p>

10. Verify that the environmental variables are set as expected.

a. Take the node to the LOADER prompt.

From the ONTAP prompt, you can issue the command `system node halt -skip-lif -migration-before-shutdown true -ignore-quorum-warnings true -inhibit -takeover true`.

b. Check the environment variable settings with the `printenv` command.

c. If an environment variable is not set as expected, modify it with the `setenv environment_variable_name changed_value` command.

d. Save your changes using the `saveenv` command.

e. Reboot the node.

11. The next step depends on your system configuration:

If your system is in...	Then...
A stand-alone configuration	You can begin using your system after the node reboots.

If your system is in...	Then...
An HA pair	<p>After the impaired node is displaying the <code>Waiting for Giveback...</code> message, perform a giveback from the healthy node:</p> <ol style="list-style-type: none"> <li>Perform a giveback from the healthy node: <pre>storage failover giveback -ofnode partner_node_name</pre> <p>This initiates the process of returning ownership of the impaired node's aggregates and volumes from the healthy node back to the impaired node.</p> <div data-bbox="699 617 756 672" data-label="Image"></div> <div data-bbox="820 577 1347 646" data-label="Text"> <p>If the giveback is vetoed, you can consider overriding the vetoes.</p> </div> <div data-bbox="820 676 1396 711" data-label="Text"> <p><a href="#">ONTAP 9 High-Availability Configuration Guide</a></p> </div> </li> <li>Monitor the progress of the giveback operation by using the <code>`storage failover show-giveback`</code> command.</li> <li>After the giveback operation is complete, confirm that the HA pair is healthy and that takeover is possible by using the <code>storage failover show</code> command.</li> <li>Restore automatic giveback if you disabled it by using the <code>storage failover modify</code> command.</li> </ol>

## Boot the recovery image - AFF C190

You must boot the ONTAP image from the USB drive, restore the file system, and verify the environmental variables.

### Steps

- From the LOADER prompt, boot the recovery image from the USB flash drive:

```
boot_recovery
```

The image is downloaded from the USB flash drive.

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

If your system has...	Then...
A network connection	<p>a. Press <b>y</b> when prompted to restore the backup configuration.</p> <p>b. Set the healthy node to advanced privilege level:</p> <pre>set -privilege advanced</pre> <p>c. Run the restore backup command:</p> <pre>system node restore-backup -node local -target -address <i>impaired_node_IP_address</i></pre> <p>d. Return the node to admin level:</p> <pre>set -privilege admin</pre> <p>e. Press <b>y</b> when prompted to use the restored configuration.</p> <p>f. Press <b>y</b> when prompted to reboot the node.</p>
No network connection	<p>a. Press <b>n</b> when prompted to restore the backup configuration.</p> <p>b. Reboot the system when prompted by the system.</p> <p>c. Select the <b>Update flash from backup config</b> (sync flash) option from the displayed menu.</p> <p>If you are prompted to continue with the update, press <b>y</b>.</p>

4. Ensure that the environmental variables are set as expected:
  - a. Take the node to the LOADER prompt.
  - b. Check the environment variable settings with the `printenv` command.
  - c. If an environment variable is not set as expected, modify it with the `setenv environment_variable_name changed_value` command.
  - d. Save your changes using the `saveenv` command.
5. The next depends on your system configuration:
  - If your system has onboard keymanager, NSE or NVE configured, go to [Restore OKM, NSE, and NVE as needed](#)
  - If your system does not have onboard keymanager, NSE or NVE configured, complete the steps in this section.
6. From the LOADER prompt, enter the `boot_ontap` command.

If you see...	Then...
The login prompt	Go to the next Step.

If you see...	Then...
Waiting for giveback...	<ol style="list-style-type: none"> <li>Log into the partner node.</li> <li>Confirm the target node is ready for giveback with the <code>storage failover show</code> command.</li> </ol>

- Connect the console cable to the partner node.
- Give back the node using the `storage failover giveback -fromnode local` command.
- At the cluster prompt, check the logical interfaces with the `net int -is-home false` command.

If any interfaces are listed as "false", revert those interfaces back to their home port using the `net int revert` command.

- Move the console cable to the repaired node and run the `version -v` command to check the ONTAP versions.
- Restore automatic giveback if you disabled it by using the `storage failover modify -node local -auto-giveback true` command.

## Restore OKM, NSE, and NVE as needed - AFF C190

Once environment variables are checked, you must complete steps specific to systems that have Onboard Key Manager (OKM), NetApp Storage Encryption (NSE) or NetApp Volume Encryption (NVE) enabled.

- Determine which section you should use to restore your OKM, NSE, or NVE configurations: If NSE or NVE are enabled along with Onboard Key Manager you must restore settings you captured at the beginning of this procedure.
  - If NSE or NVE are enabled and Onboard Key Manager is enabled, go to [Restore NVE or NSE when Onboard Key Manager is enabled](#).
  - If NSE or NVE are enabled for ONTAP 9.6, go to [Restore NSE/NVE on systems running ONTAP 9.6 and later](#).

### Restore NVE or NSE when Onboard Key Manager is enabled

#### Steps

- Connect the console cable to the target node.
- Use the `boot_ontap` command at the LOADER prompt to boot the node.
- Check the console output:

If the console displays...	Then...
The LOADER prompt	Boot the node to the boot menu: <code>boot_ontap menu</code>

If the console displays...	Then...
Waiting for giveback....	<ol style="list-style-type: none"> <li>Enter <code>Ctrl-C</code> at the prompt</li> <li>At the message: Do you wish to halt this node rather than wait [y/n]? , enter: <code>y</code></li> <li>At the LOADER prompt, enter the <code>boot_ontap</code> menu command.</li> </ol>

- At the Boot Menu, enter the hidden command, `recover_onboard_keymanager` and reply `y` at the prompt
- Enter the passphrase for the onboard key manager you obtained from the customer at the beginning of this procedure.
- When prompted to enter the backup data, paste the backup data you captured at the beginning of this procedure, when asked. Paste the output of `security key-manager backup show` OR `security key-manager onboard show-backup` command



The data is output from either `security key-manager backup show` or `security key-manager onboard show-backup` command.

Example of backup data:

```
-----BEGIN BACKUP-----
TmV0QXBwIEtleSBCbG9iAAEAAAAEAAAAcAEAAAAAADuD+byAAAAACEAAAAAAAAA
QAAAAAAAAABvOIH0AAAAAMh7qDLRyH1DBz12piVdy9ATSFMT0C0TIYFss4PDjTaV
dzRYkLd1PhQLxAWJwOlyqSr8qY1SEBgm1IWgE5DLRqkiAAAAAAAAACgAAAAAAAA
3WTh7gAAAAAAAAAAAAAAAAAIAAAAAAgAZJEIWvdeHr5RCAvHGclo+wAAAAAAAAA
lgAAAAAAAAAoAAAAAAAAAEOTcR0AAAAAAAAAAAAAAAAACAAAAAAAAJAGr3tJA/
LRzUQRHwv+1aWvAAAAAAAAAACQAAAAAAAAAgAAAAAAAAACdhTcvAAAAAJ1PXeBf
ml4NBsSyV1B4jc4A7cvWEFY6ILG6hc6tbKLAHZuvfQ4rlbYAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA...
H4nPQM0nrDRYRa9SCv8AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAA
-----END BACKUP-----
```

- At the Boot Menu select the option for Normal Boot.

The system boots to Waiting for giveback... prompt.

- Move the console cable to the partner node and login as "admin".
- Confirm the target node is ready for giveback with the `storage failover show` command.
- Giveback only the CFO aggregates with the `storage failover giveback -fromnode local -only-cfo-aggregates true` command.
  - If the command fails because of a failed disk, physically disengage the failed disk, but leave the disk in the slot until a replacement is received.



- If the command fails because of an open CIFS sessions, check with customer how to close out CIFS sessions.



Terminating CIFS can cause loss of data.

- If the command fails because the partner "not ready", wait 5 minutes for the NVMEMs to synchronize.
- If the command fails because of an NDMP, SnapMirror, or SnapVault process, disable the process. See the appropriate Documentation Center for more information.

11. Once the giveback completes, check the failover and giveback status with the `storage failover show` and ``storage failover show-giveback`` commands.

Only the CFO aggregates (root aggregate and CFO style data aggregates) will be shown.

12. Move the console cable to the target node.
  - a. If you are running ONTAP 9.6 or later, run the security key-manager onboard sync:
  - b. Run the `security key-manager onboard sync` command and then enter the passphrase when prompted.
  - c. Enter the `security key-manager key query` command to see a detailed view of all keys stored in the onboard key manager and verify that the `Restored` column = `yes/true` for all authentication keys.



If the `Restored` column = anything other than `yes/true`, contact Customer Support.

- d. Wait 10 minutes for the key to synchronize across the cluster.

13. Move the console cable to the partner node.
14. Give back the target node using the `storage failover giveback -fromnode local` command.
15. Check the giveback status, 3 minutes after it reports complete, using the `storage failover show` command.

If giveback is not complete after 20 minutes, contact Customer Support.

16. At the clustershell prompt, enter the `net int show -is-home false` command to list the logical interfaces that are not on their home node and port.

If any interfaces are listed as `false`, revert those interfaces back to their home port using the `net int revert` command.

17. Move the console cable to the target node and run the `version -v` command to check the ONTAP versions.
18. Restore automatic giveback if you disabled it by using the `storage failover modify -node local -auto-giveback true` command.

## Restore NSE/NVE on systems running ONTAP 9.6 and later

### Steps

1. Connect the console cable to the target node.
2. Use the `boot_ontap` command at the LOADER prompt to boot the node.

3. Check the console output:

If the console displays...	Then...
The login prompt	Go to Step 7.
Waiting for giveback...	<ul style="list-style-type: none"><li>a. Log into the partner node.</li><li>b. Confirm the target node is ready for giveback with the <code>storage failover show</code> command.</li></ul>

4. Move the console cable to the partner node and give back the target node storage using the `storage failover giveback -fromnode local -only-cfo-aggregates true local` command.
- If the command fails because of a failed disk, physically disengage the failed disk, but leave the disk in the slot until a replacement is received.
  - If the command fails because of an open CIFS sessions, check with customer how to close out CIFS sessions.



Terminating CIFS can cause loss of data.

- If the command fails because the partner "not ready", wait 5 minutes for the NVMEMs to synchronize.
  - If the command fails because of an NDMP, SnapMirror, or SnapVault process, disable the process. See the appropriate Documentation Center for more information.
5. Wait 3 minutes and check the failover status with the `storage failover show` command.
6. At the clustershell prompt, enter the `net int show -is-home false` command to list the logical interfaces that are not on their home node and port.
- If any interfaces are listed as `false`, revert those interfaces back to their home port using the `net int revert` command.
7. Move the console cable to the target node and run the `version -v` command to check the ONTAP versions.
8. Restore automatic giveback if you disabled it by using the `storage failover modify -node local -auto-giveback true` command.
9. Use the `storage encryption disk show` at the clustershell prompt, to review the output.
10. Use the `security key-manager key query` command to display the key IDs of the authentication keys that are stored on the key management servers.

- If the `Restored` column = `yes/true`, you are done and can proceed to complete the replacement process.
- If the `Key Manager type` = `external` and the `Restored` column = anything other than `yes/true`, use the `security key-manager external restore` command to restore the key IDs of the authentication keys.



If the command fails, contact Customer Support.

- If the `Key Manager type` = `onboard` and the `Restored` column = anything other than `yes/true`, use the `security key-manager onboard sync` command to re-sync the Key Manager type.

Use the `security key-manager key query` command to verify that the Restored column = `yes/true` for all authentication keys.

11. Connect the console cable to the partner node.
12. Give back the node using the `storage failover giveback -fromnode local` command.
13. Restore automatic giveback if you disabled it by using the `storage failover modify -node local -auto-giveback true` command.

## Return the failed part to NetApp - AFF C190

After you replace the part, you can return the failed part to NetApp, as described in the RMA instructions shipped with the kit. Contact technical support at [NetApp Support](#), 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific) if you need the RMA number or additional help with the replacement procedure.

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